List of Course Outcome

Academic year 2020-21

1.First year of Engineering

2.Computer Engineering

3.Electronics and Telecommunication

4.Mechanical Engineering

5.Information Technology

6.Electrical Engineering

7.Master of Business Administration

8.Master of computer Application

JAYAWANT SHIKSHAN PRASARAK MANDAL's
Jayawantrao Sawant College of Engineering
(Approved by AICTE, New Delhi, Govt of Maharashtra and Affiliated to University of Pune)
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Prof.Dr.T.J.Sawant
D.E.E., B.E.(Electrical), MISTE,Ph.D
FOUNDER SECRETARY

Dr. Rajendra D. Kanphade
M.E. Ph.D. (Electronics Engg.)
LMISTE, FIETE, SMIEEE
Principal

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.

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.

DEPARTMENT OF ENGINEERING SCIENCES

Course Outcomes

Academic Year 2020-21

Class: FE

Course: Engineering Mathematics I **Course Code: 107001**

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

CO 1	Mean value theorems and its generalizations leading to Taylors and Maclaurin's series useful in the analysis of engineering problems.
CO 2	the Fourier series representation and harmonic analysis for design and analysis of periodic continuous and discrete systems.
CO 3	to deal with derivatives of functions of several variables that are essential in various branches of Engineering.
CO 4	to apply the concept of Jacobian to find partial derivatives of implicit function and functional dependence. Use of partial derivatives in estimating error and approximation and finding extreme values of the function.
CO 5	the essential tool of matrices and linear algebra in a comprehensive manner for analysis of system of linear equations, finding linear and orthogonal transformations, Eigen values and Eigen vectors applicable to engineering problems

Course: Engineering Physics **Course Code: 107002**

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

CO 1	Develop understanding of interference, diffraction and polarization; connect it to few engineering applications.
CO 2	Learn basics of lasers and optical fibers and their use in some applications.
CO 3	Understand concepts and principles in quantum mechanics. Relate them to some applications.
CO 4	Understand the theory of semiconductors and their applications in some semiconductor devices.
CO 5	Summarize basics of magnetism and superconductivity. Explore a few of their technological applications.
CO 6	Comprehend use of concepts of physics for Non Destructive Testing. Learn some properties of nanomaterials and their application.

Course: Engineering Chemistry **Course Code: 107009**

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

CO 1	Apply the different methodologies for analysis of water and techniques

	involved in softening of water as a commodity.
CO 2	Select appropriate electro-technique and method of material analysis.
CO 3	Demonstrate the knowledge of advanced engineering materials for various engineering applications.
CO 4	Analyze fuel and suggest use of alternative fuels.
CO 5	Identify chemical compounds based on their structure.
CO 6	Explain causes of corrosion and methods for minimizing corrosion.

Course: Systems in Mechanical Engineering **Course Code: 102003**

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

CO 1	Describe and compare the conversion of energy from renewable and non-renewable energy sources.
CO 2	Explain basic laws of thermodynamics, heat transfer and their applications.
CO 3	List down the types of road vehicles and their specifications.
CO 4	Illustrate various basic parts and transmission system of a road vehicle.

CO 5	Discuss several manufacturing processes and identify the suitable process.
CO 6	Explain various types of mechanism and its application.

Course: Basic Electrical Engineering **Course Code: 103004**

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

CO 1	Differentiate between electrical and magnetic circuits and derive mathematical relation for self and mutual inductance along with coupling effect.
CO 2	Calculate series, parallel and composite capacitor as well as characteristics parameters of alternating quantity and phasor arithmetic.
CO 3	Derive expression for impedance, current, power in series and parallel RLC circuit with AC supply along with phasor diagram.
CO 4	Relate phase and line electrical quantities in polyphase networks, demonstrate the operation of single phase transformer and calculate efficiency and regulation at different loading conditions.
CO 5	Apply and analyze the resistive circuits using star-delta conversion KVL, KCL and different network theorems under DC supply.
CO 6	Evaluate work, power, energy relations and suggest various batteries for different applications, concept of charging and discharging and depth of charge.

Course: Basic Electronics Engineering **Course Code: 104010**

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

CO 1	Explain the working of P-N junction diode and its circuits.
CO 2	Identify types of diodes and plot their characteristics and also can compare BJT with MOSFET.
CO 3	Build and test analog circuits using OPAMP and digital circuits using universal/basic gates and flip flops.
CO 4	Use different electronics measuring instruments to measure various electrical parameters.
CO 5	Select sensors for specific applications.
CO 6	Describe basic principles of communication systems.

Course: Programming & Program Solving **Course Code: 110005**

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

CO 1	Inculcate and apply various skills in problem solving.

CO 2	Choose most appropriate programming constructs and features to solve the problems in diversified domains.
CO 3	Exhibit the programming skills for the problems those require the writing of well- documented programs including use of the logical constructs of language, Python.
CO 4	Demonstrate significant experience with the Python program development environment.

Course: Engineering Mechanics **Course Code: 101011**

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

CO 1	determine resultant of various force systems.
CO 2	determine centroid, moment of inertia and solve problems related to friction.
CO 3	determine beam reactions, calculate forces in cables using principles of equilibrium.
CO 4	solve trusses, frames for finding member forces and apply principles of equilibrium to forces in space.
CO 5	calculate position, velocity and acceleration of particle using principles of kinematics.

CO 6	calculate position, velocity and acceleration of particle using principles of kinetics and Work, Power, Energy.

Course: Audit Course I (Environmental Studies I) **Course Code: 101007**

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

CO 1	Demonstrate an integrative approach to environmental issues with a focus on sustainability.
CO 2	Explain and identify the role of the organism in energy transfers in different ecosystems.
CO 3	Distinguish between and provide examples of renewable and nonrenewable resources & analyze personal consumption of resources.
CO 4	Identify key threats to biodiversity and develop appropriate policy options for conserving biodiversity in different settings.

Course: Workshop Practice **Course Code: 111006**

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

CO 1	Familiar with safety norms to prevent any mishap in workshop.

CO 2	Able to handle appropriate hand tool, cutting tool and machine tools to manufacture a job.
CO 3	Able to understand the construction, working and functions of machine tools and their parts.
CO 4	Able to know simple operations (Turning and Facing) on a centre lathe.

Course: Engineering Mathematics II **Course Code: 107008**

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

CO 1	the effective mathematical tools for solutions of first order differential equations that model physical processes such as Newton's law of cooling, electrical circuit, rectilinear motion, mass spring systems, heat transfer etc.
CO 2	advanced integration techniques such as Reduction formulae, Beta functions, Gamma functions, Differentiation under integral sign and Error functions needed in evaluating multiple integrals and their applications.
CO 3	to trace the curve for a given equation and measure arc length of various curves.
CO 4	the concepts of solid geometry using equations of sphere, cone and cylinder in a comprehensive manner.
CO 5	evaluation of multiple integrals and its application to find area bounded by curves, volume bounded by surfaces, Centre of gravity and Moment of

	inertia.

Course: Engineering Graphics **Course Code: 102012**

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

CO 1	Draw the fundamental engineering objects using basic rules and able to construct the simple geometries.
CO 2	Construct the various engineering curves using the drawing instruments.
CO 3	Apply the concept of orthographic projection of an object to draw several 2D views and its sectional views for visualizing the physical state of the object.
CO 4	Apply the visualization skill to draw a simple isometric projection from given orthographic views precisely using drawing equipment.
CO 5	Draw the development of lateral surfaces for cut section of geometrical solids.
CO 6	Draw fully-dimensioned 2D, 3D drawings using computer aided drafting tools.

Course: Project Based Learning **Course Code: 110013**

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

CO 1	Project based learning will increase their capacity and learning through shared cognition.
CO 2	Students able to draw on lessons from several disciplines and apply them in practical way.
CO 3	Learning by doing approach in PBL will promote long-term retention of material and replicable skill, as well as improve teachers' and students' attitudes towards learning.

Course: Audit Course II (Environmental Studies II) **Course Code: 101014**

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

CO 1	Have an understanding of environmental pollution and the science behind those problems and potential solutions.
CO 2	Have knowledge of various acts and laws and will be able to identify the industries that are violating these rules.
CO 3	Assess the impact of ever increasing human population on the biosphere: social, economic issues and role of humans in conservation of natural resources.
CO 4	Learn skills required to research and analyze environmental issues scientifically and learn how to use those skills in applied situations such as careers that may involve environmental problems and/or issues.

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

Course Outcomes

Academic Year 2020-21

C201	Discrete Mathematics
C201.1	**Formulate** problems precisely, solve the problems, apply formal proof techniques, and explain the reasoning clearly.
C201.2	**Apply** appropriate mathematical concepts and skills to solve problems in both familiar and unfamiliar situations including those in real-life contexts.
C201.3	**Design and analyze** real world engineering problems by applying set theory, propositional logic and to construct proofs using mathematical induction.
C201.4	**Specify, manipulate and apply** equivalence relations; construct and use functions and apply these concepts to solve new problems
C201.5	**Calculate** numbers of possible outcomes using permutations and combinations; to model and analyze computational processes using combinatorics.
C201.6	**Model and solve** computing problem using tree and graph and solve problems using appropriate algorithms.
C201.7	**Analyze** the properties of binary operations, apply abstract algebra in coding theory and evaluate the algebraic structures**.**

C202	Fundamentals Of Data Structures
C202.1	**Design** the algorithms to solve the programming problems, **identify** appropriate algorithmic strategy for specific application, and **analyze** the time and space complexity.
C202.2	**Discriminate** the usage of various structures, **Design/Program/Implement** the appropriate data structures; use them in implementations of abstract data types and Identity the appropriate data structure in approaching the problem solution
C202.3	**Demonstrate** use of sequential data structures- Array and Linked lists to store and process data.
C204.4	**Understand** the computational efficiency of the principal algorithms for searching and sorting and choose the most efficient one for the application.
C202.5	**Compare** and **contrast** different implementations of data structures (dynamic and static).
C202.6	**Understand, Implement and apply** principles of data structures-stack and queue to solve computational problems.

C203	Object Oriented Programming
C203.1	**Apply** constructs- sequence, selection and iteration; classes and objects, inheritance, use of predefined classes from libraries while developing software.
C203.2	**Design** object-oriented solutions for small systems involving multiple objects.

C203.3	**Use** virtual and pure virtual function and complex programming situations.
C203.4	**Apply** object-oriented software principles in problem solving.
C203.5	**Analyze** the strengths of object-oriented programming.
C203.6	**Develop** the application using object oriented programming language(C++).

C204	**Computer Graphics**
C204.1	**Identify** the basic terminologies of Computer Graphics and interpret the mathematical foundation of the concepts of computer graphics.
C204.2	**Apply** mathematics to develop Computer programs for elementary graphic operations
C204.3	**llustrate** the concepts of windowing and clipping and **apply** various algorithms to fill and clip polygons.
C204.4	**Understand** and **apply** the core concepts of computer graphics, including transformation in two and three dimensions, viewing and projection.
C204.5	**Understand** the concepts of color models, lighting, shading models and hidden surface elimination.
C204.6	**Create** effective programs using concepts of curves, fractals, animation and gaming.

C205	Digital Electronics and Logic Design
C205.1	**Simplify** Boolean Expressions using K Map
C205.2	**Design and implement** combinational circuits.
C205.3	**Design and implement** sequential circuits.
C205.4	**Develop** simple real-world application using ASM and PLD
C205.5	**Differentiate and Choose** appropriate logic families IC packages as per the given design specifications
C205.6	**Explain** organization and architecture of computer system

C206	**Data Structure Laboratory**
C206.1	**Use** algorithms on various linear data structure using sequential organization to solve real life problems.
C206.2	**Analyze** problems to **apply** suitable searching and sorting algorithm to various applications
C206.3	**Analyze** problems to **use variants of** linked list and solve various real life problems

C206.4	Designing and implement data structures and algorithms for solving different kinds of problems.

C207	**OOP and Computer Graphics Lab**
C207.1	U**nderstand** and **apply** the concepts like inheritance, polymorphism, exception handling and generic structures for implementing reusable programming codes.
C207.2	**Analyze** the concept of file and **apply** it while storing and retrieving the data from secondary storages.
C207.3	**Analyze** and **apply** computer graphics algorithms for line-circle drawing, scan conversion and filling with the help of object oriented programming concepts.
C207.4	**Understand** the concept of windowing and clipping and **apply** various algorithms to fill and clip polygons.
C207.5	**Apply** logic to implement, curves, fractals, animation and gaming programs.

C208	**Digital Electronics Lab**
C208.1	**Understand** the working of digital electronic circuits.
C208.2	**Apply** the knowledge to appropriate IC as per the design specifications.
C208.3	**Design** and **implement** Sequential and Combinational digital circuits as per the specifications

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C209	**Business Communication Skills**
C209.1	**Express** effectively through verbal/oral communication and improve listening skills
C209.2	**Write** precise briefs or reports and technical documents.
C209.3	**Prepare** for group discussion / meetings / interviews and presentations
C209.4	**Explore** goal/target setting, self-motivation and practicing creative thinking.
C209.5	**Operate** effectively in multi-disciplinary and heterogeneous teams through the knowledge of team work, Inter-personal relationships, conflict management and leadership qualities.

C210	Humanity and Social Science
C210.1	**Aware** of the various issues concerning humans and society.
C210.2	**Aware** about their responsibilities towards society.
C210.3	Sensitized about broader issues regarding the social, cultural, economic and human aspects, involved in social changes.
C210.4	**Able** to understand the nature of the individual and the relationship between self and the community.
C210.5	**Able** to understand major ideas, values, beliefs, and experiences that have shaped human history and cultures.

C210	Audit Course -3 Smart Cities
C210.1	**Understand** the dynamic behavior of the urban system by going beyond the physical appearance and by focusing on representations, properties and impact factors
C210.2	**Explore** the city as the most complex human-made organism with a metabolism that can be modeled in terms of stocks and flows
C210.3	**Knowledge** about data-informed approaches for the development of the future city, based on crowd sourcing and sensing
C210.4	**Knowledge** about the latest research results in for the development and management of future cities
C210.5	**Understand** how citizens can benefit from data-informed design to develop smart and responsive cities

C211	Engineering Mathematics-III
C211.1	Solve Linear differential equations, essential in modelling and design of computer-based systems.
C211.2	Apply concept of Fourier transform and Z-transform and its applications to continuous and discrete systems and image processing.
C211.3	Apply Statistical methods like correlation and regression analysis and probability theory for data analysis and predictions in machine learning.
C211.4	Solve Algebraic and Transcendental equations and System of linear equations using numerical techniques.
C211.5	Obtain Interpolating polynomials, numerical differentiation and integration, numerical solutions of ordinary differential equations used in modern scientific computing.

C212	Data Structures and Algorithm
C212.1	**Identify and articulate** the complexity goals and benefits of a good hashing scheme for real- world applications.

C212.2	**Apply** non-linear data structures for solving problems of various domain.
C212.3	**Design and specify** the operations of a nonlinear-based abstract data type and implement them in a high-level programming language.
C212.4	**Analyze** the algorithmic solutions for resource requirements and optimization
C212.5	**Use** efficient indexing methods and multiway search techniques to store and maintain data.
C212.6	U**se** appropriate modern tools to understand and analyze the functionalities confined to the secondary storage.

C213	Software Engineering
C213.1	**Analyze** software requirements and formulate design solution for a software.
C213.2	**Design** applicable solutions in one or more application domains using software engineering approaches that integrate ethical, social, legal and economic concerns
C213.3	**Apply** new software models, techniques and technologies to bring out innovative and novelistic solutions for the growth of the society in all aspects and evolving into their continuous professional development.
C213.4	**Model** and design User interface and component-level.
C213.5	**Identify** and handle risk management and software configuration management.
C213.6	**Utilize** knowledge of software testing approaches, approaches to verification and validation.
C213.7	**Construct** software of high quality – software that is reliable, and that is reasonably easy to understand, modify and maintain efficient, reliable, robust and cost-effective software solutions.

C214	Microprocessor
C214.1	**E**xhibit skill of assembly language programming for the application.
C214.2	**Classify** Processor architectures.
C214.3	**Illustrate** advanced features of 80386 Microprocessor.
C214.4	**Compare** and **contrast** different processor modes.
C214.5	**Use** interrupts mechanism in applications
C214.6	**Differentiate** between Microprocessors and Microcontrollers
C214.7	**Identify** and **analyze** the tools and techniques used to design, implement, and debug microprocessor-based systems

C215	Principles of Programming Languages
C215.1	**Make** use of basic principles of programming languages.
C215.2	**Develop** a program with Data representation and Computations
C215.3	**Develop** programs using Object Oriented Programming language : Java.
C215.4	**Develop** application using inheritance, encapsulation, and polymorphism.
C215.5	**Demonstrate** Multithreading for robust application development.

C215.6	**Develop** a simple program using basic concepts of Functional and Logical programming paradigm

C216	**Data Structures and Algorithms Lab**
C216.1	**Understand** the ADT/libraries, hash tables and dictionary to design algorithms for a specific problem.
C216.2	Choose most appropriate data structures and **apply** algorithms for graphical solutions of the problems.
C216.3	**Apply** and **analyze** non linear data structures to solve real world complex problems.
C216.4	**Apply** and **analyze** algorithm design techniques for indexing, sorting, multi-way searching, file organization and compression.
C216.5	**Analyze** the efficiency of most appropriate data structure for creating efficient solutions for engineering design situations

C217	**Microprocessor Lab**
C217.1	**Understand** and **apply** various addressing modes and instruction set to implement assembly language programs
C217.2	**Apply** logic to **implement** code conversion
C217.3	**Analyze** and **apply** logic to **demonstrate** processor mode of operation

C218	**Project Based Learning -II**
C218.1	Identify the real life problem from societal need point of view
C218.2	Choose and compare alternative approaches to select most feasible one
C218.3	Analyze and synthesize the identified problem from technological perspective
C218.4	Design the reliable and scalable solution to meet challenges
C218.5	Evaluate the solution based on the criteria specified
C218.6	Inculcate long life learning attitude towards the societal problems

C219	**Code Of Conduct**
C219.1	**Understand** the basic perception of profession, professional ethics, various moral and social issues, industrial standards, code of ethics and role of professional ethics in engineering field.
C219.2	**Aware** of professional rights and responsibilities of an engineer,

	responsibilities of an engineer for safety and risk benefit analysis.
C219.3	**Understand** the impact of the professional Engineering solutions in societal and Environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
C219.4	**Acquire** knowledge about various roles of engineers in variety of global issues and able to apply ethical principles to resolve situations that arise in their professional lives.

C219	**Audit Course –IV (The Science Of Happiness)**
C219.1	**Understand** what happiness is and why it matters to you
C219.2	**Learn** how to increase your own happiness
C219.3	**Understand** of the power of social connections and the science of empathy
C219.4	**Understand** what is mindfulness and its real world applications

C301	**Theory of computation**
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
C302	**Database Management Systems**
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
	SoftwareEngineering&ProjectManagement
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	**Information Systems &Engineering Economics**
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
C305	**Computer Networks**
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.
C306	**Skill Development Lab**
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.
C308	**Computer Networks Lab**
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 communication
C308.4	Illustrate Client-Server architectures and prototypes by the means of correct standards and technology
C308.5	Demonstrate different routing and switching algorithms
C309	**Design and Analysis of Algorithms**
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.
C310	**Systems Programming and Operating System**
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.
C311	**Embedded Systems and Internet of Things**
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
C312	**Software Modelling and Design**
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 Static modeling 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
C313	**WebTechnology**
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
C314	**Seminar and Technical Communication**
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

C315	**WebTechnology Lab**
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
C316	**Systems Programming & Operating System Lab**
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.
C317	**Embedded Systems &Internet of Things Lab**
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

C410	**High Performance Computing**
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
C402	**Artificial Intelligence and Robotics**
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.
C403	**Data Analytics**
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
C404	**Elective-I:Data Mining and Warehousing**
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
C405	**Elective –II Mobile Computing**
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.
C408	**Project Work Stage–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
C409	**Machine Learning**
C409.1	Distinguish different learning based applications
C409.2	Apply different pre-processing 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
C410	**Information and Cyber Security**
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.
C411	**Elective III-ERTOS**
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
C412	**Compiler construction**
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
C413	**ProjectWorkStage–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

C414	**Laboratory Practice III**
C414.1	Analyzethedatasetandapply differentsupervisedlearningtechniques.
C414.2	Analyzethedatasetandapply differentunsupervisedlearningtechniques.
C414.3	Applystandardencryptiontechniquestoprovidesecurity.
C414.4	Applyanalgorithmforauthenticationandconfidentiality.

C415	**Laboratory Practice IV**
C415.1	Applyvarioussoftcomputingmethodologies./ConstructLexicalanalyzerandParsers usingLEXandYACC tools.
C415.2	Makeuseofswarmintelligencealgorithmstosolverealworldproblems./Makeuseof various codeoptimizationandgenerationalgorithms to buildthecompiler.
C415.3	MakeuseofBAItechniquestoanalyzethedata./DesignandDevelopcloud applicationsforthegivenproblem.
C415.4	AnalyzetheoutputgeneratedbytheprocessofBusinessIntelligence./Analyzethecomponentsof Openstack,GoogleCloudPlatform,AmazonWebServices,Microsoft Azure.

C409	**Audit Course5(AC5:VI-MOOC-LearnNewSkill)**
C409.1	Apply the acquired knowledge for product development.
C409.2	Make use of modern technologies for development of applications.
C409.3	Recognize the need and engage in independent learning.

DEPARTMENT OF ELECTRONICS AND TELECOMMUNICATION ENGINEERING

PROGRAM SPECIFIC OUTCOME (PSOs)

PSO1: To gain proficiency in designing the communication systems for engineering applications.
PSO2. To apply the knowledge of design and development to the electronic systems based on VLSI and embedded technology.
PSO3. To integrate automation of the processes with the support of hardware.
PSO4. To develop software programs for simulation and implementation in the process of solving multidisciplinary engineering problems

Course Outcomes

Academic Year 2020-21

C201	Engineering Mathematics III
C201.1	Apply higher order linear differential equations to model and solving LCR circuit problems.
C201.2	Solve problems related to Fourier transform, Z-transform and applications to Communication systems and Signal processing.
C201.3	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.
C201.4	Solve vector differentiation problems, analyze the vector fields
C201.5	Apply the theorems for vector integral calculus problems and Electro-Magnetic fields.
C201.6	Determine conformal mappings, transformations and perform contour integration of complex functions in the study of electrostatics and signal processing.

C202	Electronic Circuits
C202.1	Understand the physics, characteristics and parameters of MOSFET towards its application as an amplifier.
C202.2	Design MOSFET amplifiers, with and without feedback, MOSFET oscillators, for given Specifications.
C202.3	Analyze and assess the performance of linear and switching regulators, with their variants, towards applications in regulated power supplies.
C204.4	Understand schematic of Op-Amp and define its performance parameters.
C202.5	Design, Build and test Op-amp based analog signal processing and conditioning circuits towards various real time applications.
C202.6	Compare the principles of various data conversion techniques and PLL with their applications.

C203	Digital Circuits
C203.1	Interpret the types of digital logic families for the effective design of the electronic system.
C203.2	Use the basic logic gates and various reduction techniques of the digital logic circuit
C203.3	Design combinational circuits using knowledge of Boolean algebra.
C203.4	Construct Sequential Circuits.
C203.5	Demonstrate the concept of FSM and ASM for digital electronics applications.
C203.6	Apply the knowledge of combinational and sequential logic design for complex digital circuits.

C204	Electrical Circuits
C204.1	Analyze behavior of the simple DC and AC circuit with different circuit simplification techniques.
C204.2	Formulate first order or second order differential equations of driven and source free RL, RC and series RLC circuits to determine network parameters.
C204.3	Analyze two port networks in time domain and s-domain
C204.4	Differentiating DC motors and Generators based on their working principle and characteristics.
C204.5	Understand induction motors construction, working and characteristics.
C204.6	Study of construction and working of special function motors

C205	Data structures
C205.1	An ability to identify the appropriate data structure to enhance programming skill by applying knowledge of basic data structures.
C205.2	Classify several searching and sorting methods to analyze and interpret the data with the help of time and space complexity.
C205.3	Evaluate mathematical expression to solve engineering problems for industry & research.
C205.4	Implementation of data to provide flexibility in programming.
C205.5	Organization of composite data to solve the problems by demonstrating non-linear data structures.
C205.6	An ability to select an appropriate algorithm to satisfy eco-social needs and safety.

C206	Electronic Skill Development
C206.1	Apply minimization techniques to design Combinational and Sequential digital circuits.
C206.2	Analyze and design Algorithmic State Machines and VHDL circuits.
C206.3	Explain and classify Logic families.
C206.4	Draw combinational circuits using PLDs.
C206.5	Illustrate architecture of Microcontroller 8051 and Programming Model.

C207	Signals & Systems
C207.1	Analyze classification of systems with mathematical expressions and operate continuous and discrete time signals.
C207.2	Formulate input output relationship for LTI systems and interpret system response with convolution.
C207.3	Evaluate the signals in frequency domain using Fourier series and Fourier

	transform.
C207.4	Resolve the signals in complex frequency domain using Laplace Transform and develop the ability to analyze system by using properties.
C207.5	Compute the probability of a given event, model, probability functions CDF and PDF.

C208	**Control Systems**
C208.1	Determine physical system in suitable form for analysis of control system.
C208.2	Understand the stability of a closed-loop control system.
C208.3	Apply time domain parameters for control systems analysis.
C208.4	Inspect control systems stability in frequency domain.
C208.5	Express system equations in state variable form.
C208.6	Introduce controllers and digital control system.
C209	**Principles of Communication Systems**
C209.1	To compute & compare the bandwidth and transmission power requirements by analyzing time and frequency domain spectra of signal required for modulation schemes under study.
C209.2	Describe and analyze the techniques of generation, transmission and reception of Amplitude Modulation Systems.
C209.3	Explain generation and detection of FM systems and compare with AM systems.
C209.4	Exhibit the importance of Sampling Theorem and correlate with Pulse Modulation technique (PAM, PWM, and PPM).
C209.5	Characterize the quantization process and elaborate digital representation techniques (PCM, DPCM, DM and ADM).
C209.6	Illustrate waveform coding, multiplexing and synchronization techniques and articulate their importance in baseband digital transmission.
C210	**Object Oriented Programming**
C210.1	Describe the principles of object-oriented programming
C210.2	Describe the principles of object-oriented programming. CO2: Apply the concepts of data encapsulation, inheritance in C++.
C210.3	Understand Operator overloading and friend functions in C++.
C210.4	Apply the concepts of classes, methods inheritance and polymorphism to write programs C++.
C210.5	Apply Templates, Namespaces and Exception Handling concepts to write programs in C++.
C210.6	Describe and use of File handling in C++.
C211	**Data Analytics Lab**
C211.1	Understand the fundamentals of data science.

C211.2	Introduce various Python packages related to data science.
C211.3	Explore Python programs related to data sequences using NumPy and Pandas.
C211.4	Carry out Python programs related to data frames using NumPy and Pandas.

C212	**Employability Skills Development**
C212.1	Define personal and career goals using introspective skills and SWOC assessment. Outline and evaluate short-term and long-term goals.
C212.2	Develop effective communication skills (listening, reading, writing, and speaking), self-management attributes, problem solving abilities and team working & building capabilities in order to fetch employment opportunities and further succeed in the workplace.
C212.3	Be a part of a multi-cultural professional environment and work effectively by enhancing inter-personal relationships, conflict management and leadership skills
C212.4	Comprehend the importance of professional ethics, etiquettes & morals and demonstrate sensitivity towards it throughout certified career
C212.5	Develop practically deployable skill set involving critical thinking, effective presentations and leadership qualities to hone the opportunities of employability and excel in the professional environment
C213	**Project Based Learning**
C213.1	: Identify the real-world problem (possibly of interdisciplinary nature) through a rigorous literature survey and formulate / set relevant aim and objectives.
C213.2	Contribute to society through proposed solution by strictly following professional ethics and safety measures.
C213.3	Propose a suitable solution based on the fundamentals of electronics and communication engineering by possibly the integration of previously acquired knowledge
C213.4	Analyze the results and arrive at valid conclusion.
C213.5	Use of technology in proposed work and demonstrate learning in oral and written form
C213.6	Develop ability to work as an individual and as a team member.

C301	**Digital Communication**
C301.1	Demonstrate the use of source coding methods for audio signal transmission
C301.2	Analyze the channel blocks for digital communication systems
C301.3	Determine impact of random noise in digital communication system
C301.4	Categorize the baseband receivers for received input based on signal to noise ratio and bit error probability
C301.5	Distinguish between passband receivers for bandwidth and symbol rate
C301.6	Illustrate the use of spread spectrum technology for digital communication systems
C302	**Digital Signal Processing**
C302.1	Identify concept of sampling and orthogonality and mapping between analog to digital domain.
C302.2	Carryout DT signal and system using DFT and its significance and problem related to computational complexity.
C302.3	Test DTLTI system using Z transform by applying its properties.
C302.4	Construct digital IIR filter for given filter specifications.
C302.5	Design digital FIR filter to meet specific magnitude and linear phase requirements.
C302.6	Discuss different DSP applications.
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
C304	**Microcontrollers**
C304.1	Explain the architecture, features & peripheral support of PIC microcontroller.
C304.2	Interpret Input Output port interfacing & programming environment of PIC microcontroller.
C304.3	Simulate small embedded application for PIC microcontroller using assembly language programming.
C304.4	Understand the architecture, features & peripheral support of PIC microcontroller.
C304.5	Describe interfacings with PIC microcontroller using port structure & interrupt structure.
C304.6	Simulate small embedded application for PIC microcontroller using embedded C.
C305	**Mechatronics**

C305.1	Understand basic elements of mechatronics system and its characterization.
C305.2	Categorize different types of sensors and transducers and their selection as per need of application.
C305.3	Identify the hydraulic actuators for hydraulic system applications.
C305.4	Illustrate pneumatic actuators and their use for pneumatic system applications.
C305.5	Discuss electric, electro-mechanical actuators including their parameter consideration.
C305.6	Apply the knowledge of mechatronics elements in automobile applications.
C306	**Skill Development Lab**
C306.1	Describe the fundamentals of electrical measuring instruments with specifications, features and capabilities of electronic instruments.
C306.2	Exemplify an instrument for given measurements.
C306.3	Illustrate the required measurements using various instrument setups.
C306.4	Analyze the appropriate instrument for interpret the measurement of electrical parameters professionally.
C307	**Power Electronics**
C307.1	Understand the construction and working of power devices with their gate driving circuits.
C307.2	Analyze types of single phase & three phase controlled rectifiers (AC to DC Converters).
C307.3	Illustrate single phase & three phase controlled Inverters (DC to AC Converters).
C307.4	Examine the types of choppers & AC voltage controller.
C307.5	Distinguish resonant converters & protection circuits.
C307.6	Infer the types of UPS and different motor drives.
C308	**ITCCN**
C308.1	Perform information theoretic analysis of communication system specifically for data compression by means of source coding techniques.
C308.2	Evaluate channel coding techniques for error detection and correction in communication system and computer network.
C308.3	Design cyclic codes and encoder-decoder circuits by understanding the Galois field arithmetic.
C308.4	Comprehend fundamental principles of data communication and networking.
C308.5	Understand the flow and error control techniques in communication network.
C309	**Business Management**
C309.1	Illustrate fundamentals of Management thoughts, vital for understanding the conceptual frame work of Business Management as a discipline.
C309.2	Evaluate quality assessment tools for project development.
C309.3	Analyze financial of Project Management process for execution of ideas.

C309.4	Demonstrate role & responsibilities of best suitable HR organization. professional to acquire human resource for an
C309.5	Develop Entrepreneurship skills.
C309.6	Understand different Marketing environment & consumer behaviors.
C310	**Advanced Processor**
C310.1	Relate the ARM microprocessor architecture & DSP architecture to recognize its applications.
C310.2	Utilize advanced peripherals to interface with ARM based microcontrollers
C310.3	Develop an Embedded System to solve real time problems.
C310.4	Make use of DSP Processors and resources for signal processing.
C311	**Systems Programming and Operating System**
C311.1	Utilize the components of system software for implementation of assembler and macro processor
C311.2	Understand system software concepts as linker, loader and compilers
C311.3	Classify the Operating Systems with the knowledge of its fundamentals.
C311.4	Infer concurrency controls in OS
C311.5	Evaluate different memory management schemes
C311.6	Illustrate the IO and file management policies.
C312	**Mini Project**
C312.1	Understand, plan and execute a Mini Project with team.
C312.2	Implement electronic hardware by learning PCB artwork design, soldering techniques, testing and troubleshooting etc.
C312.3	Prepare a technical report based on the Mini project.
C312.4	Deliver technical seminar based on the Mini Project work carried out.

C401	**VLSI Design & Technology**
C401.1	Implement digital system design modules using VHDL coding.
C401.2	Determine adequacy of efficient VHDL modeling by focusing design issues
C401.3	Understand architectures to model digital circuit with simulate, synthesis & prototype in CPLD/FPGA.
C401.4	Design digital CMOS circuit to estimate chip area, power & speed.
C401.5	Analyze issues & constraints in ASIC Design
C401.6	Apply testing methodology in digital design and built self test circuit.
C402	**Computer Network**

C402.1	Understand MAC protocols and basic principles of wired & wireless LANs.
C402.2	Describe and analyze the Network layer services and its performance, IP protocol, IP Packet forwarding techniques, IPv4 and Mobile IP.
C402.3	Summarize unicast & multicast network routing algorithms and explain IGMP & IPv6 protocols.
C402.4	Compare transport layer protocols and evaluate their performance.
C402.5	Explain the concept of C-S Model for HTTP, DNS, FTP, DHCP, Email and Telnet using Windows XP/2003 Server systems applications.
C402.6	Discuss the concept of cryptography and elaborate network& internet security.
C403	**RMT**
C403.1	Explain different terminologies of radiating elements to analyze various performance parameters.
C403.2	Analyze different antenna to evaluate array factor for antenna array.
C403.3	Implement different modes of transmission lines during the wave propagation.
C403.4	Design microwave communication network by using passive microwave components.
C403.5	Generate the electromagnetic waves with the help of microwave tubes and solid state devices.
C403.6	Measurements for different microwave parameters of microwave test bench.
C404	**Elective-I: Internet of Things**
C404.1	Understand the architecture and basic knowledge of IoT systems.
C404.2	Interface sensors and actuators to IoT on WSN platform.
C404.3	Apply wireless technology and IP based protocols for design of IoT systems.
C404.4	Use data storage techniques in IoT systems.
C404.5	Implement applications of IoT for betterment of society.
C405	**Elective-II: Electronic Product Design**
C405.1	Illustrate the stages of product design aspects.
C405.2	Identify the basic requirements for hardware design & testing methods using product parameters.
C405.3	Use the appropriate software platform for the testing & real time Programming.
C405.4	Understand the PCB design techniques.
C405.5	Test & debug the designed electronics product.
C405.6	Recognize the importance of Preparation, Presentation, and Preservation of product documents.
C406	**Mobile Communication**
C406.1	Illustrate switching techniques for voice and data traffic.
C406.2	Evaluate the performance parameters in traffic engineering.
C406.3	Demonstrate basic concepts of cellular network & propagation mechanism.
C406.4	Interpret GSM network and its applications.
C406.5	Infer data transmission in GSM & its services.

C406.6	Understand evolution of GSM & CDMA technologies
C407	**Broadband Communication Systems**
C407.1	Describe the primary components fiber optical communication systems.
C407.2	Design Link power budget and Rise Time Budget by proper selection of components and check its viability.
C413.3	Understand the role of WDM components in advanced fiber optical communication systems.
C407.4	Analyze various launching techniques and orbital mechanisms to get communication system as per engineering norms
C407.5	Identify various satellite subsystems to meet the socio economic challenges
C407.6	Design and analyze satellite link for sustainable satellite communication
C408	**PLC and Automation**
C408.1	Analyze the type of control system for their selection in process industry.
C408.2	Design a signal conditioning circuit as per the sensor interface requirement.
C408.3	Discover the need of various controller modes and actuators for applications in multi-disciplinary process and environment.
C408.4	Interpret PLC architectures and modern communication technology for various industrial systems by comparing them.
C408.5	Implement a SCADA and HMI system for automation applications.
C408.6	Understand CNC Machine tools and process.
C409	**Audio Video Engineering**
C409.1	Understand the concept of color television along with standards
C409.2	Describe the digital TV, Digital Video Compression Techniques and LED, LCD Display Devices
C409.3	Analyze advanced television systems- HD TV, IP TV, Mobile TV, Wi-Fi TV,3D TV and digital broadcasting
C409.4	Interpret audio recording systems and acoustics principles
C410	**Wireless Sensor Network**
C410.1	Understand Wireless Sensor Network different concepts and terminologies.
C410.2	Recognize use of Radio Communication and importance of Link Management in WSN
C410.3	Illustrate various wireless standards and protocols associated with Wireless Sensor Network
C410.4	Identify Localization concept and Routing Techniques used in WSN
C410.5	Explain various techniques of Data Aggregation and importance of security in Wireless Sensor Network
C410.6	Monitor and coordinate the issues involved in design and deployment of Wireless Sensor Network
C411	**Project**
C411.1	Understand the problems in society, organization or industry and through literature survey and apply engineering knowledge to convert it into open ended problem statement.
C411.2	Select appropriate techniques, resources and modern engineering tools to demonstrate and interpret the said work through proper documentation.

C411.3	Design, analyze and evaluate the performance of the real time system with consideration of the ethical, societal and environmental approach.
C411.4	Communicate effectively on designed system through presentation report writing with proper product management and finance aspects.

Department of Electrical Engineering.

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

201	Power Generation Technologies
CO201.1	Identify components and elaborate working principle of conventional power plants.
CO201.2	Recognize the importance and opportunities of renewable energies.
CO201.3	Calculate and control power output of wind solar, and hydro power plant.
CO201.4	Describe process of grid interconnection of distributed generation and requirements
CO201.5	Interpret the environmental and social impact of various generation technologies.

202	Engineering Mathematics-III
CO202.1	Solve higher order linear differential equation using appropriate techniques to model and analyze electrical circuits.
CO202.2	Apply Integral transforms such as Laplace transform, Fourier transform and Z-Transform to solve problems related to signal processing and control systems.
CO202.3	Apply Statistical methods like correlation, regression and Probability theory as applicable to analyze and interpret experimental data related to energy management, power systems, testing and quality control.
CO202.4	Perform Vector differentiation and integration, analyze the vector fields and apply to wave theory and electro-magnetic fields
CO202.5	Analyze Complex functions, conformal mappings, and perform contour integration in the study of electrostatics, signal and image processing.

203	**Material Science**
CO203.1	Discuss classification, properties and characteristics of different electrical engineering materials.
CO203.2	State various applications measuring methods for parameters of different classes of electrical engineering materials.
CO203.3	Solve simple problems based on dielectric, magnetic and conducting materials.
CO203.4	Apply knowledge of Nano-technology to electrical engineering.
CO203.5	Execute tests ondielectric, insulating, magnetic, conducting, resistive materials as per IS to decide the quality of thematerials.
CO203.6	Create learning resource material ethically to demonstrate **self learning leading to** lifelong learning skills and usage of ICT/ online technology through collaborative/active learning activities.

204	Analog and Digital Electronics
CO204.1	Design logical, sequential and combinational digital circuit using K-Map.
CO204.2	Demonstrate different digital memories and programmable logic families.
CO204.3	Apply and analyze applications of OPAMP in open and closed loop condition.
CO204.4	Design uncontrolled rectifier with given specifications

205	Electrical Measurements and Instrumentation
CO205.1	Define various characteristic and classify measuring instruments along with range extension techniques.
CO205.2	Apply measurement techniques for measurement of resistance, inductance and capacitance.
CO205.3	Demonstrate construction, working principle of electrodynamo type and induction type instruments for measurement of power and energy.
CO205.4	Make use of CRO for measurement of voltage, current and frequency.
CO205.5	Classify transducer and apply it for measurement of physical parameters in real time.

206	**SOFT SKILLS**

CO206.1	Do SWOC analysis
CO206.2	Develop presentation and take part in group discussion.
CO206.3	Understand and implement etiquette 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

207	Power System I
CO207.1	Recognize different patterns of load curve and calculate associated different factors with it and tariff.
CO207.2	Draft specifications of electrical equipment in power station
CO207.3	Design electrical and mechanical aspects in overhead transmission and underground cables.
CO207.4	Evaluate the inductance and capacitance of different transmission line configurations.
CO207.5	Analyse the performance of short and medium transmission lines

208	Electrical Machines I
CO208.1	Evaluate performance parameters of transformer with experimentation and demonstrate construction along with specifications as per standards.
CO208.2	Distinguish between various types of transformer connections as per vector groups with application and to perform parallel operation of single/three phase transformers.
CO208.3	Select and draft specifications of DC machines and Induction motors for various applications along with speed control methods.
CO208.4	Justify the need of starters in electrical machines with merits and demerits
CO208.5	Test and evaluate performance of DC machines and Induction motors as per IS standard

209	Network Analysis
CO209.1	Calculate current/voltage in electrical circuits using simplification techniques, Mesh, Nodal analysis and network theorems.
CO209.2	Analyze the response of RLC circuit with electrical supply in transient and stead state.
CO209.3	Apply Laplace transform to analyze behavior of an electrical circuit.

CO209.4	Derive formula and solve numerical of two port network and Design of filters
CO209.5	Apply knowledge of network theory to find transfer function, poles and zeroes location to perform stability analysis and parallel resonance

210	Numerical Methods and Computer Programming
CO210.1	Demonstrate types of errors in computation and their causes of occurrence.
CO210.2	Calculate root of algebraic and transcendental equations using various methods.
CO210.3	Apply numerical methods for various mathematical problems such as interpolation, numerical differentiation, integration and ordinary differential equation.
CO210.4	Solve linear simultaneous equation using direct and indirect method.
CO210.5	Develop algorithms and write computer programs for various numerical methods

211	Fundamentals of Microcontroller and Applications
CO211.1	Describe the architecture and features of various types of the microcontroller.
CO211.2	Illustrate addressing modes and execute programs in assembly language for the microcontroller.
CO211.3	Write programs in C language for microcontroller 8051
CO211.4	Elaborate interrupt structure of 8051 and program to handle interrupt and ADC809
CO211.5	Define the protocol for serial communication and understand the microcontroller development systems.
CO211.6	Interface input output devices and measure electrical parameters with 8051 in real time.

212	Applications of mathematics in Electrical Engineering
CO212.1	Apply fundamentals of mathematics in solving electrical engineering problem
CO212.2	Analyze complex electrical engineering problem using mathematical techniques
CO212.3	Implement program and simulation for problems in electrical engineering.
CO212.4	Demonstrate self lifelong learning skills with applications of mathematics in electrical engineering through software.

213	Project Based Learning
CO213.1	Identify, formulate, and analyze the simple project problem.
CO213.2	Apply knowledge of mathematics, basic sciences, and electrical engineering fundamentals to develop solutions for the project.
CO213.3	Learn to work in teams, and to plan and carry out different tasks that are required during a project.
CO213.4	Understand their own and their team-mate's strengths and skills.
CO213.5	Draw information from a variety of sources and be able to filter and summarize the relevant points.
CO213.6	Communicate to different audiences in oral, visual, and written forms.

Class: TE

301	Industrial and Technology Management
CO301.1	Understand concepts of Technology management and Quality management.
CO 301.2	Explain importance of quality management and understand use of various assistance tools for quality improvement .
CO 301.3	Differentiate between marketing management and financial management and understand various theories of work motivation and group dynamics .
CO 301.4	Summarize intellectual property rights and understand concept of patent ,copy rights and trademarks .

302	Advance Microcontroller and its Applications
CO302.1	Illustrate architecture of PIC18F458 microcontroller, its instructions and the addressing modes.
CO302.2	Construct 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	Determine the advance features of microcontroller peripherals in electrical system.

303	Electrical Machines II
CO303.1	Apply 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	Investigate 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.

304	Power Electronics
CO304.1	Apply the fundamental principles of power electronic device like SCR and GTO and use them with their triggering circuit, protection circuit.
CO304.2	Describe 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	Analyze single Phase DC to AC inverters and evaluate their performance.
CO304.6	Analyze three Phase DC to AC inverters and evaluate their performance.

305	Electrical Installation, Maintenance and Testing
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.

306	Seminar and Technical Communication
CO306.1	Understand needs of today's world regarding innovations in Electrical engineering.
CO306.2	Improve 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.

307	Power System II
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 .

308	Control System I
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 .

309	Utilization of Electrical Energy
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.

310	Design of Electrical Machines
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

311	Energy Audit and Management
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.

312	Electrical Workshop
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

401	**Power System Operation and Control**
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.

402	**PLC and SCADA Applications**
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

403	Elective-I Power Quality
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.

404	**Elective-II** Restructuring and Deregulation
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

405	**Control System II**
CO405.1	Describe the basic digital control system, sampling and reconstruction .
CO405.2	Express a system in the state space format.
CO405.3	Solve the state equation and familiarize with STM and its properties.
CO405.4	Design a control system using state space techniques including state feedback control and full order observer.

406	**Project I**
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	Analyse methods including design of hardware and using model tools for validation of hardware.

407	**Switchgear and Protection**
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.

408	**Power Electronic Controlled Drives**
CO408.1	To Apply the basic concepts of drive and identify the importance of electrical drives in industries
CO408.2	To Classify the various types of loads and their characteristics in the industries
CO408.3	To solve the basic problems on motor –load dynamics and multiquadrant operation
CO408.4	To Apply electric braking and its types, impart the practical knowledge by solving numericals
CO408.5	To 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

409	**Elective-III- HVDC and FACTS**
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

410	**Elective-IV**Smart Grid
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

411	**Project II**
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 INFORMATION TECHNOLOGY

PROGRAM SPECIFIC OUTCOME (PSOs)

PSO1:

Solve problems in areas like Software Design and Development, ComputerArchitectures and Operating System, web systems, Computer Networks and Database Management Systems to address critical challenges in the field of IT.

PSO2:

Apply skills in Design and Development of Software systems, Operating System, DatabaseManagement, Computer networks and Web Technologies.

PSO3:

Exhibit active participation in multidisciplinary applications.

CourseOutcomes

AcademicYear2020-21

C201	DiscreteMathematics
C201.1	Formulate and apply formal proof techniques and solve the problems with logical reasoning
C201.2	Analyze and evaluate the combinatorial problems by using probability theory.
C201.3	Apply the concepts of graph theory to devise mathematical models
C201.4	Analyze types of relations and functions to provide solution to computational problems.
C201.5	Identify techniques of number theory and its application.
C201.6	Identify fundamental algebraic structures.

C202	Logic Design & Computer Organization
C202.1	Perform basic binary arithmetic & simplify logic expressions.
C202.2	Grasp the operations of logic ICs and Implement combinational logic functions using ICs.
C202.3	Comprehend the operations of basic memory cell types and Implement sequential logic functions using ICs.
C204.4	Elucidate the functions & organization of various blocks of CPU.
C202.5	Understand CPU instruction characteristics, enhancement features of CPU.
C202.6	Describe an assortment of memory types (with their characteristics) used in computer systems and basic principle of interfacing input, output devices.

C203	Data Structure & Algorithms
C203.1	Perform basic analysis of algorithms with respect to time and space complexity.
C203.2	Select appropriate searching and/or sorting techniques in the application development.
C203.3	Implement abstract data type (ADT) and data structures for given application.
C203.4	Design algorithms based on techniques like brute -force, divide and conquer, greedy, etc.
C203.5	Apply implement learned algorithm design techniques and data structures to solve problems.
C203.6	Design different hashing functions and use files organizations.

C204	Object-Oriented Programming
C204.1	Differentiate various programming paradigms.
C204.2	Identify classes, objects, methods, and handle object creation, initialization, and Destruction to model real-world problems.
C204.3	Identify relationship among objects using inheritance and polymorphism principles.

C204.4	Handle different types of exceptions and perform generic programming.
C204.5	Use of files for persistent data storage for real world application.
C204.6	Apply appropriate design patterns to provide object-oriented solutions.

C205	**Basics of Computer Network**
C205.1	Understand and explain the concepts of communication theory and compare functions of OSI and TCP/IP model.
C205.2	Analyze data link layer services, error detection and correction, linear block codes, cyclic Codes, framing and flow control protocols.
C205.3	Compare different access techniques, channelization and IEEE standards.
C205.4	Apply the skills of subnetting, supernetting and routing mechanisms.
C205.5	Differentiate IPv4 and IPv6.
C205.6	Illustrate services and protocols used at transport layer.

C206	**Logic Design &Computer Organization Lab**
C206.1	Use logic function representation for simplification with K-Maps and design Combinational logic circuits using SSI & MSI chips.
C206.2	Design Sequential Logic circuits: MOD counters using synchronous counters.
C206.3	Understand the basics of simulator tool & to simulate basic blocks such as ALU & memory.

C207	**Data Structure & Algorithms Lab**
C207.1	Analyze algorithms and to determine algorithm correctness and time efficiency class.
C207.2	Implement abstract data type (ADT) and data structures for given application.
C207.3	Design algorithms based on techniques like brute -force, divide and conquer, greedy, etc.).
C207.4	Solve problems using algorithmic design techniques and data structures.
C207.5	Analyze of algorithms with respect to time and space complexity.

C208	**Object Oriented Programming Lab**
C208.1	Differentiate various programming paradigms.
C208.2	Identify classes, objects, methods, and handle object creation, initialization, and destruction to model real-world problems.
C208.3	Identify relationship among objects using inheritance and polymorphism.
C208.4	Handle different types of exceptions and perform generic programming
C208.5	Use file handling for real world application.
C208.6	Apply appropriate design patterns to provide object-oriented solutions.

C209	Soft Skill Lab
C209.1	Introspect about individual's goals, aspirations by evaluating one's SWOC and think creatively
C209.2	Develop effective communication skills including Listening, Reading, Writing and Speaking.
C209.3	Constructively participate in group discussion, meetings and prepare and deliver Presentations.
C209.4	Write precise briefs or reports and technical documents.
C209.5	Practice professional etiquette, present oneself confidently and successfully handle personal interviews.
C209.6	Function effectively in multi-disciplinary and heterogeneous teams through the knowledge of team work, Inter-personal relationships, conflict management and leadership quality.

C210	Mandatory Audit Course3: Quantitative Aptitude & Logical Reasoning
C210.1	Apply basic concepts of quantitative abilities
C210.2	Use logical reasoning for solving real world problems
C210.3	Compete in examinations like internships, industry placements, postgraduate admissions, civil services etc.

C211	EngineeringMathematics-III
C211.1	Solve Linear differential equations, essential in modelling and design of computer-based systems.
C211.2	Apply concept of Fourier transform and Z-transform and its applications to continuous and discrete systems and image processing.
C211.3	Apply Statistical methods like correlation& regression analysis and probability theory for data analysis and predictions in machine learning.
C211.4	Solve Algebraic &Transcendental equations and System of linear equations using numerical techniques.
C211.5	Obtain Interpolating polynomials, numerical differentiation and integration, numerical solutions of ordinary differential equations used in modern scientific computing.

C212	Processor Architecture
C212.1	Apprehend architecture and memory organization of PIC 18 microcontroller.
C212.2	Implement embedded C programming for PIC 18.
C212.3	Use concepts of timers and interrupts of PIC 18.
C212.4	Demonstrate real life applications using PIC 18.
C212.5	Analyze architectural details of ARM processor.

C213	Database Management System
C213.1	Apply fundamental elements of database management systems.
C213.2	Design ER-models to represent simple database application scenarios.
C213.3	Formulate SQL queries on data for relational databases.
C213.4	Improve the database design by normalization & to incorporate query processing.
C213.5	Apply ACID properties for transaction management and concurrency control.
C213.6	Analyze various database architectures and technologies.

C214	Computer Graphics
C214.1	Apply mathematical and logical aspects for developing elementary graphics operations like scan conversion of points, lines, circle, and apply it for problem solving.
C214.2	Employ techniques of geometrical transforms to produce, position and manipulate Objects in 2 dimensional and 3-dimensional space respectively.
C214.3	Describe mapping from a world coordinates to device coordinates, clipping, and projections in order to produce 3D images on 2D output device.
C214.4	Apply concepts of rendering, shading, animation, curves and fractals using computer graphics tools in design, development and testing of 2D, 3D modeling applications.
C214.5	Perceive the concepts of virtual reality.

C215	Software Engineering
C215.1	Classify various software application domains.
C215.2	Analyze software requirements by using various modeling techniques.
C215.3	Translate the requirement models into design models.
C215.4	Apply planning and estimation to any project.
C215.5	Use quality attributes and testing principles in software development life cycle
C215.6	Discuss recent trends in Software engineering by using CASE and agile tools.

C216	Programming Skill Development Lab
C216.1	Apply concepts related to embedded C programming.
C216.2	Develop and Execute embedded C program to perform array addition, block transfer, sorting operations
C216.3	Perform interfacing of real-world input and output devices to PIC18FXXX microcontroller

C216.4	Use source prototype platform like Raspberry-Pi/Beagle board/Arduino.

C217	Database Management System Lab
C217.1	Install and configure database systems.
C217.2	Analyze database models & entity relationship models.
C217.3	Design and implement a database schema for a given problem-domain
C217.4	Implement relational database systems.
C217.5	Populate and query a database using SQL DDL / DML / DCL commands.
C217.6	Design a backend database of any one organization: CASE STUDY

C218	Computer Graphics Lab
C218.1	Apply line& circle drawing algorithms to draw the objects.
C218.2	Apply polygon filling methods for the object.
C218.3	Apply polygon clipping algorithms for the object.
C218.4	Apply the 2D transformations on the object.
C218.5	Implement the curve generation algorithms.
C218.6	Demonstrate the animation of any object using animation principles.

C219	Project Based Learning
C219.1	Design solution to real life problems and analyze its concerns through shared cognition.
C219.2	Apply learning by doing approach in PBL to promote lifelong learning.
C219.3	Tackle technical challenges for solving real world problems with team efforts.
C219.4	Collaborate and engage in multi-disciplinary learning environments.

C220	Mandatory Audit course 4 : Intellectual Property Rights
C220.1	Exhibit the concepts of Intellectual Property Rights
C220.2	Differentiate among different IPR
C220.3	Formulate and characterize innovative ideas and inventions into IPR
C220.4	Demonstrate knowledge of advances in patent law and IP regulations

C301	Theory of computation
C301.1	Able to Design Finite State Machine with and without output for a given problem.
C301.2	Able to Construct Regular Expression for a given formal language.
C301.3	Able to Identify Context Free Grammar and apply grammar rules for syntax analysis.
C301.4	Able to Design Pushdown Automata, Post Machine and Turing machine for a given formal language.
C301.5	Able to Interpret the problems of decidability, reducibility and time complexity.

C302	Database Management Systems
C302.1	Describe the basic functionality of RDBMS and analyze database model for a sample system.
C302.2	Design a database and implement a database schema for a given problem domain using SQL commands and transaction processing.
C302.3	Describe the concept of concurrency control for transactions and use of recovery processes. Also describe various database architectures.
C302.4	Analyze the impact of big data on the information industry using data services like XML, Hadoop, JSON, and MongoDB.
C302.5	Describe the concept of data warehousing and data mining.

C303	Software engineering & Project Management
C303.1	To analyze and apply appropriate lifecycle model of software development.
C303.2	To identify software requirements by applying various modeling techniques.
C303.3	To apply project planning and scheduling techniques in given project management task
C303.4	To understand principles of agile development, SCRUM process and analyze agile process model from other process models.
C303.5	To apply various software tools and techniques for project monitoring and control with risk and quality management.
C303.6	To practice current and future trends of IT industry in software engineering and project management.

C304	Operating System
C304.1	Describe the concept of Operating system and Implement Shell programming as well as kernel programming.

C304.2	To apply the concept of process, thread and Implement Process management System call.
C304.3	To implement Classical Synchronization Problems and describe the concept of memory management.
C304.4	To apply the concept of Disk scheduling and Implement File Handling System Calls.

C305	**Human-Computer Interaction**
C305.1	To explain importance of HCI study and principles of user-centered design (UCD) approach.
C305.2	To develop understanding of human factors in HCI design.
C305.3	To develop understanding of models, paradigms and context of interactions.
C305.4	To design effective user-interfaces following a structured and organized UCD process.
C305.5	To evaluate usability of a user-interface design.
C305.6	To apply cognitive models for predicting human-computer-interactions.

C306	**SOFTWARE LABORATORY - I**
C306.1	To install and configure database systems.
C306.2	To analyze database models & entity relationship models
C306.3	To design and implement a database schema for a given problem-domain
C306.4	To understand the relational and document type database systems.
C306.5	To populate and query a database using SQL DML/DDL commands.
C306.6	To populate and query a database using MongoDB commands.

C307	**SOFTWARE LABORATORY – II**
C307.1	To understand the basics of Linux commands and program the shell of Linux
C307.2	To develop various system programs for the functioning of operating system.
C307.3	To implement basic building blocks like processes, threads under the Linux
C307.4	To develop various system programs for the functioning of OS concepts in user space like concurrency control and file handling in Linux.
C307.5	To design and implement Linux Kernel Source Code.
C307.6	To develop the system program for the functioning of OS concepts in kernel space like embedding the system call in any Linux kernel.

C308	**SOFTWARE LABORATORY – III**
C308.1	To identify the needs of users through requirement gathering.
C308.2	To apply the concepts of Software Engineering process models for project development.

C308.3	To apply the concepts of HCI for user-friendly project development.
C308.4	To deploy website on live webserver and access through URL.
C308.5	To understand, explore and apply various web technologies.
C308.6	To develop team building for efficient project development.

C309	**Audit Course 3:Professional Ethics and Etiquettes**
C309.1	To summarize the principles of proper courtesy as they are practiced in the workplace.
C309.2	To describe ways to apply proper courtesy in different professional situations.
C309.3	To practice appropriate etiquettes in the working environment and day to day life.
C309.4	To learn and build proper practices for global corporate world.

C310	**Computer Network Technology**
C310.1	Classify the routing protocols and analyses how to assign the IP addresses for the given network
C310.2	To implement a network protocol based on socket programming.
C310.3	Configure servers by demonstrating different servers with their applications.
C310.4	Describe different wireless technologies and IEEE standards.
C310.5	Analyze Routing Protocols for Ad-hoc Wireless Networks and Implement wireless sensor network.
C310.6	To develop applications on emerging trends in communication networks

C311	**System Programming**
C311.1	Able to analyze assembly scheme, different loading schemes, design and implement system programs such as assembler, macro processor.
C311.2	Able to design and implement lexical analyzer, and use tool LEX for generation of Lexical Analyzer.
C311.3	Able to study role of parsers and use tool YACC for generation of Syntax Analyzer.
C311.4	Able to study storage allocation, code generation and code optimization issues assessed and applied accordingly.

C312	**Design And Analysis of Algorithms**
C312.1	To apply proof techniques to prove correctness of problem and to calculate computational complexity for algorithms using asymptotic notations also solve recurrence relations.
C312.2	To apply Divide & Conquer, Greedy and Dynamic programming approach to design and analyze algorithms.
C312.3	To illustrate problems using Backtracking algorithmic strategy.
C312.4	To compare approaches for Branch and Bound strategy.
C312.5	To explore the concept of P, NP, NP-complete, NP-Hard and parallel algorithms.

C313	Cloud Computing
C313.1	To describe the need of Cloud based solutions.
C313.2	To explain concept of virtualization and common standards used in implementation of cloud computing.
C313.3	To explain effective techniques to program Cloud Systems.
C313.4	To describe Security Mechanisms and issues in Cloud Applications.
C313.5	To discuss use of ubiquitous clouds in applications of Internet of Things.
C313.6	To explain emerging trends in cloud computing.

C314	Data Science & Big Data Analytics
C314.1	To understand Big Data primitives
C314.2	To learn and apply different mathematical models for Big Data.
C314.3	To understand the different Big data processing technologies.
C314.4	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.
C314.5	To learn different programming platforms for big data analytics.

C315	SOFTWARE LABORATORY – IV
C315.1	To implement small size network and its use of various networking commands.
C315.2	To understand and use various networking and simulations tools.
C315.3	To configure various client/server environments to use application layer protocols
C315.4	To understand the protocol design at various layers.
C315.5	To explore use of protocols in various wired and wireless applications.
C315.6	To develop applications on emerging trends.

C316	SOFTWARE LABORATORY – V
C316.1	To design and implement two pass assembler for hypothetical machine instructions.
C316.2	To design and implement different phases of compiler (Lexical Analyzer, Parser, Intermediate code generation)
C316.3	To use the compile generation tools such as “Lex" and "YACC”.
C316.4	To apply algorithmic strategies for solving various problems.
C316.5	To compare various algorithmic strategies.
C316.6	To analyze the solution using recurrence relation.

C316	SOFTWARE LABORATORY – VI
C317.1	To apply Big data primitives and fundamentals for application development

C317.2	To explore different Big data processing techniques with use cases.
C317.3	To apply the Analytical concept of Big data using R/Python.
C317.4	To visualize the Big Data using Tableau.
C317.5	To design algorithms and techniques for Big data analytics.
C317.6	To design Big data analytic application for emerging trends.

C316	**PROJECT BASED SEMINAR**
C317.1	To Gather, organize, summarize and interpret technical literature with the purpose of formulating a project proposal.
C317.2	To write a technical report summarizing state-of-the-art on an identified topic.
C317.3	Present the study using graphics and multimedia presentations.
C317.4	Define intended future work based on the technical review.
C317.5	To explore and enhance the use of various presentation tools and techniques.
C317.6	To understand scientific approach for literature survey and paper writing.

C401	**Information and Cyber Security**
C401.1	Design and implement the solution to the complex engineering problem of Information and Cyber using Number theory.
C401.2	Able to analyze, implement various security algorithm and Develop analytical competency to identify the solutions to various security principles.
C401.3	Able to identify risk analysis for information security.
C401.4	To identify need of Cyber Security and cyber-crime techniques to state Laws that govern cyber crime.

C402	**Machine Learning and Applications**
C402.1	Explain the concept of machine learning.
C402.2	Apply classification methods to measure performance and accuracy.
C403.3	Apply regression methods to measure performance and accuracy and discuss the concept of theory of generalization.
C404.4	Demonstrate logic based ,algebraic ,probabilistic model.
C404.5	To describe trends in machine learning.

C403	**Software Design and Modelling**
C403.1	Define and understand object oriented methodologies, basics of Unified Modeling Language (UML).

C403.2	Analysis of Object oriented process, use case modeling, domain/class, Interaction and Behavior modeling.
C403.3	Discuss and design process of business, access and view layer of class design.
C403.4	Compute study of GRASP principles and GoF design patterns.
C403.5	Study of architectural design principles and guidelines in the various type of application development.

C404	**Elective-I: Business Intelligence**
C404.1	To Comprehend the Information Systems and development approaches of intelligent system.
C404.2	To Evaluate and rethink business processes using information systems.
C404.3	To Propose the Framework for business intelligence.
C404.4	To Get acquainted with the Theories, techniques, and considerations for capturing organizational intelligence.
C404.5	To align business intelligence with business strategy.
C404.6	To apply the techniques for implementing business intelligence systems.

C405	**Elective-II: Software Testing and Quality Analysis**
C405.1	Describe software testing process and to illustrate the role of software tester in software development process.
C405.2	Investigate the scenario and to select the proper testing technique to test the software.
C405.3	Explore the test automation concepts and tools and estimation of cost, schedule based on standard metrics.
C405.4	Choose appropriate quality assurance models and develop quality.
C405.5	Describe different software quality assurance trends.

C406	**Computer Laboratory VII**
C406.1	The students will be able to implement and port controlled and secured access to software systems and networks.
C406.2	The students will be able to build learning software in various domains.

C407	**Computer Laboratory VIII**
C407.1	Draw, discuss different UML 2.0 diagrams, their concepts, notation, advanced notation, forward and reverse engineering aspects.
C407.2	Identify different software artifacts used to develop analysis and design model from requirements.
C407.3	Develop use case model.
C407.4	Develop, implement analysis model and design model.
C407.5	Develop, implement Interaction and behavior Model.
C407.6	Implement an appropriate design pattern to solve a design problem.

C408	Project Phase-I
C408.1	To show preparedness to study independently in chosen domain of Information Technology and programming languages and apply their acquired knowledge to variety of real time problem scenarios.
C408.2	To function effectively as a team to accomplish a desired goal.
C408.3	An understanding of professional, ethical, legal, security and social issues and responsibilities related to Information Technology Project.

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C409	Audit Course V:Green Computing
C409.1	Understand the concept of green IT and relate it to sustainable development.
C409.2	Apply the green computing practices to save energy.
C409.3	Discuss how the choice of hardware and software can facilitate a more sustainable operation.
C409.4	Use methods and tools to measure energy consumption.

C410	Distributed Computing System
C410.1	Apply the principles of distributed systems to develop new applications.
C410.2	Develop the interface between different distributed applications using message passing communication techniques.
C410.3	Analyze different Synchronization and Election techniques used in distributed system.
C410.4	Analyze different security issues in distributed and multimedia systems.

C411	Ubiquitous Computing
C411.1	Demonstrate the knowledge of design of Ubicomp and its applications.
C411.2	Explain smart devices and services used by Ubicomp Systems.
C411.3	Describe the significance of actuators and controllers in real time application design.
C411.4	Explain the concept of HCI in the design of automation applications.
C411.5	Explain taxonomy of Ubicomp privacy and ways of addressing Ubicomp privacy.
C411.6	Describe Ubicomp communication and management.

C412	Elective III: Information Storage and Retrieval
C412.1	To understand the concept of Information retrieval.
C412.2	To deal with storage and retrieval process of text and multimedia data.
C412.3	To evaluate performance of any information retrieval system
C412.4	To understand importance of recommender system.
C412.5	To understand concept of multimedia and distributed information retrieval.

C413	Elective IV: RTCD
C413.1	To understand rural development and rural economy of India.
C413.2	To identify different measures and paradigms of rural development.
C413.3	To Understand and learn importance of technologies in rural development and use of ICT.
C413.4	To learn different measures of community development.
C413.5	To learn different forms of rural entrepreneurship.
C413.6	To understand challenges and opportunities in rural development by learning different case studies.

C414	Information Storage and Retrieval Laboratory
C414.1	Student should be able to understand the concept, data structure and preprocessing algorithms of Information retrieval.
C414.2	Student should be able to deal with storage and retrieval process of text and multimedia data
C414.3	Student should be able to evaluate performance of any information retrieval system.
C414.4	Students should be able to design user interfaces
C414.5	Student should be able to understand importance of recommender system. (take decision on design parameters of recommender system.)
C414.6	Student should be able to understand the concept of multimedia and distributed information retrieval.
C414.7	Students must be able to map the concepts of the subject on recent developments in the Information retrieval field

C415	COMPUTER LABORATORY-IX
C415.1	Demonstrate knowledge of the core concepts and techniques in distributed systems
C415.2	Learn how to apply principles of state-of-the-Art Distributed systems in practical application
C415.3	Design, build and test application programs on distributed systems.

C416	COMPUTER LABORATORY-X
C416.1	Set up the Android environment and explain the Evolution of cellular networks (BT-2)
C416.2	Develop the User Interfaces using pre-built Android UI components (BT -6)
C416.3	Create applications for performing CURD SQLite database operations using Android(BT-6)
C416.4	Create the smart android applications using the data captured through sensors (BT-6)
C416.5	Implement the authentication protocols between two mobile devices for providing security (BT-3)
C416.6	Analyze the data collected through android sensors using any machine learning algorithm (BT4).

DEPARTMENT OF MECHANICAL ENGINEERING

Course Outcomes

AcademicYear 2020-21

SE Mechanical Engineering (2019 Pattern)

C201	Solid Mechanics
C201.1	DEFINE various types of stresses and strain developed on determinate and indeterminate members
C201.2	DRAW Shear force and bending moment diagram for various types of transverse loading and support.
C201.3	COMPUTE the slope & deflection, bending stresses and shear stresses on a beam
C201.4	CALCULATE torsional shear stress in shaft and buckling on the column
	APPLY the concept of principal stresses and theories of failure to determine stresses on a 2-D element.
	UTILIZE the concepts of SFD & BMD, torsion and principal stresses to solve combined loading application based problems.

C202	Solid Modeling and Drafting
C202.1	UNDERSTAND basic concepts of CAD system, need and scope in Product Lifecycle Management
C202.2	UTILIZE knowledge of curves and surfacing features and methods to create complex solid geometry
C202.3	CONSTRUCT solid models, assemblies using various modeling techniques & PERFORM mass property analysis, including creating and using a coordinate system
C204.4	APPLY geometric transformations to simple 2D geometries
C202.5	USE CAD model data for various CAD based engineering applications viz. production drawings, 3D printing, FEA, CFD, MBD, CAE, CAM, etc.
C202.6	USE PMI & MBD approach for communicatio

C203	Engineering Thermodynamics
C203.1	DESCRIBE the basics of thermodynamics with heat and work interactions.
C203.2	APPLY laws of thermodynamics to steady flow and non-flow processes
C203.3	APPLY entropy, available and non available energy for an Open and Closed System.
C203.4	DETERMINE the properties of steam and their effect on performance of vapour power cycle
	ANALYSE the fuel combustion process and products of combustion
	SELECT various instrumentations required for safe and efficient operation of steam generator

C204	Engineering Materials and Metallurgy
C204.1	COMPARE crystal structures and ASSESS different lattice parameters
C204.2	CORRELATE crystal structures and imperfections in crystals with mechanical behavior of materials.
C204.3	DIFFERENTIATE and DETERMINE mechanical properties using destructive and nondestructive testing of materials
C204.4	IDENTIFY & ESTIMATE different parameters of the system viz., phases, variables, component, grains, grain boundary, and degree of freedom. etc.
C204.5	ANALYSE effect of alloying element & heat treatment on properties of ferrous & nonferrous alloy.
C204.6	SELECT appropriate materials for various applications.

C205	Electrical and Electronics Engineering
C205.1	APPLY programming concepts to UNDERSTAND role of Microprocessor and Microcontroller in embedded systems.
C205.2	DEVELOP interfacing of different types of sensors and other hardware devices with Atmega328 based Arduino Board
C205.3	UNDERSTAND the operation of DC motor, its speed control methods and braking.

C205.4	DISTINGUISH between types of three phase induction motor and its characteristic features.
C205.5	EXPLAIN about emerging technology of Electric Vehicle (EV) and its modular subsystems
C205.6	CHOOSE energy storage devices and electrical drives for EVs

C206	**Geometric Dimensioning and Tolerancing Lab**
C206.1	SELECT appropriate IS and ASME standards for drawing
	READ & ANALYSE variety of industrial drawings.
	APPLY geometric and dimensional tolerance, surface finish symbols in drawing
	EVALUATE dimensional tolerance based on type of fit, etc.
	SELECT an appropriate manufacturing process using DFM, DFA, etc

C207	**Engineering Mathematics - III**
C207.1	SOLVE higher order linear differential equations and its applications to model and analyze mass spring systems
C207.2	APPLY Integral transform techniques such as Laplace transform and Fourier transform to solve differential equations involved in vibration theory, heat transfer and related mechanical engineering applications
C207.3	APPLY Statistical methods like correlation, regression in analyzing and interpreting experimental data applicable to reliability engineering and probability theory in testing and quality control..

C207.4	PERFORM Vector differentiation & integration, analyze the vector fields and APPLY to fluid flow problems
	SOLVE Partial differential equations such as wave equation, one and two dimensional heat flow equations.

C208	**Kinematics of Machinery**

C208.1	APPLY kinematic analysis to simple mechanisms
C208.2	ANALYZE velocity and acceleration in mechanisms by vector and graphical method
C208.3	SYNTHESIZE a four bar mechanism with analytical and graphical methods
C208.4	APPLY fundamentals of gear theory as a prerequisite for gear design
C208.5	CONSTRUCT cam profile for given follower motion

C209	**Applied Thermodynamics**
C209.1	DETERMINE COP of refrigeration system and ANALYZE psychrometric processes
C209.2	DISCUSS basics of engine terminology,air standard, fuel air and actual cycles.
C209.3	IDENTIFY factors affecting the combustion performance of SI and CI engine.
C209.4	DETERMINE performance parameters of IC Engines and emission control.
C209.5	EXPLAIN working of various IC Engine systems and use of alternative fuels
C209.6	CALCULATE performance of single and multi stage reciprocating compressors and DISCUSS rotary positive displacement compressors

C210	**Fluid Mechanics**
C210.1	DETERMINE various properties of fluid.
C210.2	APPLY the laws of fluid statics and concepts of buoyancy
C210.3	IDENTIFY types of fluid flow and terms associated in fluid kinematics
C210.4	APPLY principles of fluid dynamics to laminar flow
C210.5	ESTIMATE friction and minor losses in internal flows and DETERMINE boundary layer formation over an external surface
C210.6	CONSTRUCT mathematical correlation considering dimensionless parameters, also ABLE to predict the performance of prototype using model laws

C211	**Manufacturing Processes**
C211.1	SELECT appropriate moulding, core making and melting practice and estimate pouring

	time, solidification rate and DESIGN riser size and location for sand casting process
C211.2	UNDERSTAND mechanism of metal forming techniques and CALCULATE load required for flat rolling

C211.3	DEMONSTRATE press working operations and APPLY the basic principles to DESIGN dies and tools for forming and shearing operations
C211.4	CLASSIFY and EXPLAIN different welding processes and EVALUATE welding characteristics
	DIFFERENTIATE thermoplastics and thermosetting and EXPLAIN polymer processing techniques.
	UNDERSTAND the principle of manufacturing of fibre-reinforce composites and metal matrix composites

C212	**Machine Shop**
C212.1	PERFORM welding using TIG/ MIG/ Resistance/Gas welding technique
C212.2	MAKE Fibre-reinforced Composites by hand lay-up process or spray lay-up techniques
C212.3	PERFORM cylindrical/surface grinding operation and CALCULATE its machining time
C212.4	DETERMINE number of indexing movements required and acquire skills to PRODUCE a spur gear on a horizontal milling machine
C212.5	PREPARE industry visit report
C212.6	UNDERSTAND procedure of plastic processing

C213	**Project Based Learning - II**
C213.1	IDENTIFY the real-world problem (possibly of interdisciplinary nature) through a rigorous literature survey and formulate / set relevant aims and objectives
C213.2	ANALYZE the results and arrive at valid conclusions.
C213.3	PROPOSE a suitable solution based on the fundamentals of mechanical engineering by possibly integration of previously acquired knowledge.

C213.4	CONTRIBUTE to society through proposed solutions by strictly following professional ethics and safety measures
C213.5	USE of technology in proposed work and demonstrate learning in oral and written form
C213.6	DEVELOP ability to work as an individual and as a team member

TE Mechanical Engineering (2015 Pattern)

01	**Design of Machine Elements I**
C301.1	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
C301.2	Estimate dimensions of shafts (by ASME code), keys and couplings for power transmission application
C301.3	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
C301.4	Design Power Screws applications like Screw Jack and C-clamp
C301.5	Design threaded and welded joints subjected to eccentric loads like Jib Headed Cranes
C301.6	Design Helical and Leaf springs used in valves and automobiles.
C302	**Heat Transfer**
C302.1	Analyze the various modes of heat transfer and apply heat conduction equations for thermal systems with and without internal heat generation.
C302.2	Apply the conduction equation to different types of fins to evaluate its performance.
C302.3	Apply the general heat conduction equation to thermal systems for transient condition using lumped system analysis.
C302.4	Calculate the convective heat transfer rate over plate and through pipe application using empirical co-relation and understand the phenomena of boiling
C302.5	Evaluate the radiation heat exchange between the surfaces for application in radiation shield of furnaces

C302.6	Compute the efficiency and effectiveness of heat exchanger using LMTD and ϵ-NTU method.
	Theory of Machines II
C303.1	Calculate the design parameters of spur gear to avoid interference used in machine tools and automobile applications.
C303.2	Estimate forces and torque acting on Helical, Bevel, Worm and Worm Wheel used in machine tools and automobile applications.
C303.3	Determine speed and torque in epi-cyclic gear trains used in gear box.
C303.4	Generate cam profile for given follower motions to avoid cam jump.
C303.5	Synthesize four bar mechanism with analytical and graphical methods.
C303.6	Determine Gyroscopic couple or its effect for stabilization of dynamic applications cars, ships, and aeroplane.
C303.7	Distinguish between stepped and step-less drive for automobile applications.
C304	**TurboMachines**
C304.1	Classify turbo machines along with its applications and evaluate performance parameters for flat, inclined plate, curved vane and series of vanes.
C304.2	Analyse impulse water turbine with design aspects, selection criteria, performance parameters and characteristics for its use in hydroelectric power plant.
C304.3	Evaluate performance parameters of reaction water turbines & draft tube along with discussion of governing mechanism & dimensional analysis.

C304.4	Evaluate performance parameters of impulse, and reaction steam turbine along with discussion of nozzles, governing mechanism, selection & losses.
C304.5	Evaluate performance parameters of single & multistage centrifugal pumps along with discussion of cavitation, selection & dimensional analysis.
C304.6	Evaluate performance parameters of centrifugal compressor along with discussion of theoretical aspect of axial compressor

C305	**Metrology & Quality Control**
C305.1	Select tool and techniques to determine geometry and dimensions and describe gauges to meet desired needs within realistic constraints.
C305.2	Describe measuring parameter of gear and threads using pneumatic and mechanical comparator also explain different surface roughness parameter.
C305.3	Determine geometry and dimensions of components in engineering applications using CMM tools and techniques.
C305.4	Explain the importance of quality control tools in manufacturing and industrial engineering applications.
C305.5	Explain the concepts of basic sampling and acceptance for SQC to plot different statistical curves.
C305.6	Describe ideas of 5S, Kaizen, Kanban and its applications in engineering industries for continuous improvement process.
C306	**Skill Development Lab**
C306.1	To assemble, disassemble and part drawing of tail stock used in machine shop
C306.2	To assemble, disassemble and part drawing of valve (PRV, Sluice valve, Steam stop valve) assembly used in fluid machinery.
C306.3	To assemble, disassemble and part drawing of I.C. Engine (4 stroke single cylinder) assembly used in two wheeler.
C306.4	To assemble, disassemble and part drawing of hydraulic actuator used in fluid machinery
C306.5	To assemble, disassemble and part drawing of hermetically sealed compressor used in refrigeration and air conditioning system
C306.6	To assemble, disassemble and part drawing of industrial gear box used in automobiles and machine tool.
C308	**Numerical Methods & Optimization**
C308.1	Evaluate the roots of equations and simultaneous equations in engineering

	applications using iterative approach with minimised error.
C308.2	Apply graphical, simplex and Newton's optimisation method to solve constrained and unconstrained engineering problems.
C308.3	Apply given numerical techniques to solve ordinary differential equations (ODE) and partial differential equations (PDE).
C308.4	Apply Lagrange's & Newton's forward interpolation method for regression analysis, and fit different curves by least square technique.
C308.5	Evaluate integration of functions using single and double integration numerical techniques
C309	**Design of Machine Elememts II**
C309.1	Determine module of Spur Gears to avoid bending and pitting failure for constant speed gear boxes
C309.2	Calculate normal module for Helical Gears and module at the larger end for Bevel Gears.
C309.3	Estimate dynamic load rating capacity of rolling contact bearings used in transmission systems based on applied load and expected life
C309.4	Compute efficiency, module, diametral quotient and speed ratio for worm drive used in Industrial Applications
C309.5	Carry out selection of belt drives from manufacturing catalogue for Industrial applications and Explain theory of chain and rope drives..
C309.6	Determine quantity of lubrication required for sliding contact bearings to ensure proper heat dissipation
C310	**Refrigeration & Air Conditioning**
C310.1	Discuss the applications of refrigeration and air-conditioning and describe refrigerants used in refrigeration & air conditioning systems with their classes, properties, environmental issues, etc..
C310.2	Determine performance parameters of simple vapour compression systems using property tables, p-h charts.

C310.3	Describe working of simple, actual, Li-Br, three fluid vapour absorption refrigeration system
C310.4	Determine the performance parameters of multiple-pressure vapour compression systems using p-h charts and discuss introduction to Linde Hampson cycle.
C310.5	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.
C310.6	Explain components of refrigeration and air-conditioning systems for domestic and commercial applications
C310.7	Determine pressure losses & size of duct for flow through simple duct system.
C311	**Mechatronics**
C311.1	Determine Sensitivity, Precision and Resolution for sensors used in measurement systems.
C311.2	Construct block diagram using key elements of mechatronics system for household and industrial applications and Carry out block diagram reduction.
C311.3	Understand Signal Processing and Interfacing of Sensors and Actuators to Data Acquisition System to Determine resolution of ADC/DAC.
C311.4	Develop PLC program for household and industrial applications.
C311.5	Determine the system stability based on time and frequency domain for mechatronics system
C311.6	Determine controller output using Proportional, Integral, Derivative and combinational actions to reduce system errors.
C312	**Manufacturing Process II**
C312.1	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)
C312.2	Determine machining time in drilling, milling and broaching machine with their applications.
C312.3	Explain grinding machines, grinding wheels and super finishing processes including Honing, Lapping, Buffing and Burnishing

C312.4	Explain advanced machining process – EDM, LBM, AJM, USM, and ECM withtheir Principles, Working, Process Parameters, Advantages, Limitations and Application.
C312.5	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
C312.6	Draw Jigs & Fixtures for simple components with help of elements, Location guidelines, Principles of clamping & guiding
C313	**Seminar**
C313.1	Explain reviews of research literature published in reputed journals.
C313.2	Apply techniques of effective ways of written communication acceptable to journal standards
C313.3	Demonstrate depth of understanding of solution of engineering problems written in reputed journals.
C313.4	Explain the impact of concept in societal, environmental contexts
C313.5	Apply techniques, resource and modern engineering tools to solve complex engineering problem

BE Mechanical Engineering (2015 Pattern)

C401	**Hydraulics & Pneumatics**
C401.1	Calculate the Power and Efficiency of positive displacement pumps using basics of Fluid Power.
C401.2	Determine the performance parameters of Actuator and Accumulator of Hydraulic system
C401.3	Explain construction and working of types of Fluid Power Control Valves
C401.4	Draw the circuit diagram of hydraulic system used in Industrial Applications
	5 Illustrate the components, control valves and circuits of the Pneumatic system
C401.6	Describe the design of hydraulic and Pneumatics circuit using manufacturers

	catalogue and simulation using any suitable software.
C402	**CAD/CAM Automation**
C402.1	Determine the result of geometrical transformations on 2D objects using homogeneous transformation matrix..
C402.2	Formulate mathematical expression of analytical and synthetic curves, surfaces and Select appropriate analytical and synthetic curves and surfaces in part modelling.
C402.3	Construct and Analyze structural problem of Mechanical systems for safe working conditions using FEA software and validate the same by classical approach.
C402.4	Create a CNC part program and tool path in CAM software for Turning/ Milling using FANUC control..
C402.5	Explain various Additive Manufacturing process and design and development of product using rapid prototyping.
C402.6	Explain the robotics system and Development of Automated system using Ardiuno interfacing.
C403	**Dynamics of Machinery**
C403.1	Estimate natural frequency for single DOF undamped & damped free vibratory systems
C403.2	Determine response to forced vibrations due to harmonic excitation, base excitation and excitation due to unbalance forces.
C403.3	Apply balancing technique for static and dynamic balancing of multi cylinder inline and radial engines.
C403.4	Describe vibration measuring instruments for industrial / real life applications along with suitable method for vibration control.
C403.5	Explain noise, its measurement & noise reduction techniques for industry and day today life problems.
C404	**Elective-I: Finite Element Analysis**

C404.1	Understand the Fundamentals concept of FEA & Techniques used to solve mechanical engineering problems.
C404.2	Analyze 1D element structural problems involving bars, beams, trusses.
C404.3	Derive and use 2-D element stiffness matrices and load vectors to solve for displacements and stresses.
C404.4	Analyze 2D elements for triangular, quadrilateral, iso-parametric Element.

	5 Analyze steady state heat transfer problems
C404.6	Compute dynamic problems consisting bar, beam element and interpret the result of 3D element structural problems using commercial FEA package.
C405	**Elective II- HVAC**
C405.1	Determine the performance parameters of transcritical & ejector systems used in refrigeration & air-conditioning applications
C405.2	Estimate thermal performance of compressor, evaporator, condenser and cooling tower used in refrigeration systems.
C405.3	Describe refrigerant piping design, capacity & safety controls and balancing of vapour compressor system.
C405.4	Explain importance of indoor and outdoor design conditions, IAQ, ventilation and air distribution system used in central air conditioning systems
C405.5	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.
C405.6	Explain working of types of desiccant, evaporative, thermal storage, radiant cooling, clean room and and formulate mathematical model of air-conditioning system.
C406	
	Energy Engineering
C406.1	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
C406.2	Associate and discuss types of steam condenser used in thermal power plant and environmental impact of thermal power plant
C406.3	Compute theoretical aspects, geological considerations and types of components for hydroelectric and nuclear power plant with economic consideration.
C406.4	Estimate performance parameter of gas turbine power plant and diesel power plant with their configuration.
C406.5	Discuss types of Non-conventional power plant and their commercialization
C406.6	Associate and discuss types of electrical instruments used in power plant and Estimate miscellaneous cost and performances incorporated with types of power generation system
C407	**Mechanical System Design**
C407.1	Analyze and design machine tool gear box, cylinder, pressure vessel and I.C. engine components for stated specifications.
C407.2	Apply the statistical considerations in design to analyze the defects and failure modes in industrial product.
C407.3	Design suitable material handling system for bulk load.
C407.4	Develop the optimum solutions for weight, cost, and size, stiffness using Johnson's method for shaft, helical spring, and pressure vessel
C408	**ELE III-Tribology**

C408.1	Understand the practical aspect of tribology in industry
C408.2	Describe theories, laws, measurement of friction and wear.
C408.3	Analyze hydrodynamic bearing and performance using derived equations
C408.4	Determine performance of hydrodynamic bearing using derived equations
C408.5	Explain characteristics of Elasto-hydrodynamic lubrication and Gas Lubrication

C408.6	Apply the principles of surface engineering for different applications of tribology
C409	**ELE III-Industrial Engineering**
C409.1	Describe different aspect of industrial engineering and productivity improvement techniques.
C409.2	Apply different concepts of method study to improve the work content
C409.3	Describe and analyze techniques of work measurement and time study
C409.4	Illustrate different aspect of work system design and production planning control
C409.5	Identify various cost accounting and financial management practices applicable in different industries.
C409.6	Apply concept of engineering economy, ergonomics and industrial safety practices.
C410	**ELECTIVE IV- Product Design & Development**
C410.1	Describe fundamentals of Product design and development process, understand conventional and recent trends of Product design and development process
C410.2	Identify & formulate customer needs and its tools for the product design & development. Explain mission statement, forecasting.
C410.3	Describe information gathering for product development like brain storming, lateral thinking and morphological analysis for product development
C410.4	Demonstrate reverse and forward engineering in product development by using teardown process. Explain Benchmarking for the product development process
C410.5	Describe conceptually design processes as DFA, DFMEA, design for safety etc. also cost analysis for the effective cost of the product
C410.6	Explain Product life cycle and management and data management concepts.

Dr. Pradeep A. Patil ,HOD (Mechanical)

Master of Business Administration
(MBA)

MBA Programme Focus:

1.1 **Programme 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. **Life Long 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 Leadership GA3: Competence in Creativity & Innovation
GA4: Research Aptitude, Scholarship & Enquiry
GA5: Global Orientation
GA6: Proficiency in ICT & Digital Literacy
GA7: Entrepreneurship & Intrapreneurship Orientation
GA8: Cross-functional & Inter-disciplinary Orientation
GA9: Results Orientation
GA10: Professionalism, Ethical, Values Oriented & Socially Responsible behavior
GA11: Life-Long Learning Orientation

MBA I (Sem I)

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

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 at large.
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 business research.
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 world marketing 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 business and 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 ABILITIES	COURSE OUTCOMES
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 ABILITIES	COURSE OUTCOMES
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 their inter-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 Quantitative approach.
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).

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.

emester 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 a business-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.

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 through banking 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 covered in 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 assessee.
CO219FIN.5	ANALYSING	ANALYZE and DISCOVER intrinsic value of a security.
	EVALUATING	DESIGN/ DEVELOP / CREATE tax saving plan.

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		**220HRM: Public Relations & Corporate Communications**
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
CO220HRM.1	REMEMBERING	DESCRIBE the various forms of Corporate Communications from a HR perspective.
CO220HRM.2	UNDERSTANDING	EXPLAIN the role of Public Relations & Corporate Communications in HRM.
CO220HRM.3	APPLYING	PLAN and EXECUTE a PR activity.
CO220HRM.4	ANALYSING	EXAMINE the PR campaign & strategies of real world organizations.

CO220HRM.5	EVALUATING	DEVELOP a strategic communication plan for a real life Corporate communication issue.
CO220HRM.6	CREATING	COMPLIE an analytical report on the PR activities and communication strategies designed & practiced by the organizations and IMPROVE on it.

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		**219OSCM: Inventory 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
CO219OSCM.1	REMEMBERING	DEFINE the key terms associated with Inventory Management.
CO219OSCM.2	UNDERSTANDING	CLASSIFY various types of inventory, and inventory costs.
CO219OSCM.3	APPLYING	CALCULATE Economic Order Quantity and stock levels under various conditions.
CO219OSCM.4	ANALYSING	COMPARE and CONTRAST various methods of inventory control.
CO219OSCM.5	EVALUATING	ASSESS various factors influencing Make or Buy decisions.
CO219OSCM.6	CREATING	SOLVE problems based on ABC classification of inventory.

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 appropriate visualization 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		**219BA: Workforce 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
CO2019BA.1	REMEMBERING	ENUMERATE the use of Workforce Analytics.
CO2019BA.2	UNDERSTANDING	UNDERSTAND the process of creating and using HR analytics
CO2019BA.3	APPLYING	USE dashboards, pivot tables for data driven decision making in HR.
CO2019BA.4	ANALYSING	ILLUSTRATE the use of various tools and frameworks for predictive analytics.
CO2019BA.5	EVALUATING	DERIVE a variety of metrics and quantify key outcomes in multiple areas of HR.
CO2019BA.6	CREATING	BUILD value for HR departments by showing clear links between HR and Business outcomes.

MBA II (Sem III)

Semester III		**301– Strategic 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
CO301.1	REMEMBERING	DESCRIBE the basic terms and concepts in Strategic Management.
CO301.2	UNDERSTANDING	EXPLAIN the various facets of Strategic Management in a real world context.
CO301.3	UNDERSTANDING	DESCRIBE the trade-offs within and across strategy formulation, implementation, appraisal.
CO301.4	APPLYING	INTEGRATE the aspects of various functional areas of management to develop a strategic perspective.
CO301.5	ANALYSING	EXPLAIN the nature of the problems and challenges confronted by the top management team and the approaches required to function effectively as strategists.
CO301.6	CREATING	DEVELOP the capability to view the firm in its totality in the context of its environment.

Semester III		**302– Decision Science**
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

CO302.1	REMEMBERING	DESCRIBE the concepts and models associated with Decision Science.
CO302.2	UNDERSTANDING	UNDERSTAND the different decision-making tools required to achieve optimisation in business processes.
CO302.3	UNDERSTANDING	APPLY appropriate decision-making approach and tools to be used in business environment.
CO302.4	APPLYING	ANALYSE real life situation with constraints and examine the problems using different decision-making tools
CO302.5	ANALYSING	EVALUATE the various facets of a business problem and develop problem solving ability
CO302.6	CREATING	DISCUSS & propose the various applications of decision tools in the present business scenario.

Semester III		**307– International Business Environment**
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
CO 307 .1	Remembering	Recall and Describe the key concepts of international Business Environment
CO 307 .2	Understanding	Understand the relevance of Multinational Corporations (MNCs) in global trade
CO 307 .3	Applying	Demonstrate the significance of FDI and FPI in respect of developing economy
CO 307 .4	Analysing	Analyze the issues related to Labor, Environmental and Global Value chain
CO 307 .5	Evaluating	Formulate and discuss the case related to various Agreements under WTO and contemporary global business environment.

Semester III		**308 – Project 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
CO 308 .1	Remembering	DEFINE the key terms and concepts in project management.
CO 308 .2	Understanding	EXPLAIN the Importance of project management methodologies and tools at the distinct stages in the Project's life cycle
CO 308 .3	Applying	ILLUSTRATE the importance of PM in most industries and businesses
CO 308 .4	Analysing	EXAMINE the importance of Leadership specifically in heterogenous and virtual teams as well as governance and approaches to conflict resolutions
CO 308 .5	Evaluating	DESIGN dashboard, status report and index for Key Performance Indicators of project for the Management

Semester III		**310– Corporate Governance**
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
CO310.1	REMEMBERING	RECOGNIZE and REMEMBER the scope of Corporate Governance.
CO310.2	UNDERSTANDING	UNDERSTAND the role of Board of Directors and Committees in Good Corporate Governance and key mechanism.
CO310.3	APPLYING	APPLICATION of empirical methods of Corporate Governance and its impact on the Firms.
CO310.4	ANALYSING	Analyze the legal framework of Corporate Governance and formulate Internal control policies.
CO310.5	EVALUATING	Evaluate the legal framework and global perspective of Corporate Governance.
CO310.6	CREATING	FORMULATE and DISCUSS Cases related to CG (Models), their SUCCESS & FAILURES.

Semester III	SC – MKT- 03	304 MKT : Services Marketing
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
CO304 MKT.1	REMEMBERING	RECALL the key concepts in services marketing
CO304 MKT.2	UNDERSTANDING	EXPLAIN the role of Extended Marketing Mix in Services
CO304 MKT.3	APPLYING	DEMONSTRATE the new Paradigm and Perspectives in Marketing of Services
CO304 MKT.4	ANALYSING	ANALYSE the significance of services marketing in the Indian and global economy
CO304 MKT.5	EVALUATING	EVALUATE Segmentation, Targeting & Positioning of Services in dynamic marketing environment
CO304 MKT.6	CREATING	DEVELOP marketing mix for various services offering

Semester III	SC – MKT- 04	**305 MKT : Sales & Distribution Management**
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
CO305MKT.1	REMEMBERING	DESCRIBE the theoretical concepts related to Sales Management and Distribution Management Domain
CO305MKT.2	UNDERSTANDING	UNDERSTAND the concepts, techniques and approaches required for effective decision making in the areas of Sales and Distribution.
CO305MKT.3	APPLYING	APPLY the concepts related to sales and distribution management.
CO305MKT.4	ANALYSING	ANALYZE the real life scenarios of sales and distribution management.
CO305MKT.5	EVALUATING	EVALUATE the existing sales and distribution strategies and approaches.
CO305MKT.6	CREATING	DEVELOP generate and evaluate sales and distribution strategies.

Semester III	SE -IL -MKT- 07	**312 MKT: Business to Business Marketing**
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

CO312 MKT.1	REMEMBERING	DEFINE the terms and concepts related to Business to Business marketing
CO312MKT.2	UNDERSTANDING	EXPLAIN the terms and concepts used in business to business marketing
CO312 MKT.3	APPLYING	IDENTIFY challenges and opportunities in Business-to-Business Marketing.
CO312 MKT.4	ANALYSING	FORMULATE segmentation, targeting and positioning, consumer buying behaviour and marketing mix in the context of Business to Business marketing
CO312MKT.5	EVALUATING	DESIGN marketing mix elements considering business-to-business sales and service situations.
CO312MKT.6	CREATING	DEVELOP marketing plan for business-to-business Marketing situations.

Semester III	SE -IL -MKT- 08	**313 MKT: International Marketing**
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
CO313MKT.1	REMEMBERING	ENUMERATE various terms and key concepts associated with international marketing.
CO313MKT.2	UNDERSTANDING	EXPLAIN various key concepts used in all aspects of international marketing.
CO313MKT.3	APPLYING	APPLY all stages in international marketing management process.
CO313MKT.4	ANALYSING	EXAMINE various facets of international marketing environment and the relevant aspects of international marketing management process from a data driven decision perspective.
CO313MKT.5	EVALUATING	JUDGE suitability of alternative market segmentation bases, target market selection, market entry strategies, positioning strategies and international marketing mix strategies based on Assessment of international marketing environment.
CO313MKT.6	CREATING	DESIGN appropriate market segmentation, target market, market entry strategies, positioning strategies and international marketing mix strategies for business organizations.

Semester III		**304 FIN– Advanced Financial Management**
3 Credits	**LTP: 2:1:1**	**Subject Core - SC - FIN - 03**

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

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO 304.1	REMEMBERING	DESCRIBE the basic concepts in financing, investing and profit distribution in a firm
CO 304.2	UNDERSTANDING	EXPLAIN theoretical concepts related to raising and use of funds and value of firm
CO 304 .3	APPLYING	CALCULATE values for making capital structure, investment, liquidity and dividend decisions in the financial management of a firm
CO 304.4	ANALYSING	ANALYZE the options for making the right financial decisions of a firm
CO 304.5	EVALUATING	ASSESS the role of financial planning, risk analysis in investments, liquidity and credit management policy of the firm on shareholder value
CO304.6	CREATING	DESIGN an appropriate financial strategy using any one or multiple concepts/ techniques learned in this course.

Semester III		**305 FIN – International Finance**
3 Credit	**LTP : 2:1:1**	**Subject Core (SC) Course – International Finance**

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

CO#	Cognitive Ability	Course Outcomes
CO305FIN.1	Remembering	Enumerate the key terms associated with International Finance.
CO305FIN.2	Understanding	Summarize the various the concepts related to regulators, financial markets, Financial Instruments, tax structures at international level.
CO305FIN.3	Applying	Illustrate the role of international monitory systems & intermediaries in Global financial market.
CO305FIN.4	Analyzing	Inspect the various parameters of global financial market and interpret best possible international investment opportunities.
CO305FIN.5	Evaluating	Determine the various strategies to start investment or business at the international level by considering various factors of international finance.
CO305FIN.6	Creating	Formulate the investment plan or business plan by adapting international finance environment.

SEMESTER III		**315 FIN – Indirect Taxation**
2 Credit	**LTP : 1:1:1**	**Subject Elective (SE-IL) Course – Financial Management**

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

CO#	Cognitive Ability	Course Outcomes
CO315FIN.1	Remembering	Remembering the key concepts of Indirect Taxes in India Identifying and enumerating the various terms associated with GST and other indirect taxes.
CO315FIN.2	Understanding	Explain how GST works as an Uniform Tax Structure, Illustrate the GST framework of India, & describe the important concepts such as supply, dual taxation method, registration process, etc.
CO315FIN.3	Applying	Apply the theories and Principles and perform all calculation through numerical problems on valuation and calculation of taxes. Identify the time value of supply; determine the taxable person and tax levied on goods and services.
CO315FIN.4	Analysing	Illustrate the e filling process of GST Categorize the Goods and Services under GST and amount of tax to be paid using Dual tax concept.
CO315FIN.5	Evaluating	Evaluate Input Tax Credit Process, reversal, late filing and New Amendments; appraise various indirect taxes; Interpret the GST framework in India & verify the tax levied on Goods and Services.
CO315FIN.6	Creating	Elaborate all Provisions of GST and can correlate with filing of returns; virtual e filling can be done Estimate the GST, TDS, anticipate goods, services, tax payable person for the business.

Semester III		**318 Fin–Digital Banking**
2 Credits	**LTP: 2:1:1**	**Subject Elective (SE) Course- Financial Management (Fin)**

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

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO318 Fin.1	REMEMBERING	Remember various concepts and products in Digital Banking
CO318 Fin.2	UNDERSTANDING	Explain and understand the significance and development of Digital Banking
CO318 Fin.3	APPLYING	Compare and contrast the Branchless Banking and Traditional Banking
CO318 Fin.4	ANALYSING	Analyze the payment system of digital banking from consumer's point of view
CO318 Fin.5	EVALUATING	Evaluate Role of digital banking and emerging technologies in economic development

Semester-III		**304HRM- Strategic Human Resource Management**
3 Credits	**LTP: 2:1:1**	**Subject Core (SC) Course- Human Resource Management**

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

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO304HRM.1	REMEMBERING	REMEMBER the strategies adopted by HR and their implementation issues and challenges faced by the organization in national and international context.
CO304HRM.2	UNDERSTANDING	Ability to UNDERSTAND and ARTICULATE the basic concepts of SHRM and link the HR strategies to the organizational business strategies.
CO304HRM.3	APPLYING AND ANALYZING	Ability to ANALYZE HR as an investment to the company.
CO304HRM.4	EVALUATING	Ability to INTERPRET and EVALUATE the implementation of the HR strategies.
CO304HRM.5	CREATING	FORMULATE and provide realistic solutions to the industry by designing innovative strategies and logical decision making.

Semester III		**305HRM : HR Operations**
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 OBJECTIVES (CO'S)
CO315HRM.1	REMEMBERING	DESCRIBE structure of personnel department, its policies and maintenance of employee files & records
CO315HRM.2	UNDERSTANDING	LEARN drafting of communications for disciplinary actions
CO315HRM.3	APPLYING	DEMONSTRATE the knowledge and calculations of bonus, gratuity, PF, ESI etc.
CO315HRM.4	ANALYSING	EXPERIMEMT to calculate the computation of Workmen compensation, Bonus and Gratuity as per relevant acts
CO315HRM.5	EVALUATING	CALCULATE computation of Workmen compensation, Bonus and Gratuity
CO315HRM.6	CREATING	FILE returns under various labour laws and prepare salary structure

Semester III		312HRM: Talent Management
2 Credits	LTP: 1:1:1	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 OBJECTIVES (CO'S)
CO.312.1	REMEMBERING	DEFINE Talent Management and its significance
CO.312.2	UNDERSTANDING	UNDERSTANDING performance excellence through Talent Management
CO.312.3	APPLYING	APPLY Talent Management concepts in Human Resource Management
CO.312.4	ANALYSING	ANALYSING Talent Management practices in employee development and career enhancement
CO.312.5	EVALUATING	FORMULATE the Talent Management Strategies for any organisation.

Sem- III		316 HRM: Mentoring and Coaching
2 Credits	LTP: 0:3:1	Subject Elective (SE) Course-Human Resource Management

Course Outcomes: At the end of this course the learner shall be able to –

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO316HRM.1	Remembering	ENUMERATE various concepts of Mentoring and Coaching.
CO316HRM.2	Understanding	UNDERSTAND techniques of Mentoring and Coaching
CO316HRM.3	Applying	APPLY models of Mentoring and Coaching to real world scenarios
CO316HRM.4	Analyzing	ANALYSE issues in Mentoring and Coaching
CO316HRM.5	Evaluating & Creating	DEVELOP skills needed to become Mentor, Coach

Semester III		304 OSCM- Services Operations Management – II
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
CO304OSCM .1	REMEMBERING	DEFINE the key concepts in Services Operations Management.
CO304OSCM .2	UNDERSTANDING	DIFFERENRTIATE between various service strategies, service quality dimensions, and customer relationships based on life time value.
CO304OSCM .3	APPLYING	IDENTIFY the sources of value in a service supply relationship & three factors that drive profitability for a professional service firm
CO304OSCM .4	ANALYSING	CATEGORIZE a service firm according to its stage of competitiveness.
CO304OSCM .5	EVALUATING	MODIFY the Service strategies of an organization for achieving the strategic service vision.
CO304OSCM .6	CREATING	SOLVE the relevant numerical in the scope of the subject.

Semester III		305 OSCM - Logistics 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
CO305OSCM.1	REMEMBERING	DEFINE basic terms and concepts related to Logistics management.
CO305OSCM.2	UNDERSTANDING	EXPLAIN the infrastructure of logistics, its linkage with various types of communication modes.
CO305OSCM.3	APPLYING	DESCRIBE the various dimensions of logistics management and transport, their inter-linkages with different types of freights.
CO305OSCM.4	ANALYSING	CALCULATE logistic costs and various classification methods of reducing the cost. Involving the information technology and its impacts.
CO305OSCM.5	EVALUATING	OUTLINE a typical logistic framework and services. ILLUSTRATE the linkages with its dynamic storage system / Customer Issues, Logistic and Business Issues in a real world context.
CO305OSCM.6	CREATING	DISCUSS modern real world logistical systems using the various concepts in the syllabus.

Semester III		312 OSCM- Manufacturing Resource Planning
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
CO312OSCM.1	REMEMBERING	DEFINE basic terms and concepts related to MRP II.
CO312OSCM.2	UNDERSTANDING	DESCRIBE the integrated planning structure and functions incorporated within MRP.
CO312OSCM.3	APPLYING	ILLUSRATE the importance of MRP as a top-management planning tool
CO312OSCM.4	ANALYSING	IDENTIFY the vertical and horizontal cross-functional integration within the MRP II planning hierarchy.
CO312OSCM.5	EVALUATING	EXPLAIN how what-if simulation, modeling, and analysis are used to produce feasible plans.
CO312OSCM.6	CREATING	DISCUSS how MRP supports the company's cost, quality, and delivery operating objectives.

Semester III		313 OSCM- Sustainable Supply Chains
2 Credits	LTP: 2:0:0	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
CO313OSCM.1	REMEMBERING	ENUMERATE the key concepts of Sustainable Supply Chains and Sustainable Supply Chain Management.
CO313OSCM.2	UNDERSTANDING	DESCRIBE and DISCUSS the role and importance of sustainability and sustainable development in different types of supply chains.

CO313OSCM.3	APPLYING	IDENTIFY and USE relevant established and emerging principles, frameworks and theories in sustainable logistics and supply chain management.
CO313OSCM.4	ANALYSING	INTEGRATE fundamental strategies, tools and techniques to analyze and design environmentally sustainable supply chain systems.
CO313OSCM.5	EVALUATING	DETERMINE the unsustainable impact of logistics activities, both individual, and in the wider context of the supply chain.
CO313OSCM.6	CREATING	COMPILE the managerial challenges, and FORMULATE a structured solution to these, with clear implications for relevant stakeholders.

Semester III		**304 BA- Advanced Statistical Methods 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
CO304BA .1	REMEMBERING	RECALL all basic statistical concepts and associated values, formulae.
CO304BA .2	UNDERSTANDING	EXPLAIN the statistical tools and DESCRIBE their applications in multiple business domains and scenarios
CO304BA .3	APPLYING	APPLY time series analysis in prediction of various trends.
CO304BA .4	ANALYSING	DISCRIMINATE between various types of probability and probability distributions.
CO304BA .5	EVALUATING	FORMULATE and TEST hypothesis using tools of R.
CO304BA .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 III		**305 BA - Machine Learning & Cognitive intelligence using Python**
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
CO305BA.1	REMEMBERING	DEFINE the key terms in Python, Machine Learning and Cognitive Intelligence
CO305BA.2	UNDERSTANDING	EXPLAIN the applications of Machine Learning in multiple business domains and scenarios
CO305BA.3	APPLYING	DEVELOP a thought process to think like data scientist/business Analyst
CO305BA.4	ANALYSING	ANALYSE data using supervised and unsupervised Learning Techniques
CO305BA.5	EVALUATING	SELECT the right functions, arrays of Python for Machine Learning algorithms.
CO305BA.6	CREATING	COMBINE various tools and functions of Python language in developing Machine Learning algorithms and use them in live analytical projects in multiple business domain and scenarios.

Semester III		**312 BA- Social Media, Web & Text 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
CO312BA.1	REMEMBERING	DEFINE the key terms in Social Media Analytics, Web Analytics and Text Analytics
CO312BA.2	UNDERSTANDING	EXPLAIN the applications of Social Media Analytics, Web Analytics and Text Analytics in multiple business domains and scenarios
CO312BA.3	APPLYING	DEVELOP a thought process to harness the power of social media analytics to improve website or business
CO312BA.4	ANALYSING	ANALYSE Social Media Analytics and Web Analytics Tools
CO312BA.5	EVALUATING	SELECT the right metrics for Social Media Analytics and Web Analytics
CO312BA.6	CREATING	COMBINE various tools and metrics in building high impact dashboard in multiple business domains and scenarios

Semester III		**317 BA- E Commerce Analytics - I**
2 Credits	**LTP: 2:0:0**	**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
CO317BA.1	REMEMBERING	DESCRIBE the key concepts in e-commerce analytics.
CO317BA.2	UNDERSTANDING	DEMONSTRATE the use of analytics to drive profitability throughout the organization, and across the entire customer experience and lifecycle.
CO317BA.3	APPLYING	SOLVE the unique problems in e-commerce, and transform data into better decisions and customer experiences.
CO317BA.4	ANALYSING	DISCOVER high-value insights via dashboards and visualization.
CO317BA.5	EVALUATING	DEVELOP analytical approaches to improve ecommerce marketing and advertising, understand customer behavior, increase conversion rates, strengthen loyalty, optimize merchandising and product mix, streamline transactions, optimize product mix, and accurately attribute sales.
CO317BA.6	CREATING	FORMULATE the right analytics driven strategy for ecommerce businesses.

Semester III		**SC – RABM – 01 Agriculture and Indian Economy**
3 Credits	**LTP: 2:1:1**	**Rural & Agri Business Management**

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

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
RABM01.1	REMEMBERING	DEFINE the key terms in Indian Agriculture/Land Reforms/ economic holding.
RABM01.2	UNDERSTANDING	EXPLAIN the key terms in The place of agriculture in the national economy/ The present position of Indian Agriculture with an advanced management perspective.
RABM01.3	APPLYING	IDENTIFY the various issues in the Agriculture Industry in India. DEMONSTRATE their significance from the perspective of Indian farmer & Indian Economy & business decision making.
RABM01.4	ANALYSING	EXAMINE the inter-relationships between various facets of Agriculture & economy from the perspective of a farmer, Labour, firm, industry, market, competition and business cycles.

RABM01.5	EVALUATING	DEVELOP critical thinking based on changing pattern of ownership and operational holdings in India, Farms size, Productivity/ Profitability and farm efficiency
RABM01.6	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 III		**SE – RABM – 03 Rural Credit and Finance**
2 Credits	**LTP: 1:1:1**	**Rural & Agri Business Management**

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

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
RABM03.1	REMEMBERING	RECALL the Role of Credit in Agriculture & Role of Agriculture in Economic Development
RABM03.2	UNDERSTANDING	UNDERSTAND the concept and special features of co-operative banking, Structure of the co-operative credit system in India
RABM03.3	APPLYING	Apply the theories of Agricultural finance with concept of credit
RABM03.4	ANALYSING	ANALYZE Players and Approaches in Microfinance & Rural Finance.
RABM03.5	EVALUATING	EXPLAIN the triangle of microfinance and the role of BDS in rural finance.
RABM03.6	CREATING	Develop a plan to create awareness about different rural finance schemes

Semester III		**SC-PHCM- 01 Fundamental of Pharma and Healthcare Management**
3 Credits	**LTP: 2:1:1**	**Pharma and Healthcare Management**

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

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
PHCM01.1	REMEMBERING	DESCRIBE concept of Pharma and healthcare management and FIND out the different role and responsibilities of managers.
PHCM01.2	UNDERSTANDING	UNDERSTAND the different managerial functions of managers
PHCM01.3	APPLYING	IDENTIFY right the motivation for right stakeholder in the healthcare sector for effective delivery of service.
PHCM01.4	ANALYSING	ANALYZE modern Pharma and Healthcare models
PHCM01.5	EVALUATING	EXPLAIN government initiatives to provide healthcare facilities in each part of country
PHCM01.6	CREATING	CONSTRUCT model to provide effective service in healthcare management

Semester III		**SE-PHCM- 03 Strategic Planning & Healthcare Management**
2 Credits	**LTP: 1:1:1**	**Pharma and Healthcare Management**

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

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
PHCM03.1	REMEMBERING	DEFINE strategy and DESCRIBE various types of Strategic planning
PHCM03.2	UNDERSTANDING	EXPLAIN why Vision Mission needs to consider for strategy formulation
PHCM03.3	APPLYING	USE strategic planning to solve the management problem in healthcare management

PHCM03.4	ANALYSING	ANALYSE various management problem where it is required to take strategic actions.
PHCM03.5	EVALUATING	COMPARE various strategic formulations and the select right strategy
PHCM03.6	CREATING	Understand the problem and DEVELOP strategy to solve it.

semester III		**SC-THM-01 Fundamentals of Hospitality Management**
3 Credits	**LTP: 2:1:1**	**Tourism and Hospitality Management**

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

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
THM01.1	REMEMBERING	DESCRIBE different types of hotels & travel agents
THM01.2	UNDERSTANDING	UNDERSTAND the basic functioning of star hotels, major operational, Departments, government rules & regulations
THM01.3	APPLYING	USE of flow charts & diagrams of various Hospitality Sectors to know the hierarchy of the organization
THM01.4	ANALYSING	EXAMINE current changes taking place in the Hotel & Tourism Industry
THM01.5	EVALUATING	EVALUATE the changes required to improve traditional methods to suit the current market trends.
THM01.6	CREATING	DEVELOP Smart techniques adaptable to the present market scenario for better customer satisfaction

Semester III		**SE-THM-03 Event Management**
2 Credits	**LTP: 2:1:1**	**Tourism and Hospitality Management**

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

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
THM03.1	REMEMBERING	DESCRIBE the fundamentals of event management & different types of Events
THM03.2	UNDERSTANDING	EXPLAIN the concepts of Events & guest requirements to plan an event
THM03.3	APPLYING	DESIGN & Budget an event from various perspectives
THM03.4	ANALYSING	EXAMINE possible shortfalls on an event & create necessary back up systems to avoid failures
THM03.5	EVALUATING	COMPARE Success of an event in comparison to the set objectives
THM03.6	CREATING	COMPOSE New concepts of the event with innovative ideas to leave a lasting impression in the guest's mind along with achieving organizational growth.

Semester: III	Course Code: SC-IB-01	304 IB: Import Export Documentation and Procedures
3 Credits	LTP: 2:1:1	Generic Core Course

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

CO	COGNITIVE ABILITIES	COURSE OUTCOMES
CO304IB.1	REMEMBERING	DESCRIBE THE PROCESS OF IMPORT AND EXPORT IN THE CONTEXT OF BUSINESS
CO304IB.2	UNDERSTANDING	EXPLAIN THE IMPORT AND EXPORT TRANSACTIONS, CLASSIFICATION AND VARIOUS PAYMENT TERMS
CO304IB.3	APPLYING	IDENTIFY VARIOUS TYPES OF DOCUMENTS REQUIRED FOR THE PROCEDURES INVOLVED IN IMPORT AND EXPORT
CO304IB.4	ANALYSING	EXAMINE VARIOUS DOCUMENTATION FORMATS FOR THE IMPORT AND EXPORT PROCESSES

CO304IB.5	EVALUATING	EXPLAIN PRE AND POST ACTIVITIES OF IMPORT AND EXPORT PROCESS
CO304IB.6	CREATING	DISCUSS ON VARIOUS ASPECTS OF TRADES, DOCUMENTATION AND PROCEDURES FOR IMPORT AND EXPORT

Semester: III	**Course Code: SE-IB-01**	**312 IB: Cross Cultural Management and Global Leadership**
2 Credits	LTP: 1:1:1	Elective Core Course

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

CO	COGNITIVE ABILITIES	COURSE OUTCOMES
CO312IB.1	REMEMBERING	DESCRIBE THE CONCEPT OF CULTURE AND SIGNIFICANCE OF CROSS-CULTURAL MANAGEMENT
CO312IB.2	UNDERSTANDING	OUTLINE THE CULTURAL VALUES AND DIFFERENCES WITH DIMENSIONS OF CULTURAL NORMS AND BEHAVIORS
CO312IB.3	APPLYING	IDENTIFY VARIOUS FACTORS AFFECTING CULTURE AND DECISION-MAKING MODELS ACROSS CULTURES
CO312IB.4	ANALYSING	EXAMINE THEORIES OF LEADERSHIP WITH LEADERSHIP ACROSS CULTURES
CO312IB.5	EVALUATING	EXPLAIN CULTURALLY INTELLIGENT LEADERSHIP IN INTERNATIONAL TRADE
CO312IB.6	CREATING	DISCUSS ON LEADING AND MANAGING MULTICULTURAL TEAMS IN INTERNATIONAL CONTEXT

MBA II (Sem IV)

Semester IV		401 – Enterprise Performance 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
CO401.1	REMEMBERING	Enumerate the different parameters & facets of management control of an enterprise.
CO401.2	UNDERSTANDING	Illustrate the various techniques of enterprise performance management for varied sectors.
CO401.3	UNDERSTANDING	Determine the applicability of various tools and metrics as a performance evaluation & management tools.
CO401.4	APPLYING	Analyse the key financial & non-financial attributes to evaluate enterprise performance.
CO401.5	ANALYSING	Formulate the various parameters to evaluate enterprise performance effectively through implementation of strategy.

Semester IV		402 – Indian Ethos & Business Ethics
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
CO402.1	REMEMBERING	DESCRIBE major theories, concepts, terms, models and framework of Indian ethos and business ethics. DISCOVER the contemporary Issues in Business Ethics
CO402.2	UNDERSTANDING	CLASSIFY and RECOGNIZE Karma, Karma Yoga and discover its relevance in business setting, ILLUSTRATE the business ethical decision rationale derived from Indian Heritage Scriptures.
CO402.3	UNDERSTANDING	APPLY Principles, Theories, Models and Framework of Indian ethos and business ethics in order to incorporate value system in work culture and work place.
CO402.4	APPLYING	DEVELOP and EXHIBIT analytical, problem solving skills, and work ethos by COMPREHENSION and PRACTICE of Indian ethos and value system
CO402.5	ANALYSING	IMPLEMENT, EVALUATE, and FACILITATE ethical business behavior and promote sustainable business ecology, improve profitability, foster business relation and employee productivity.
CO402.6	CREATING	ELABORATE Ethical dilemmas in different business areas of marketing, HRM and Finance and ADAPT dilemma resolution interventions by referring to certain norms, theories and models of Eastern Management.

Semester IV		405 – Global Strategic 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
CO405.1	Remembering	Define the concept and key terms associated with the global strategic management.
CO405.2	Understanding	Describe in detail global strategic alliance, merger and acquisitions.
CO405.3	Applying	Demonstrate various global organisation models in global strategic management context.
CO405.4	Analyzing	Examine various entry and business-level strategies from global strategic management prospective.
CO405.5	Evaluating	Explain globalization, innovation, and sustainability and challenges to strategic management.
CO405.6	Creating	Design global strategies and understand their relative merits and demerits.

Semester IV		**408 – Corporate Social Responsibility & Sustainability**
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
CO408.1	REMEMBERING	Enumerate the different concepts, legislative provisions, environmental aspects, best practices, complexity, scope, reports, social framework etc. related to CSR, business ethics & sustainability development.
CO408.2	UNDERSTANDING	Compare different CSR theories, cases, dimensions of Sustainability and demonstrate a multi stake holder perspective in viewing CSR, Business ethics & Sustainability issues etc.
CO408.3	APPLYING	Apply the different models, theories, approaches, cases etc. for implementation & monitoring of CSR activities & Sustainability and its impact on corporate culture & society at large.
CO408.4	ANALYSING	Analyze the different reports, cases, various legal issues relating to CSR, different sustainability reports and various national and global initiatives related to CSR, Business ethics & Sustainability.
CO408.5	EVALUATING	Evaluate the level of commitment of different organizations to CSR, Business ethics in attaining Sustainability development & show its competitive advantages.
CO408.6	CREATING	Create & Implement a CSR policy in attaining Sustainability development and its impact on various stakeholders.

Semester IV	SC – MKT- 05	**403 MKT: Marketing 4.0**
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
CO403MKT.1	**REMEMBERING**	DESCRIBE the various concepts associated with Marketing 4.0
CO403MKT.2	**UNDERSTANDING**	EXPLAIN the importance of 5A's in Marketing 4.0.

CO403MKT.3	**APPLYING**	DEMONSTRATE the application of concepts of digital marketing, new productivity metrics, Human centric marketing, Omni channel marketing to the real world of digital economy
CO403MKT.4	**ANALYSING**	DISTINGUISH between traditional and digital marketing practices in given real world context to be the effective marketers.
CO403MKT.5	**EVALUATING**	ASSESS how Technology & connectivity has changed human life and business in the context of real-world commodities, products & services.
CO403MKT.6	**CREATING**	DEVELOP strategies to create WOW! Moments with customer engagement

Semester IV	SC – MKT- 06	**404 MKT: Marketing Strategy**
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**
CO404MKT.1	REMEMBERING	DISCOVER perspectives of market strategy.
CO404MKT.2	UNDERSTANDING	UNDERSTAND the intricacies of competitive marketing situations and ways to handle each situation.
CO404MKT.3	APPLYING	BUILD a market strategy through integrating concepts like product life cycle, adoption, and segmentation, branding, pricing, distribution, and market communication.
CO404MKT.4	ANALYSING	ANALYSE a company's current situation through applying internal and external analyses.
CO404MKT.5	EVALUATING	EXPLAIN alternative ways to measure the outcome of market strategies.
CO404MKT.6	CREATING	CREATE Corporate Advantage by exploring how the scope of firms is influenced by resources that are shared across products.

Semester IV	(SE – IL - MKT- 13)	**409 MKT-Customer Relationship 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
CO 409MKT.1	REMEMBERING	DEFINE and DESCRIBE basic concepts and theories related to CRM.
CO 409MKT.2	UNDERSTANDING	UNDERSTAND and EXPLAIN key concepts and theories associated with CRM.
CO 409MKT.3	APPLYING	APPLY and ILLUSTRATE principles, theories and models of CRM in B2B and B2C markets.
CO 409MKT.4	ANALYZING	CLASSIFY Customer acquisition and retention strategies and ANALYZE Customer database in CRM.
CO 409MKT.5	EVALUATING	EVALUATE suitability and effectiveness of CRM strategies in specific marketing situation.
CO 409MKT.6	CREATING	DEVELOP CRM strategies/plans for various B2B and B2C markets.

Semester IV	**(SE-IL-MKT-14)**	**410MKT: Rural and Agriculture Marketing**
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**

CO410MKT.1	REMEMBERING	DEFINE various concepts related to Rural and Agricultural Marketing
CO410MKT.2	UNDERSTANDING	UNDERSTAND the rural consumer buying Behaviour, Rural Marketing Mix, COMPARE Rural and Urban market on different terms, Environment, and Consumer, Industrial and Agriculture Market.
CO410MKT.3	APPLYING	APPLY knowledge and skills of Rural Marketing to design marketing Mix strategies.
CO410MKT.4	ANALYSING	ILLUSTRATE the Rural product, Pricing and Distribution Strategies with modern approach and challenges faced in rural Market and emerging Models in Rural Market.
CO410MKT.5	EVALUATING	EVALUATE the use of ICT in Agriculture Marketing with use of various models in domestic and international Market.
CO410MKT.6	CREATING	BUILD a model for Marketing of Agricultural products by using marketing mix tools

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

CO#	Cognitive Ability	Course Outcomes
CO403 .1	Remembering	Define and Describe the basic concepts related to Financial Laws
CO403. 2	Understanding	Illustrate the implications of various laws, Explain concepts and details of various financial laws.
CO403. 3	Applying	Make use of contextual financial laws applicable to organisations.
CO403. 4	Analyzing	Infer the application of financial laws to organisations
CO403. 5	Evaluating	Appraise and perceive the benefits of applicable laws to the organisations.

Semester IV		**404 FIN Current Trends & Cases in Finance**
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
CO404FIN.1	REMEMBERING	DESCRIBE the concepts related to emerging areas of Microfinance, Small finance banks, Payment Banks, Start-Ups, SHG and Digitization and analytics
CO404FIN.2	UNDERSTANDING	EXPLAIN in detail, all the theoretical concepts taught through the syllabus
CO404FIN.3	APPLYING	APPLY the various theories and models of financial management in the case.
CO404FIN.4	ANALYSING	ANALYSE the situation and decide the key financial as well as non-financial elements involved in the situation.
CO404FIN.5	EVALUATING	EVALUATE the financial impact of the alternative on the given case.

Semester IV		**409 FIN- Fixed Income Securities**
2 Credit	**LTP : 2:1:0**	**SUBJECT ELECTIVE (SE - IL)- Fixed Income Securities**

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

CO#	Cognitive Ability	Course Outcomes
CO409FIN.1	Remembering	Describing the basic concepts of Fixed Income Securities
CO409FIN.2	Understanding	Understanding the various types of securities traded in the fixed income market and the concepts related to the risk and returns of the Fixed income securities
CO409FIN.3	Applying	Applying the knowledge of fixed income securities for diversifying the portfolio of investments
CO409FIN.4	Analyzing	Predictive analysis of the economic outlook through yield curve analysis
CO409FIN.5	Evaluating	devise the various investment strategies based on portfolio returns.

Semester IV		**412 FIN–Strategic Cost Management**

2 Credits	**LTP: 1:1:1**	**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
CO412FIN.1	REMEMBERING	Remember the basic concepts, tools and techniques of cost management in the contemporary business environment and how it has influenced cost management
CO412FIN.2	UNDERSTANDING	EXPLAIN in detail, all the theoretical concepts taught through the syllabus; differentiate between various costing techniques.
CO412FIN.3	APPLYING	ILLUSTRATE contemporary management techniques and how they are used in cost management to respond to the contemporary business environment.
CO412FIN.4	ANALYSING	ANALYSE the situation and decide the key cost factors / elements involved in the decision making
CO412FIN.5	EVALUATING	FORMULATE new models and techniques for managing the cost strategically in any business organization.

Semester IV		**403 HRM - Organizational Diagnosis & Development**
Credits: 3	**LTP: 2:1:1**	**Subject Core – Human Resource Management – 05**

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

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO404.1	REMEMBERING	DESCRIBE the major theories, concepts, terms, models tools and frameworks in the field of Organizational Diagnosis & Development.
CO404.2	UNDERSTANDING	UNDERSTAND concept of OD and 'intervention'.
CO404.3	APPLYING	MAKE USE of the Theories, Models, Principles and Frameworks of Organizational Diagnosis & Development in specific organizational settings.
CO404.4	ANALYSING	ANALYZE the external and internal environment with right tool of diagnosis and review the role of consultant in OD.
CO404.5	EVALUATING	IDENTIFY AND MAP an intervention to organisational need
CO404.6	CREATING	DESIGN the role of the consultant for an organisational issue

Semester – IV		**404 HRM: Current Trends & Cases in Human Resource Management**
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
CO404HRM.1	REMEMBERING	**DESCRIBE** the conceptual framework of Digital Disruptions and its impact on the current HR Trends.
CO404HRM.2	UNDERSTANDING	**SUMMARIZE** the impact of Current HR trends on HR Functions
CO404HRM.3	APPLYING	**ILLUSTRATE** value creation & competitive advantage of Technology on current HR Trends

CO404HRM.4	ANALYSING	**EXAMINE** the changing role of HR Priorities
CO404HRM.5	EVALUATING	**ELABORATE** upon the various types of current HR Trends
CO404HRM.6	CREATING	**APPLY** the existing Tech tools to real time HRM Challenges and offer Solutions.

Semester IV		410HRM : Designing HR Policies
2 Credits	LTP: 2:1:1	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 OBJECTIVES (CO'S)
CO.410HRM.1	REMEMBERING	IDENTIFY important points to be incorporated in HR Manual
CO.410HRM.2	UNDERSTANDING	UNDERSTAND policy requirement for Recruitment & Selection process
CO.410HRM.3	APPLYING	PREPARE policies on employee benefits for an organization of your choice
CO.410HRM.4	ANALYSING	ILLUSTRATE steps involved in better employee relations & grievance handling
CO.410HRM.5	CREATING	CONSTRUCT various HR policies for an organization of your choice

Semester IV		412HRM : Best Practices In HRM
2 Credits	LTP: 1:1:1	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 OBJECTIVES (CO'S)
CO.412HRM.1	REMEMBERING	DEFINE dynamic approach towards Human Resource activities and practices.
CO.412HRM.2	UNDERSTANDING	EXPLAIN theoretical framework for best practices.
CO.412HRM.3	APPLYING	IDENTIFY & CLASSIFY the practices according to the industry and sub sectors of the industry.
CO.412HRM.4	ANALYSING & EVALUATING	COMPARE and DETERMINE various skill sets required at Human Resource Section.
CO.412HRM.5	CREATING	PLAN a survey of various industry and DEVELOP a trend analysis of Human Resource Best Practices.

Semester IV		403 OSCM- E Supply Chains and Logistics
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

CO403OSCM .1	REMEMBERING	DESCRIBE the structure of modern days Logistics.
CO403OSCM .2	UNDERSTANDING	EXPLAIN the key concepts of Supply Chain Management and the – driving forces in contemporary Supply Chain Management.
CO403OSCM .3	APPLYING	IDENTIFY the various flows in real world supply chains and Logistics. IDSCRIBE the importance of documentations.
CO403OSCM .4	ANALYSING	COMPARE and CONTRAST push and pull strategies in Supply Chain Management. ANALYSE the impact of tracking system linkage in Logistics.
CO403OSCM .5	EVALUATING	EXPLAIN the key Operational Aspects of E Procurement.
CO403OSCM .6	CREATING	DEVELOP a framework for e-logistics

Semester IV		**404 OSCM- Industry 4.0**
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
CO404OSCM .1	REMEMBERING	DEFINE industrial revolutions and its different aspects.
CO404OSCM .2	UNDERSTANDING	EXPLAIN the role of technology pillars of Industry 4.0.
CO404OSCM .3	APPLYING	DEMONSTRATE the use of data in effective decision making.
CO404OSCM .4	ANALYSING	ILLUSTRATE the need of cyber physical system for sustainable competitive advantage.
CO404OSCM .5	EVALUATING	EXPLAIN the challenges faced by various industries in full fledge implementation of Industry 4.0
CO404OSCM .6	CREATING	DEVELOP a framework for any organization using base of Smart Industry Readiness Index Proposed by Singapore EDB

Semester IV		**409 OSCM- Enterprise Resource Planning**
2 Credits	**LTP: 2:1:1**	**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
CO409OSCM.1	REMEMBERING	DESCRIBE the key concepts of ERP systems for manufacturing or service organizations.
CO409 OSCM.2	UNDERSTANDING	EXPLAIN the scope of common ERP Systems modules.
CO409 OSCM.3	APPLYING	DEVELOP basic understanding of how ERP enriches the business organizations in achieving a multidimensional growth.
CO409 OSCM.4	ANALYSING	EXAMINE the challenges associated with implementing enterprise systems and their impacts on organizations.
CO409 OSCM.5	EVALUATING	JUSTIFY selection of an appropriate ERP transition strategy.
CO409 OSCM.6	CREATING	FORMULATE best selection and implementation strategy in a real setting.

Semester IV		**410 OSCM- World Class Manufacturing**
2 Credits	**LTP: 2:1:1**	**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
CO410OSCM.1	REMEMBERING	DEFINE the basic terms associated with Manufacturing Excellence and World Class Manufacturing
CO410OSCM.2	UNDERSTANDING	SUMMARIZE the features of various frameworks used for World Class Manufacturing
CO410OSCM.3	APPLYING	IDENTIFY the challenges to manufacturing industry in the information age
CO410OSCM.4	ANALYSING	ANALYZE the usage of Information management tools, Material processing and handling tools.
CO410OSCM.5	EVALUATING	EVALUATE the country's preparedness for World Class Manufacturing
CO410OSCM.6	CREATING	ESTIMATE the performance of manufacturing firms with the measurement system to determine the readiness for World Class Manufacturing

Semester IV		**403 BA- Economics of Network Industries**
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
CO403BA .1	REMEMBERING	APPRECIATE the differences in the nature of information goods as opposed to traditional goods and services.
CO403BA .2	UNDERSTANDING	DESCRIBE the characteristics of the markets for network products.
CO403BA .3	APPLYING	ILLUSRTRATE the characteristics of the cost structure of information goods and its implications for pricing of information goods w.r.t. price discrimination, versioning of information goods, and bundling
CO403BA .4	ANALYSING	COMPARE and CONTRAST the pros and cons of keeping products compatible, and strategic aspects of the decision regarding compatibility.
CO403BA .5	EVALUATING	EVALUATE the role of complementary products, compatibility and standards, switching costs and lock-in in network industries.
CO403BA .6	CREATING	DISCUSS the economics of Internet advertising, and the business model of zero pricing.

Semester IV		**404 BA- Artificial Intelligence in Business Applications**
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
CO404BA .1	REMEMBERING	IDENTIFY KNOWLEDGE associated and represent it by logical sequence and plan a strategy to solve given problem
CO404BA .2	UNDERSTANDING	UNDERSTAND AI's fundamental concepts and methods.
CO404BA .3	APPLYING	APPLY various machine learning algorithms on structured data to develop machine learning models.
CO404BA .4	ANALYSING	ACQUIRE advanced Data ANALYSIS SKILLS through algorithm and search processes.

CO404BA .5	EVALUATING	SELECT logical and functional process to develop the model
CO404BA .6	CREATING	CREATE SOLUTIONS for various business problems using AI techniques.

Semester IV		**409 BA- E Commerce Analytics - II**
2 Credits	**LTP: 2:1:1**	**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
CO409BA.1	REMEMBERING	DESCRIBE the key concepts in e-commerce analytics.
CO409BA.2	UNDERSTANDING	DEMONSTRATE the use of analytics to drive profitability throughout the organization, and across the entire customer experience and lifecycle.
CO409BA.3	APPLYING	SOLVE the unique problems in e-commerce, and transform data into better decisions and customer experiences.
CO409BA.4	ANALYSING	DISCOVER high-value insights via dashboards and visualization.
CO409BA.5	EVALUATING	DEVELOP analytical approaches to improve ecommerce marketing and advertising, understand customer behavior, increase conversion rates, strengthen loyalty, optimize merchandising and product mix, streamline transactions, optimize product mix, and accurately attribute sales.
CO409BA.6	CREATING	FORMULATE the right analytics driven strategy for ecommerce businesses.

Semester IV		**410BA: Healthcare Analytics**
2 Credits	**LTP: 2:0:0**	**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
CO410BA.1	REMEMBERING	DESCRIBE the key terms in healthcare data analytics
CO410BA.2	UNDERSTANDING	EXPLAIN the fundamental concepts in Health Care Analytics
CO410BA.3	APPLYING	ILLUSTRATE the use of specific tools and techniques to design effective ways of handling, retrieving, analyzing, and making use of healthcare data
CO410BA.4	ANALYSING	EXAMINE the issues associated with the applications of intelligent data acquisition, processing, and analysis of healthcare data
CO410BA.5	EVALUATING	EXPLAIN the perspectives of healthcare related opportunities for developing new analytical approaches.
CO410BA.6	CREATING	ADAPT healthcare data analytics for improving the health and well-being of people.

Semester IV		**SC – RABM – 02 ICT for Agriculture Management**
3 Credits	**LTP: 2:1:1**	**Rural & Agri Business Management**

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

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
RABM02.1	REMEMBERING	RECALL the basic terminologies related to ICT
RABM02.2	UNDERSTANDING	UNDERSTAND the use of ICT with different aspects & various issues & challenges for ICT information services
RABM02.3	APPLYING	Apply the GIS Applications in micro resource mapping

RABM02.4	ANALYSING	ANALYZE the different tools and techniques used under ICT in Agriculture Management
RABM02.5	EVALUATING	EVALUATE the common ICT platforms for information services
RABM02.6	CREATING	CHOOSE the right ICT as per the requirement of agriculture activity

Semester IV		**SE – RABM – 05 Agri – Entrepreneurship**
2 Credits	**LTP: 1:1:1**	**Rural & Agri Business Management**

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

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
RABM05.1	REMEMBERING	DEFINE the term rural entrepreneurship and ENUMERATE factors that support women's participation in rural entrepreneurship
RABM05.2	UNDERSTANDING	UNDERSTAND the Process of entrepreneurship, aims, and barriers
RABM05.3	APPLYING	APPLY different ICT in Rural entrepreneurship development.
RABM05.4	ANALYSING	Analyze the importance of IT in rural India and role of entrepreneur in rural development.
RABM05.5	EVALUATING	EVALUATE the rural capabilities, Endowment of Skill sets and Natural resources in rural India
RABM05.6	CREATING	Design the business plan, factors considering rural development & Rural BPO

Semester IV		**SC-PHCM- 02 Pharma and Healthcare regulatory environment in India**
3 Credits	**LTP: 2:1:1**	**Pharma and Healthcare Management**

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

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
PHCM02.1	REMEMBERING	IDENTIFY various environmental factors affecting on Pharma and Healthcare industry
PHCM02.2	UNDERSTANDING	UNDERSTAND various laws applicable to Pharma and Healthcare industry
PHCM02.3	APPLYING	Understand the situation and identity right legal way to solve the problem.
PHCM02.4	ANALYSING	ANALYSE steps involved in Intellectual Property Rights registrations
PHCM02.5	EVALUATING	CHOOSE the right type of IPR as per the content and work available to protect.
PHCM02.6	CREATING	Elaborate the different laws developed by constitutions to support and protect Pharma and Healthcare sector

Semester IV		**SE-PHCM- 05 Pharmaceutical Import and Export**
2 Credits	**LTP: 1:1:1**	**Pharma and Healthcare Management**

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

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
PHCM05.1	REMEMBERING	DEFINE the various concepts related to import and export procedure

PHCM05.2	UNDERSTANDING	DISCUSS various steps involved in export procedures of pharmaceutical product
PHCM05.3	APPLYING	IDENTIFY the international market for pharmaceutical product
PHCM05.4	ANALYSING	ANALYZE different payments methods used in international trade
PHCM05.5	EVALUATING	DETERMINE various rules and regulations related to export procedures of pharmaceutical product
PHCM05.6	CREATING	CHOOSE right product for the right International market.

Semester IV		**SC-THM-02 Tourism and Travel Management**
3 Credits	**LTP: 2:1:1**	**Tourism and Hospitality Management**

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

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
THM02.1	REMEMBERING	DEFINE the various components of the Tourism Industry & Types of Tourism
THM02.2	UNDERSTANDING	UNDERSTAND basic operations of a Travel Agency & tour conduction
THM02.3	APPLYING	EXECUTE theoretical knowledge to design various tour packages & work on costing for the packages
THM02.4	ANALYSING	Analyze changing trends in Travel & Transport industry- Domestic & International
THM02.5	EVALUATING	INTERPRET the impacts of Tourism Industry globally & practicing of Eco- Tourism
THM02.6	CREATING	BUILD new concepts of Eco-Tourism according to customer requirements

Semester IV		**SE-THM-05 Strategic Hospitality Management**
2 Credits	**LTP: 2:1:1**	**Tourism and Hospitality Management**

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

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
THM05.1	REMEMBERING	DEFINE Concept & process of Strategic thinking Major Players of Hospitality & Travel Industry
THM05.2	UNDERSTANDING	DISCUSS Strategic management for various organizations factors influencing strategy formulations
THM05.3	APPLYING	IMPLEMENT strategies for Hotels & Travel Agents with the help of structured designs & flow charts
THM05.4	ANALYSING	ANALYSE Suitable strategies for different Hospitality sectors with consideration to micro & macro environments
THM05.5	EVALUATING	EVALUATE Current market scenario & suggest strategies that can be utilized for the benefits of the company
THM05.6	CREATING	DEVELOP Strategies for standalone units, a chain of hotels, small and large travel agents International strategies for small & big players

Semester: IV	Course Code: SC-IB-02	404 IB: Global Trade and Logistics Management
3 Credits	LTP: 2:1:1	Generic Core Course

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

CO	COGNITIVE ABILITIES	COURSE OUTCOMES

CO404IB.1	REMEMBERING	DESCRIBE THE ECONOMIC SIGNIFICANCE OF TRADE ALONG WITH THE LOGISTICS PROCESSES
CO404IB.2	UNDERSTANDING	EXPLAIN INTERNATIONAL TRADE THEORIES AND APPLICATIONS IN BUSINESS
CO404IB.3	APPLYING	IDENTIFY VARIOUS ENVIRONMENTAL FACTORS ASSOCIATED WITH INTERNATIONAL BUSINESS
CO404IB.4	ANALYSING	EXAMINE VARIOUS MODES AND PRACTICES OF INTERNATIONAL LOGISTICS
CO404IB.5	EVALUATING	EXPLAIN THE ACTIVITIES INVLOLVED IN ENTIRE LOGISTICS PROCESSS IN INTERNATIONAL BUSINESS
CO404IB.6	CREATING	DEVELOP THE APPROPRIATE STTRATEGY OF OPERATIONS FOR GLOBAL TRADE AND LOGISTICS

Semester: IV	**Course Code: SE-IB-03**	**409 IB: Global Competitiveness, Value Chains and Alliances**
2 Credits	LTP: 1:1:1	Elective Core Course

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

CO	**COGNITIVE ABILITIES**	**COURSE OUTCOMES**
CO409IB.1	REMEMBERING	DESCRIBE THE CONCEPT OF GLOBALISATION AND GLOBAL COMPETITIVENESS IN INTERNATIONAL BUSINESS
CO409IB.2	UNDERSTANDING	EXPLAIN THE EFFICACY OF THE FOREIGN COLLABORATIONS AND JOINT VENTURES IN INTERNATIONAL BUSINESS
CO409IB.3	APPLYING	IDENTIFY VARIOUS ELEMENTS OF VALUE CHAIN INVOLVED IN IMPORT AND EXPORT BUSINESS
CO409IB.4	ANALYSING	EXAMINE VARIOUS FACTORS OF INTERNATIONAL SUPPLY CHAIN DESIGN AND GLOBAL PROCUREMENT AND DISTRIBUTION
CO409IB.5	EVALUATING	EVALUATE THE GLOBAL COMPETITIVENESS INDEX FOR INTERNATIONAL BUSINESS
CO409IB.6	CREATING	DISCUSS ON ROLE AND SIGNIFICANCE OF STRATEGIC ALLIANCES IN INTERNATIONAL BUSINESS CONTEXT

1.1 **Programme Educational Objectives (PEOs):**

PEO1: 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.

PEO2: Students will be able to steer their **career** productively in software industry, academia, research, entrepreneurial pursuit, government, consulting firms and other IT enabled services.

PEO3: 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.**

PEO4: To continue a lifelong professional development in computing that **contributes in self and societal growth**.

1.2 **Programme Outcomes (POs):** At the end of the MCA programme the learner will possess the following Program Outcome:

PO1: Apply knowledge of computing fundamentals, computing specialization, mathematics, and domain knowledge appropriate for the computing specialization to the abstraction and conceptualization of computing models from defined problems and requirements.

PO2: Identify, formulate, research literature, and solve *complex* Computing problems reaching substantiated conclusions using fundamental principles of Mathematics, Computing sciences, and relevant domain disciplines.

PO3: Design and evaluate solutions for complex computing problems, and design and evaluate systems, components, or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.

PO4: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions.

PO5: Create, select, adapt and apply appropriate techniques, resources, and modern computing tools to complex computing activities, with an understanding of the limitations.

PO6: Understand and commit to professional ethics and cyber regulations, responsibilities, and norms of professional computing practice.

PO7: Recognize the need, and have the ability, to engage in independent learning for continual development as a Computing professional.

PO8: Demonstrate knowledge and understanding of computing 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.

PO9: Communicate effectively with the computing community, and with society at large, about complex computing activities by being able to comprehend and write effective reports, design documentation, make effective presentations, and give and understand clear instructions.

PO10: Understand and assess societal, environmental, health, safety, legal, and cultural issues within local and global contexts, and the consequential responsibilities relevant to professional computing practice.

PO11: Function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary environments.

PO12: Identify a timely opportunity and using innovation to pursue that opportunity to create value and wealth for the betterment of the individual and society at large.

1.3 Program Specific Outcomes (PSOs)

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 I (Sem I)

IT-11	Java Programming
CO1	Understand Basic Concepts of OOPs, Java, Inheritance, Package. (Understand)
CO2	Understand Exception handling, arrays and Strings and multi-threading in Java (Understand.)
CO3	Understand collection framework (Understand)
CO4	Develop GUI using Abstract Windows Toolkit (AWT) and event handling (Apply)
CO5	Develop Web application using JSP and Servlet, JDBC (Apply)

IT-12	Data Structure and Algorithms
CO1	Demonstrate linear data structures linked list, stack and queue (apply)
CO2	Implement tree, graph, hash table and heap data structures (apply)
CO3	Apply brute force and backtracking techniques (apply)
CO4	Demonstrate greedy and divide-conquer approaches (apply)
CO5	Implement dynamic programming technique (apply)

IT-13	Object Oriented Software Engineering
CO1	Distinguish different process model for a software development. (Understand)
CO2	Design software requirements specification solution for a given problem definitions of a software system. (Analyse)
CO3	Apply software engineering analysis/design knowledge to suggest solutions for simulated problems (Analyse)
CO4	Design user interface layout for different types of applications (Apply)
CO5	Recognize and describe current trends in software engineering (Understand)

IT-14	Operating Systems Concepts
CO1	Understand structure of OS, process management and synchronization. (Understand)
CO2	Understand multicore and multiprocessing OS. (Understand)

CO3	Explain Real time and embedded OS (Understand)
CO4	Understand Windows and Linux OS fundamentals and administration. (Understand)
CO5	Solve shell scripting problems (Apply)

IT-15	Network Technologies
CO1	Understand the basic concepts of Computer Network, and principle of layering (Understand)
CO2	Apply the error detection and correction techniques used in data transmission (Apply)
CO3	Apply IP addressing schemes and sub netting (Apply)
CO4	Understand the concept of routing protocols, Application layer protocols and Network Security (Understand)
CO5	Apply the socket programming basics to create a simple chat application (Apply)

IT-11L	Practical
CO1	Demonstrate Collection framework (Apply)
CO2	Develop GUI using awt and swing (Apply)
CO3	Develop Web application using JSP and Servlet, JDBC (Apply)
CO4	Apply Data Structure to solve problems using JavaScript (Apply)

ITC11	Mini Project
CO1	Create working project using tools and techniques learnt in this semester (Create)

MCA I (Sem II)

IT-21	Python Programming
CO1	Understand Demonstrate the concepts of python and modular programming. (Understand)
CO2	Apply the concepts of concurrency control in python (Apply)

CO3	Solve the real-life problems using object-oriented concepts and python libraries (Apply)
CO4	Demonstrate the concept of IO, Exception Handling, database (Apply)
CO5	Analyse the given dataset and apply the data analysis concepts and data Visualization. (Analyse)

IT-22	Software Project Management
CO1	Understand the process of Software Project Management Framework and Apply estimation techniques. (Apply)
CO2	Learn the philosophy, principles and lifecycle of an agile project. (Understand)
CO3	Demonstrate Agile Teams and Tools and Apply agile project constraints and trade-offs for estimating project size and schedule (Apply)
CO4	Explain Project Tracking and Interpretation of Progress Report (Understand)
CO5	Analyse Problem statement and evaluate User Stories (Analyse)

MT-21	Optimization Techniques
CO1	Understand the role and principles of optimization techniques in business world (Understand)
CO2	Demonstrate specific optimization technique for effective decision making (Apply)
CO3	Apply the optimization techniques in business environments (Apply)
CO4	Illustrate and infer for the business scenario (Analyse)
CO5	Analyse the optimization techniques in strategic planning for optimal gain. (Analyse)

IT-23	Advanced Internet Technologies
CO1	Outline the basic concepts of Advance Internet Technologies (Understand)
CO2	Design appropriate user interfaces and implements webpage based on given problem Statement (Apply)
CO3	Implement concepts and methods of NodeJS (Apply)
CO4	Implement concepts and methods of Angular (Apply)
CO5	Build Dynamic web pages using server-side PHP programming with Database Connectivity (Apply)

IT-24	Advanced DBMS
CO1	Describe the core concepts of DBMS and various databases used in real applications (Understand)
CO2	Design relational database using E-R model and normalization (Apply)
CO3	Demonstrate XML database and nonprocedural structural query languages for data access (Apply)
CO4	Explain concepts of Parallel, Distributed and Object-Oriented Databases and their applications (Understand)
CO5	Apply transaction management, recovery management, backup and security – privacy concepts for database applications (Apply)

IT-21L	Practical
CO1	Implement python programming concepts for solving real life problems. (Apply)
CO2	Implement Advanced Internet Technologies (Apply)

ITC21	Mini Project
CO1	Create working project using tools and techniques learnt in this semester (Create)