

**Course outcomes of all dept (ODD & EVEN) A. Y. 2022-23 required in following format****Course Outcomes****After the completion of the course the student should be able to****Course Name: CSC301 Engineering Mathematics- III****Year of Study: 2022-23**

CSC301.1	Understand the concept of Laplace transform and its application to solve the real integrals in engineering problems.
CSC301.2	Understand the concept of inverse Laplace transform of various functions and its applications in engineering problems.
CSC301.3	Expand the periodic function by using Fourier series for real life problems and complex engineering problems.
CSC301.4	Understand complex variable theory, application of harmonic conjugate to get orthogonal trajectories and analytic function.
CSC301.5	Apply the concept of Correlation and Regression to the engineering problems in data science, machine learning and AI.
CSC301.6	Understand the concepts of probability and expectation for getting the spread of the data and distribution of probabilities.

**Course Name: CSC302 Discrete Structures and Graph Theory****Year of Study: 2022-23**

CSC302.1	Understand the notion of mathematical thinking, mathematical proofs and to apply them in problem solving.
CSC302.2	Ability to reason logically.
CSC302.3	Ability to understand relations, functions, Diagraph and Lattice

CSC302.4	Ability to understand and apply concepts of graph theory in solving real world problems.
CSC302.5	Understand use of groups and codes in Encoding-Decoding.
CSC302.6	Analyze a complex computing problem and apply principles of discrete mathematics to identify solutions
<b>Course Name: CSC303 Data Structures</b> <span style="float: right;"><b>Year of Study: 2022-23</b></span>	
CSC303.1	Implementing Linear and Non-linear data structures
CSC303.2	Handling Various operations like searching, insertion, deletion and traversals on various data structures.
CSC303.3	Explaining various data structures, related terminologies and its types.
CSC303.4	Selecting appropriate data structures and apply it to solve problems in various domains.
CSC303.5	Analyzing and implementing appropriate searching techniques for a given problem.
CSC303.6	Analyzing, designing, applying, and using data structures to solve engineering problems and evaluating their solutions.
<b>Course Name: CSC304 Digital Logic and Computer architecture</b> <span style="float: right;"><b>Year of Study: 2022-2023</b></span>	
CSC304.1	To learn different number systems and basic structure of computer system.
CSC304.2	To demonstrate the arithmetic algorithms.
CSC304.3	To understand the basic concepts of digital components and processor organization.

CSC304.4	To understand the generation of control signals of computer.
CSC304.5	To demonstrate the memory organization.
CSC304.6	To describe the concepts of parallel processing and different Buses.

**Course Name: CSC305 Computer Graphics Year of Study: 2022-2023**

CSC305 .1	Students will be able to understand the basic concepts of Computer Graphics.
CSC305 .2	Students will be able to implement the various algorithms for scan conversion and filling of basic objects and their comparative analysis.
CSC305 .3	Students will be able to apply 2D geometric transformations.
CSC305 .4	Students will be able to apply 2D Viewing & Clipping
CSC305 .5	Students will be able to understand 3D Object representations, Geometric Transformation and Viewing
CSC305 .6	Students will be able to understand Visible Surface Detection, Illumination Models and Surface Rendering

**Course Name: CSL301 Data Structure Lab Lab Year of Study: 2022-23**

CSL301.1	Students will be able to implement linear data structures & be able to handle operations like insertion, deletion, searching and traversing on them.
CSL301.2	Students will be able to implement nonlinear data structures & be able to handle operations like insertion, deletion, searching and traversing on them
CSL301.3	Students will be able to choose appropriate data structure and apply it in various problems

CSL301.4	Students will be able to select appropriate searching techniques for given problems.
<b>Course Name: CSL302 Digital logic and Computer Organisation lab Year of Study: 2022-23</b>	
CSL302.1	To understand the basics of digital components
CSL302.2	Design the basic building blocks of a computer: ALU, registers, CPU and memory
CSL302.3	To recognize the importance of digital systems in computer architecture
CSL302.4	To implement various algorithms for arithmetic operations.
<b>Course Name: CSL303 Computer Graphics Lab Year of Study: 2022-23</b>	
<b>CSL303.1</b>	Implement various output and filled area primitive algorithms
<b>CSL303.2</b>	Apply transformation, projection and clipping algorithms on graphical objects.
<b>CSL303.3</b>	Perform curve and fractal generation methods.
<b>CSL303.4</b>	Develop a Graphical application/Animation based on learned concept
<b>Course Name: CSL304 OOPM(Java) Lab Year of Study: 2022-23</b>	
CSL304.1	To apply fundamental programming constructs.
CSL304.2	To illustrate the concept of packages, classes and objects.

CSL304.3	To elaborate the concept of strings, arrays and vectors.
CSL304.4	To implement the concept of inheritance and interfaces.
CSL304.5	To implement the concept of exception handling and multithreading.
CSL304.6	To develop GUI based application.
<b>Course Name: CSM-301 Mini Project 1- A Year of Study: 2022-23</b>	
<b>CSM301.1</b>	Identify the problems based on societal/research needs
<b>CSM301.2</b>	Apply Knowledge, skill to solve societal problems in a group.
<b>CSM301.3</b>	Develop interpersonal skills to work as member of a group or leader.
<b>CSM301.4</b>	Draw the proper inferences from available results through theoretical/experimental/simulations.
<b>CSM301.5</b>	Analyze the impact of solutions in societal and environmental context for sustainable development.
<b>CSM301.6</b>	Use standard norms of engineering practices
<b>CSM301.7</b>	Excel in written and oral communication.
<b>CSM301.8</b>	Demonstrate capabilities of self-learning in a group, which leads to lifelong learning.
<b>CSM301.9</b>	Demonstrate project management principles during project work.

**Course Name: CSC401 Engineering Mathematics- IV: 2022-23**

CSC401.1	Apply the concepts of eigen values and eigen vectors in engineering problems.
CSC401.2	Use the concepts of Complex Integration for evaluating integrals, computing residues & evaluate various contour integrals.
CSC401.3	Apply the concept of Z- transformation and its inverse in engineering problems.
CSC401.4	Use the concept of probability distribution and sampling theory to engineering problems.
CSC401.5	Apply the concept of Linear Programming Problems of optimization
CSC401.6	Solve Non-Linear Programming Problems to engineering problems of optimization.

**Course Name: CSC402 Analysis of Algorithms Year of Study: 2022-23**

CSC402.1	Analyze the running time and space complexity of algorithms.
CSC402.2	Describe, apply and analyze the complexity of divide and conquer strategy.
CSC402.3	Describe, apply and analyze the complexity of greedy strategy
CSC402.4	Describe, apply and analyze the complexity of dynamic programming strategy.
CSC402.5	Explain and apply backtracking, branch and bound.
CSC402.6	Explain and apply string matching techniques

**Course Name: CSC403 Database Management System    Year of Study: 2022-23**

<b>CSC403.1</b>	Understand the need of database management systems.
<b>CSC403.2</b>	Design ER and EER diagram for real life applications.
<b>CSC403.3</b>	Convert ER and EER model to Relational Model.
<b>CSC403.4</b>	Design database using SQL.
<b>CSC403.5</b>	Apply the concept of normalization to relational database design.
<b>CSC403.6</b>	Understand the concept of transaction, concurrency and recovery.

**Course Name: CSC404 Operating System Year of Study: 2022-23**

<b>CSC404.1</b>	Understand the objectives, functions and structure of OS
<b>CSC404.2</b>	Analyze the concept of process management and evaluate performance of process scheduling algorithms.
<b>CSC404.3</b>	Understand and apply the concepts of synchronization and deadlocks
<b>CSC404.4</b>	Evaluate performance of Memory allocation and replacement policies
<b>CSC404.5</b>	Understand the concepts of file management.
<b>CSC404.6</b>	Apply concepts of I/O management and analyze techniques of disk scheduling

<b>Course Name CSC405 Microprocessor Year of Study: 2022-23</b>	
<b>CSC405.1</b>	<b>Describe core concepts of 8086 microprocessor.</b>
<b>CSC405.2</b>	<b>Interpret the instructions of 8086 and write assembly and Mixed language programs.</b>
<b>CSC405.3</b>	<b>Identify the specifications of peripheral chip.</b>
<b>CSC405.4</b>	<b>Design 8086 based system using memory and peripheral chips.</b>
<b>CSC405.5</b>	<b>Appraise the architecture of advanced processors</b>
<b>CSC405.6</b>	<b>Understand hyperthreading technology</b>
<b>Course Name CSL401 Analysis of Algorithm Lab Year of Study: 2022-23</b>	
CSL401.1	Implement the algorithms using different approaches
CSL401.2	Analyze the complexities of various algorithms.
CSL401.3	Compare the complexity of the algorithms for specific problem
<b>Course Name: CSL402 Database Management system Lab Lab Year of Study: 2022-23</b>	
CSL402.1	Design ER /EER diagram and convert to relational model for the realworld application.
CSL402.2	Apply DDL, DML, DCL and TCL commands

CSL402.3	Write simple and complex queries
CSL402.4	UsePL / SQL Constructs.
CSL402.5	Demonstrate the concept of concurrent transactions execution and frontend-backend connectivity
<b>Course Name: CSL403 Operating system Lab: 2022-23</b>	
CSL403.1	Demonstrate basic Operating system Commands, Shell scripts, System Calls and API with Linux
CSL403.2	Implement various process scheduling algorithms and evaluate their performance.
CSL403.3	Implement and analyze concepts of synchronization and deadlocks.
CSL403.4	Implement various Memory Management techniques and evaluate their performance.
CSL403.5	Implement and analyze concepts of virtual memory.
CSL403.6	Demonstrate and analyze concepts of file management and I/O management techniques.
<b>Course Name: CSL404 Microprocessor Lab Year of Study: 2022-23</b>	
<b>CSL404.1</b>	<b>Use appropriate instructions to program microprocessor to perform various task</b>
<b>CSL404.2</b>	<b>Develop the program in assembly/ mixed language for Intel 8086 processor</b>
<b>CSL404.3</b>	<b>Demonstrate the execution and debugging of assembly/ mixed language program</b>

<b>Course Name: CSL405 Skill base Lab course: Python Programming    Year of Study: 2022-23</b>	
<b>CSL405.1</b>	<b>To understand basic concepts in python.</b>
<b>CSL405.2</b>	<b>To explore contents of files, directories and text processing with python</b>
<b>CSL405.3</b>	<b>To develop program for data structure using built in functions in python</b>
<b>CSL405.4</b>	<b>To explore django web framework for developing python-based web application.</b>
<b>CSL405.5</b>	<b>To understand Multithreading concepts using python.</b>
<b>Course Name: CSM401 Mini Project 1 - B Year of Study: 2022-23</b>	
CSM401.1	Identify the problems based on societal/research needs
CSM401.2	Apply Knowledge, skill to solve societal problems in a group.
CSM401.3	Develop interpersonal skills to work as member of a group or leader.
CSM401.4	Draw the proper inferences from available results through theoretical/experimental/simulations.
CSM401.5	Analyze the impact of solutions in societal and environmental context for sustainable development.
CSM401.6	Use standard norms of engineering practices
CSM401.7	Excel in written and oral communication.

CSM401.8	Demonstrate capabilities of self-learning in a group, which leads to lifelong learning.
CSM401.9	Demonstrate project management principles during project work.

**Course Name: CSC501 Theory of Computer Science Year of Study: 2022-23**

<b>CSC501.1</b>	Understand the difference between NFA and DFA .
<b>CSC501.2</b>	Apply the equivalence of languages described by finite automata and regular expressions
<b>CSC501.3</b>	Apply regular, context free grammars while recognizing the strings and tokens.
<b>CSC501.4</b>	Design pushdown automata to recognize the language
<b>CSC501.5</b>	Develop an understanding of computation through Turing Machine.
<b>CSC501.6</b>	Apply problems on decidability and undecidability

**Course Name: CSC502 Software Engineering Year of Study: 2022-23**

<b>CSC502.1</b>	<b>Identify requirements &amp; assess the process models.</b>
<b>CSC502.2</b>	<b>Plan, schedule and track the progress of the projects.</b>
<b>CSC502.3</b>	<b>Design the software projects.</b>

<b>CSC502.4</b>	<b>Do testing of software project.</b>
<b>CSC502.5</b>	<b>Identify risks, manage the change to assure quality in software projects.</b>
<b>Course Name: CSC503 Computer Network Year of Study: 2022-23</b>	
<b>CSC503.1</b>	Demonstrate the concepts of data communication at physical layer and compare ISO - OSI model with TCP/IP model.
<b>CSC503.2</b>	Explore different design issues at data link layer.
<b>CSC503.3</b>	Design the network using IP addressing and sub netting / supernetting schemes.
<b>CSC503.4</b>	Analyze transport layer protocols and congestion control algorithms.
<b>CSC503.5</b>	Explore protocols at application layer
<b>CSC503.6</b>	Explore the different protocols used at application layer i.e. HTTP, SNMP, SMTP, FTP, TELNET and VPN.
<b>Course Name: Data Warehousing and Data Mining Year of Study: 2022-23</b>	
<b>CSC504.1</b>	Understand data warehouse fundamentals and design data warehouse with dimensional modelling and apply OLAP operations.
<b>CSC504.2</b>	Understand data mining principles and perform Data preprocessing and Visualization.
<b>CSC504.3</b>	Identify appropriate data mining algorithms to solve real world problems.
<b>CSC504.4</b>	Compare and evaluate different data mining techniques like classification, prediction, clustering and association rule mining

<b>CSC504.5</b>	Describe complex information and social networks with respect to web mining.
<b>Course Name: Business Communication &amp; Ethics II</b>	
<b>Year of Study: 2022-23</b>	
<b>CSL504.1</b>	Plan and prepare effective business/ technical documents which will in turn provide solid foundation for their future managerial roles
<b>CSL504.2</b>	Strategize their personal and professional skills to build a professional image and meet the demands of the industry.
<b>CSL504.3</b>	Emerge successful in group discussions, meetings and result-oriented agreeable solutions in group communication situations.
<b>CSL504.4</b>	Deliver persuasive and professional presentations.
<b>CSL504.5</b>	Develop creative thinking and interpersonal skills required for effective professional communication.
<b>CSL504.6</b>	Apply codes of ethical conduct, personal integrity and norms of org
<b>Course Name: Internet Programming</b>	
<b>CSDL5012.1</b>	Implement interactive web page(s) using HTML and CSS
<b>CSDL5012.2</b>	Design a responsive web site using JavaScript
<b>CSDL5012.3</b>	Demonstrate database connectivity using JDBC
<b>CSDL5012.4</b>	Demonstrate Rich Internet Application using Ajax
<b>CSDL5012.5</b>	Demonstrate and differentiate various Web Extensions.

CSDL5012.6	Demonstrate web application using Reactive Js
<b>Course Name: Computer Networks Lab Year of study: 2022-23</b>	
CSL502.1	Design and setup networking environment in Linux
CSL502.2	Use Network tools and simulators such as NS2, Wireshark etc. to explore networking algorithms and protocols.
CSL502.3	Implement programs using core programming APIs for understanding networking concepts.
<b>Course Name: Dataware Housing and mining Lab Year of Study: 2022-23</b>	
CSL503.1	Design data warehouse and perform various OLAP operations.
CSL503.2	Implement data mining algorithms like classification.
CSL503.3	Implement clustering algorithms on a given set of data sample.
CSL503.4	Implement Association rule mining
CSL503.5	Implement various visualisation techniques
CSL503.6	Implement various web mining algorithm.
<b>Course Name: Software Engineering Lab Year of Study: 2022-23</b>	

<b>CSL501. 1</b>	<b>Identify requirements and apply software process model to selected case study.</b>
<b>CSL501. 2</b>	<b>Develop architectural models for the selected case study.</b>
<b>CSL501. 3</b>	<b>Use computer-aided software engineering (CASE) tools.</b>
<b>Course Name:PCE</b>	
<b>Year of Study: 2022-23</b>	
<b>CSL504.1</b>	Plan and prepare effective business/ technical documents which will in turn provide solid foundation for their future managerial roles
<b>CSL504.2</b>	Strategize their personal and professional skills to build a professional image and meet the demands of the industry.
<b>CSL504.3</b>	Emerge successful in group discussions, meetings and result-oriented agreeable solutions in group communication situations.
<b>CSL504.4</b>	Deliver persuasive and professional presentations.
<b>CSL504.5</b>	Develop creative thinking and interpersonal skills required for effective professional communication.
<b>CSL504.6</b>	Apply codes of ethical conduct, personal integrity and norms of org
<b>Course Name: Mini Project 2A</b>	
<b>Year of Study: 2022-23</b>	
<b>CSM501.1</b>	Identify societal/research/innovation/entrepreneurship problems through appropriate literature surveys
<b>CSM501.2</b>	Identify Methodology for solving above problem and apply engineering knowledge and skills to solve it
<b>CSM501.3</b>	Validate, Verify the results using test cases/benchmark data/theoretical/inferences/experiments/simulations

<b>CSM501.4</b>	Analyze and evaluate the impact of solution/product/research/innovation/entrepreneurship towards societal/environmental/sustainable development
<b>CSM501.5</b>	Use standard norms of engineering practices and project management principles during project work
<b>CSM501.6</b>	Communicate through technical report writing and oral presentation.
	<ul style="list-style-type: none"> <li>• The work may result in research/white paper/ article/blog writing and publication</li> </ul>
	<ul style="list-style-type: none"> <li>• The work may result in business plan for entrepreneurship product created</li> </ul>
	<ul style="list-style-type: none"> <li>• The work may result in patent filing.</li> </ul>
<b>CSM501.7</b>	Gain technical competency towards participation in Competitions, Hackathons, etc.
<b>CSM501.8</b>	Demonstrate capabilities of self-learning, leading to lifelong learning.
<b>CSM501.9</b>	Develop interpersonal skills to work as a member of a group or as leader
<b>Course Name: System Programming and Compiler Construction</b>	
<b>Year of Study: 2022-23</b>	
<b>CSC601.1</b>	<b>Identify the relevance of different system programs..</b>
<b>CSC601.2</b>	<b>Explain various data structures used for assembler and macroprocessor design.</b>
<b>CSC601.3</b>	<b>Distinguish between different loaders and linkers and their contribution in developing efficient user applications</b>
<b>CSC601.4</b>	<b>Understand fundamentals of compiler design and identify the relationships among different phases of the compiler.</b>

<b>Course Name: CSS</b>		<b>Year of Study: 2022-23</b>
CSC602.1	Understand system security goals and concepts, classical encryption techniques and acquire fundamental knowledge on the concepts of modular arithmetic and number theory	
CSC602.2	Understand, compare and apply different encryption and decryption techniques to solve problems related to confidentiality and authentication	
CSC602.3	Apply different message digest and digital signature algorithms to verify integrity and achieve authentication and design secure applications	
CSC602.4	Understand network security basics, analyse different attacks on networks and evaluate the performance of firewalls and security protocols like SSL, IPSec, and PGP	
CSC602.5	Analyse and apply system security concept to recognize malicious code	
<b>Course Name: Mobile Computing</b>		<b>Year of Study: 2022-23</b>
CSC603.1	To identify basic concepts and principles in computing	
CSC603.2	To describe the components and functioning of cellular architecture.	
CSC603.3	To describe the components and functioning of mobile networking.	
CSC603.4	To classify variety of security techniques in mobile network	
CSC603.5	To apply the concepts of WLAN for local as well as remote applications	
CSC603.6	To describe Long Term Evolution (LTE) architecture and its interfaces.	
<b>Course Name</b>	<b>Artificial Intelligence</b>	<b>Year of Study: 2022-23</b>

CSC604.1	Ability to develop a basic understanding of AI building blocks presented in intelligent agents
CSC604.2	Ability to choose an appropriate problem solving method and knowledge representation technique.
CSC604.3	Ability to analyze the strength and weaknesses of AI approaches to knowledge– intensive problem solving.
CSC604.4	Ability to design models for reasoning with uncertainty as well as the use of unreliable information.
CSC604.5	Ability to design and develop AI applications in real world scenarios.

<b>Course Name</b>	<b>DLOC- IOT</b>	<b>Year of Study: 2022-23</b>
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CSDL6011.1	Understand the concepts of IoT and the Things in IoT.
CSDL6011.2	Emphasize core IoT functional Stack and understand application protocols for IoT.
CSDL6011.3	Apply IoT knowledge to key industries that IoT is revolutionizing.
CSDL6011.4	Examines various IoT hardware items and software platforms used in projects.
CSDL6011.5	Apply Domain Specific IoTs CASE STUDY like smart home or smart city
CSDL6011.6	Examines various IoT hardware items and software platforms used in projects.

<b>Course Name</b>	<b>SPCC LAB</b>	<b>Year of Study: 2022-23</b>
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CSL605.5	Explore various commercially available cloud services and recommend the appropriate one for the given application.
CSL605.6	Implement the concept of containerization
<b>Course Name: Machine Learning                      Year of Study: 2022-23</b>	
CSC701.1	To acquire fundamental knowledge of developing machine learning models
CSC701.2	To apply an appropriate machine learning model for regression
CSC701.3	To demonstrate ensemble techniques to combine predictions from different models
CSC701.4	To demonstrate the dimensionality reduction techniques
CSC701.5	To apply an appropriate machine learning model for classification
CSC701.6	To apply appropriate model for clustering
<b>Course Name: Natural Language Processing                      Year of Study: 2022-23</b>	
CSDC7013.1	To describe the field of natural language processing.
CSDC7013.2	To design language model for word level analysis for text processing
CSDC7013.3	To design various POS tagging techniques and parsers.

CSDC7013.4	To design, implement and test algorithms for semantic and pragmatic analysis
CSDC7013.5	To formulate the discourse segmentation and anaphora resolution
CSDC7013.6	To apply NLP techniques to design real world NLP applications
<b>Course Name: Big Data Analytics                      Year of Study: 2022-23</b>	
<b>CSDLO7032.1</b>	Understand the building blocks of Big Data Analytics.
<b>CSDLO7032.2</b>	Apply fundamental enabling techniques like Hadoop and MapReduce in solving real world problems.
<b>CSDLO7032.3</b>	Understand different NoSQL systems and how it handles big data.
<b>CSDLO7032.4</b>	Apply advanced techniques for emerging applications like stream analytics.
<b>CSDLO7032.5</b>	Achieve adequate perspectives of big data analytics in various applications like recommender systems, social media applications, etc.
<b>CSDLO7032.6</b>	Apply statistical computing techniques and graphics for analyzing big data.
<b>Course Name: Block chain                      Year of Study: 2022-23</b>	
CSDC7022.1	Explain blockchain concepts
CSDC7022.2	Apply cryptographic hash required for blockchain.
CSDC7022.3	Apply the concepts of smart contracts for an application

CSDC7022.4	Design a public blockchain using Ethereum
CSDC7022.5	Design a private blockchain using Hyperledger
CSDC7022.6	Use different types of tools for blockchain applications
<b>Course Name: ARVR                      Year of Study: 2022-23</b>	
<b>CSDL7021.1</b>	<b>Describe how VR systems work and list the applications of VR</b>
<b>CSDL7021.2</b>	<b>Elaborate geometric presentation of the virtual world and its operations.</b>
<b>CSDL7021.3</b>	<b>Explain the concepts of motion and tracking in VR systems.</b>
<b>CSDL7021.4</b>	<b>Design and implementation of the hardware that enables VR systems to be built.</b>
<b>CSDL7021.5</b>	<b>Describe how AR systems work and analyze the hardware requirement of AR</b>
<b>CSDL7021.6</b>	<b>Analyze and understand the working of various state of the art AR devices.</b>
<b>Course Name: CSL                      Year of Study: 2022-23</b>	
<b>ILO 7016.1</b>	Understand the concept of cybercrime and its effect on outside world
<b>ILO 7016.2</b>	Interpret and apply IT law in various legal issues
<b>ILO 7016.3</b>	Distinguish different aspects of cyber law

<b>ILO 7016.4</b>	Apply Information Security Standards compliance during software design and development
<b>ILO 7013.1</b>	Explain how information systems Transform Business
<b>ILO 7013.2</b>	Identify the impact information systems have on an organization
<b>ILO 7013.3</b>	Describe IT infrastructure and its components and its current trends
<b>ILO 7013.4</b>	Understand the principal tools and technologies for accessing information from databases to improve business performance and decision making
<b>ILO 7013.5</b>	Identify the types of systems used for enterprise-wide knowledge management and how they provide value for businesses
<b>Course Name: ML LAB                      Year of Study: 2022-23</b>	
CSL7011	To implement an appropriate machine learning model for Supervised algorithms
CSL7012	To implement an appropriate machine learning model for unSupervised algorithms
CSL7013	To implement an appropriate machine learning model for Reinforcement algorithms
CSL7014	To implement ensemble techniques to combine predictions from different models
CSL7015	To implement the dimensionality reduction techniques
CSL7016	Analyze and evaluate the impact of solution/product/research/innovation/entrepreneurship towards societal/environmental/sustainable development
<b>Course Name: NLP LAB                      Year of Study: 2022-23</b>	

CSDL7013.1	Apply various text processing techniques
CSDL7013.2	Design language model for word level analysis.
CSDL7013.3	Model linguistic phenomena with formal grammar
CSDL7013.4	Design, implement and analyze NLP algorithms.
CSDL7013.5	To apply NLP techniques to design real world NLP applications such as machine translation, sentiment analysis, text summarization, information extraction, Question Answering system etc.
CSDL7013.6	Implement proper experimental methodology for training and evaluating empirical NLP systems.

**Course Name: Block chain Lab**                      **Year of Study: 2022-23**

CSDL7022.1	Creating Cryptographic hash using merkle tree.
CSDL7022.2	Design Smart Contract using Solidity.
CSDL7022.3	Implementing ethereum blockchain using Geth.
CSDL7022.4	Explore various types of blockchain
CSDL7022.5	Implement security tools in blockchain
CSDL7022.6	Demonstrate the concept of blockchain in real world application.

**Course Name: Major Project**                      **Year of Study: 2022-23**

<b>CSP701.1</b>	To develop the understanding of the problem domain through extensive review of literature.
<b>CSP701.2</b>	To Identify and analyze the problem in detail to define its scope with problem specific data.
<b>CSP701.3</b>	To know various techniques to be implemented for the selected problem and related technical skills through feasibility analysis.
<b>CSP701.4</b>	To design solutions for real-time problems that will positively impact society and environment..
<b>CSP701.5</b>	To develop clarity of presentation based on communication, teamwork and leadership skills.
<b>CSP701.6</b>	To inculcate professional and ethical behavior.

**Course Name: Applied Data Science**

**Year of Study: 2022-23**

<b>CSDC8013.1</b>	<b>To gain fundamental knowledge of the data science process.</b>
<b>CSDC8013.2</b>	<b>To apply data exploration and visualization techniques.</b>
<b>CSDC8013.3</b>	<b>To apply anomaly detection techniques.</b>
<b>CSDC8013.4</b>	<b>To gain an in-depth understanding of time-series forecasting.</b>
<b>CSDC8013.5</b>	<b>Apply different methodologies and evaluation strategies.</b>
<b>CSDC8013.6</b>	<b>To apply data science techniques to real world applications.</b>

**Course Name: Social Media Analytics**

**Year of Study: 2022-23**

<b>CSDC8023.1</b>	<b>Understand the concept of Social media</b>
<b>CSDC8023.2</b>	<b>Understand the concept of social media Analytics and its significance.</b>
<b>CSDC8023.3</b>	<b>Learners will be able to analyze the effectiveness of social media</b>
<b>CSDC8023.3</b>	<b>Learners will be able to use different Social media analytics tools effectively and efficiently.</b>
<b>CSDC8023.5</b>	<b>Learners will be able to use different effective Visualization techniques to represent social media analytics.</b>
<b>CSDC8023.6</b>	<b>Acquire the fundamental perspectives and hands-on skills needed to work with social media data.</b>
<b>Course Name: Project Management                      Year of Study: 2022-23</b>	
ILO8021.1	Apply selection criteria and select an appropriate project from different options.
ILO8021.2	Write work break down structure for a project and develop a schedule based on it.
ILO8021.3	Identify opportunities and threats to the project and decide an approach to deal with them strategically.
ILO8021.4	Use Earned value technique and determine & predict status of the project.
ILO8021.5	Capture lessons learned during project phases and document them for future reference
<b>Course Name: Environment Management                      Year of Study: 2022-23</b>	
ILO8029.1	Understand the concept of environmental Management

ILO8029.2	Understands the Global Environmental concerns
ILO8029.3	Understand ecosystem ,interdependance and food chain
ILO8029.4	Understand and interpret environment related legislation
<b>Course Name: ADS Lab                      Year of Study: 2022-23</b>	
CSL8023.1	Apply various stages of the data science lifecycle for the selected case study.
CSL8023.2	Demonstrate data preparation, exploration and visualization techniques.
CSL8023.3	Implement and evaluate different supervised and unsupervised techniques.
<b>Course Name: SMA Lab                      Year of Study: 2022-23</b>	
<b>CSDL8023.1</b>	Understand characteristics and types of social media networks.
<b>CSDL8023.2</b>	Use social media analytics tools for business
<b>CSDL8023.3</b>	Collect, monitor , store and track social media data
<b>CSDL8023.4</b>	Analyze and visualize social media data from multiple platforms
<b>CSDL8023.5</b>	Design and develop content and structure based social media analytics models.

<b>CSDL8023.6</b>	Design and implement social media analytics applications for business.
<b>Course Name: Major Project2</b> <b>Year of Study: 2022-23</b>	
<b>CSP801.1</b>	Implement solutions for the selected problem by applying technical and professional skills.
<b>CSP801.2</b>	Analyze impact of solutions in societal and environmental context for sustainable development.
<b>CSP801.3</b>	Collaborate best practices along with effective use of modern tools.
<b>CSP801.4</b>	Develop proficiency in oral and written communication with effective leadership and teamwork.
<b>CSP801.5</b>	Nurture professional and ethical behavior.
<b>CSP801.6</b>	Gain expertise that helps in building lifelong learning experience.

**Course outcomes of all dept (ODD & EVEN) A. Y. 2022-23 required in following format**

<b>Course Code</b>	<b>Course Outcomes</b>
<b>Course Name: ECC 301 Engineering Mathematics- III      Year of Study: 2022-23</b>	
<b>ECC 301.1</b>	Understand the concept of Laplace Transform of and it's application to solve the real integrals in Engineering Problem .
<b>ECC 301.2</b>	Understand the concept of Inverse Laplace Transform of various function and and it's application to solve the real integrals in Engineering Problem .
<b>ECC 301.3</b>	Expand the periodic function by using fourier series for real life problems and Complex Engineering Problem .
<b>ECC 301.4</b>	Understand Complex variable theory, application of harmonic conjugate to get orthogonal trajectories and analytic function.
<b>ECC 301.5</b>	Use Matrix Algebra to solve to solve the Engineering problems.
<b>ECC 301.6</b>	Apply the concept of vector calculus in real life problems.
<b>Course Name: ECC 301 Engineering Mathematics- III - DSE      Year of Study: 2022-23</b>	
<b>ECC 301.1</b>	Understand the concept of Laplace Transform of and it's application to solve the real integrals in Engineering Problem .
<b>ECC 301.2</b>	Understand the concept of Inverse Laplace Transform of various function and and it's application to solve the real integrals in Engineering Problem .
<b>ECC 301.3</b>	Expand the periodic function by using fourier series for real life problems and Complex Engineering Problem .
<b>ECC 301.4</b>	Understand Complex variable theory, application of harmonic conjugate to get orthogonal trajectories and analytic function.





<b>ECC304.2</b>	Apply the time and frequency method of analysis.
<b>ECC304.3</b>	Evaluate circuit using graph theory.
<b>ECC304.4</b>	Find the various parameters of two port network.
<b>ECC304.5</b>	Apply network topology for analyzing the circuit.
<b>ECC304.6</b>	Synthesize the network using passive elements.
<b>Course Name: ECC305 Electronic Instrumentation and Control System</b>	
<b>Year of Study: 2022-23</b>	
<b>ECC305.1</b>	Learn measurement of physical parameters using various transducer and sensors.
<b>ECC305.2</b>	Learn principle of operation for various sensors.
<b>ECC305.3</b>	Describe functional Control system.
<b>ECC305.4</b>	Apply the concepts of control systems in calculating the transfer functions for given system.
<b>ECC305.5</b>	Calculate the stability of given system using appropriate criteria in time domain.
<b>ECC305.6</b>	Calculate the stability of given system using appropriate criteria in frequency domain.
<b>Course Name: ECC305 Electronic Instrumentation and Control System (DSE)</b>	
<b>Year of Study: 2022-23</b>	
<b>ECC305.1</b>	Learn measurement of physical parameters using various transducer and sensors.
<b>ECC305.2</b>	Calculate the stability of given system using appropriate criteria in time domain.

<b>ECC305.3</b>	Calculate the stability of given system using appropriate criteria in frequency domain.
<b>Course Name: ECL301 Electronic Devices and Circuits I Laboratory                      Year of Study: 2022-23</b>	
<b>ECL301.1</b>	Understand current voltage characteristics of semiconductor devices
<b>ECL301.2</b>	Design & Simulate Bipolar junction transistor & Metal Oxide Semiconductor Field effect transistor
<b>ECL301.3</b>	Evaluate frequency response to understand behavior of electronic circuits
<b>ECL301.4</b>	Design & simulate two stage Bipolar junction transistor amplifier for given specification
<b>ECL301.5</b>	Design & simulate series fed Class A power amplifier for given specification & calculate its efficiency
<b>ECL301.6</b>	Design & simulate enhancement type metal oxide semiconductor field effect transistor differential amplifier for given specifications
<b>Course Name: ECL301 Electronic Devices and Circuits I Laboratory - DSE                      Year of Study: 2022-23</b>	
<b>ECL301.1</b>	Understand current voltage characteristics of semiconductor devices
<b>ECL301.2</b>	Design & Simulate Bipolar junction transistor & Metal Oxide Semiconductor Field effect transistor
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<b>ECL301.5</b>	Design & simulate series fed Class A power amplifier for given specification & calculate its efficiency
<b>ECL301.6</b>	Design & simulate enhancement type metal oxide semiconductor field effect transistor differential amplifier for given specifications

<b>Course Name: ECL302 Digital System Design Laboratory</b>		<b>Year of Study: 2022-23</b>
<b>ECL302.1</b>	Verify logic gates using virtual tools	
<b>ECL302.2</b>	Implement arithmetic circuits using virtual tools to verify operation	
<b>ECL302.3</b>	Implement combinational logic circuits using virtual tools to verify operation	
<b>ECL302.4</b>	Implement sequential logic circuits using virtual tools to verify operation	
<b>Course Name: ECL302 Digital System Design Laboratory - DSE</b>		<b>Year of Study: 2022-23</b>
<b>ECL302.1</b>	Verify logic gates using virtual tools	
<b>ECL302.2</b>	Implement arithmetic circuits using virtual tools to verify operation	
<b>ECL302.3</b>	Implement combinational logic circuits using virtual tools to verify operation	
<b>ECL302.4</b>	Implement sequential logic circuits using virtual tools to verify operation	
<b>Course Name: ECL303 Electronics Instrumentation &amp; Control System Laboratory</b>		<b>Year of Study: 2022-23</b>
<b>ECL303.1</b>	Validate the performance characteristics of transducers.	
<b>ECL303.2</b>	Validate the characteristics of various temperature, pressure and level transducers.	
<b>ECL303.3</b>	Plot frequency response of first-order electrical system.	
<b>ECL303.4</b>	Analyze time response of second-order electrical system and calculate the steady-state error	

<b>ECL303.5</b>	Validate the effect of damping factor on the response of second order system.
<b>ECL303.6</b>	Analyze the frequency response specifications of systems by using bode-plot, Polar plot, Nyquist-plot techniques, and comment on the stability of system
<b>Course Name: ECL303 Electronics Instrumentation &amp; Control System Laboratory - DSE      Year of Study: 2022-23</b>	
<b>ECL303.1</b>	Analyze the performance characteristics of transducers.
<b>ECL303.2</b>	Plot frequency response of first-order electrical system.
<b>ECL303.3</b>	Simulate the input and output relation of a control system.
<b>Course Name: ECL304 Skill Lab-: C++ and JavaProgramming      Year of Study: 2022-23</b>	
<b>ECL304.1</b>	Understand the basic principles of Object Oriented Programming
<b>ECL304.2</b>	Apply Object Oriented Programming principles for effective programming
<b>ECL304.3</b>	Develop programming applications using OOP language.
<b>ECL304.4</b>	Implement different programming applications using packaging.
<b>ECL304.5</b>	Apply the concepts of Exception handling & Multithreading.
<b>ECL304.6</b>	Understand the concepts of Applets
<b>Course Name: ECL304 Skill Lab-: C++ and JavaProgramming - DSE      Year of Study: 2022-23</b>	
<b>ECL304.1</b>	Understand the basic principles of Object Oriented Programming

<b>ECL304.2</b>	Apply Object Oriented Programming principles for effective programming
<b>ECL304.3</b>	Develop programming applications using OOP language.
<b>ECL304.4</b>	Implement different programming applications using packaging.
<b>ECL304.5</b>	Apply the concepts of Exception handling & Multithreading.
<b>ECL304.6</b>	Understand the concepts of Applets
<b>Course Name: ECM301 Mini Project 1-A                      Year of Study: 2022-23</b>	
<b>ECM301.1</b>	Create the electrons circuit for particular application/experiment.
<b>ECM301.2</b>	Design and simulate the circuit by putting together analog and digital components.
<b>ECM301.3</b>	Learn the technique of soldering and circuit implementation on general purpose printed circuit board (GPP).
<b>ECM301.4</b>	Apply PCB design process and gain up-to-date knowledge of PCB design software.
<b>ECM301.5</b>	Apply the basic electronic tool and equipment's like (DMM, CRO, DSO etc.) studied to implement the project.
<b>ECM301.6</b>	Analysis of hardware fault (fault detection and correction)
<b>Course Name: ECM301 Mini Project 1-A - DSE                      Year of Study: 2022-23</b>	
<b>ECM301.1</b>	Create the electrons circuit for particular application/experiment.
<b>ECM301.2</b>	Design and simulate the circuit by putting together analog and digital components.

<b>ECM301.3</b>	Learn the technique of soldering and circuit implementation on general purpose printed circuit board (GPP).
<b>ECM301.4</b>	Apply PCB design process and gain up-to-date knowledge of PCB design software.
<b>ECM301.5</b>	Apply the basic electronic tool and equipment's like (DMM, CRO, DSO etc.) studied to implement the project.
<b>ECM301.6</b>	Analysis of hardware fault (fault detection and correction)
<b>Course Name: ECC401 Engineering Mathematics IV                      Year of Study: 2022-23</b>	
<b>ECC401.1</b>	Use the concept of Complex Integration for evaluating integrals computing residues & evaluate various contour integrals.
<b>ECC401.2</b>	Apply concept of correlation and regression to the engineering problem in Data science, AT & Machine learning .
<b>ECC401.3</b>	Apply the concept of Probability and expectation for getting the spread of the data and distribution of probabilities.
<b>ECC401.4</b>	Apply the concept of vector spaces and orthogonalization process in engineering problems.
<b>ECC401.5</b>	Use the concept of Quadratic form and singular value decomposition which are very useful tool in Engineering application.
<b>ECC401.6</b>	Find the extremals of the functional using concept of calculus of variation.
<b>Course Name: ECC402 Microcontrollers                      Year of Study: 2022-23</b>	
<b>ECC402.1</b>	Explain microprocessor architecture with program counter, stack pointer, interrupt, subroutine and Direct memory access.
<b>ECC402.2</b>	Explain primary, secondary, virtual, cache, semiconductor memory systems.
<b>ECC402.3</b>	Explain architecture of 8051 using block diagram, pin diagram and programming model.



<b>ECC 404.5</b>	<b>Analyse the signals and systems using Laplace Transform and z-transform.</b>
<b>ECC 404.6</b>	<b>Demonstrate the concept learnt in signals and systems course using the modern engineering tools.</b>
<b>Course Name: ECC405 Principles of Communication Engineering</b>	
<b>Year of Study: 2022-23</b>	
<b>ECC405.1</b>	<b>Understand the basic components and types of noises in communication system.</b>
<b>ECC405.2</b>	<b>Analyze the concepts of amplitude modulation and demodulation.</b>
<b>ECC405.3</b>	<b>Analyze the concepts of angle modulation and demodulation.</b>
<b>ECC405.4</b>	<b>Compare the performance of AM and FM receivers.</b>
<b>ECC405.5</b>	<b>Describe analog and digital pulse modulation techniques.</b>
<b>ECC405.6</b>	<b>Illustrate the principles of multiplexing and demultiplexing techniques</b>
<b>Course Name: ECL401 Microcontrollers Laboratory</b>	
<b>Year of Study: 2022-23</b>	
<b>ECL401.1</b>	Study editor, assembler, cross assembler, compiler, cross compiler, linker, simulator, emulator development tools
<b>ECL401.2</b>	Write 8051 assembly language programs for arithmetic and logical operations, code conversion and data transfer operations.
<b>ECL401.3</b>	Write 8051 assembly language programs for general purpose I/O, Timers and interrupts
<b>ECL401.4</b>	Interface 8051 with Input output devices and write programs for it.
<b>ECL401.5</b>	Develop microcontroller based applications using NXP 89v51RD2, Atmega328P and PIC16F886 .

<b>Course Name: ECL402 Linear Integrated Circuits Laboratory</b>		<b>Year of Study: 2022-23</b>
<b>ECL402.1</b>	Describe the fundamentals properties of Operational Amplifier	
<b>ECL402.2</b>	Analyze Operational Amplifier as Inverting, Noninverting adder, subtractor, differentiator, integrator	
<b>ECL402.3</b>	Analyze Linear & Nonlinear application of operational Amplifier	
<b>ECL402.4</b>	Describe the functioning voltage regulator & IC 555 timer	
<b>Course Name: ECL403 Principles of Communication Engineering Laboratory</b>		<b>Year of Study: 2022-23</b>
<b>ECL403.1</b>	Understand the concept of noise and its measurement in communication.	
<b>ECL403.2</b>	Analyze amplitude and angle modulation and demodulation techniques used in analog communication	
<b>ECL403.3</b>	Analyze analog pulse modulation and demodulation techniques used in analog communication	
<b>ECL403.4</b>	Analyze transmitter and receiver circuits used for analog communication	
<b>ECL403.5</b>	Understand multiplexing and de-multiplexing of signals and their need in communication	
<b>Course Name: ECL404 SKILL LAB :Python Programming</b>		<b>Year of Study: 2020-201</b>
<b>ECL404.1</b>	Describe the numbers, math functions, strings, list, tuples and dictionaries in Python	
<b>ECL404.2</b>	Demonstrate Functions and File handling operations	
<b>ECL404.3</b>	Interpret Object oriented programming in Python	

<b>ECL404.4</b>	Demonstrate GUI Applications and different database operations in python
<b>ECL404.5</b>	Design Mathematical Functions of NumPy array, Data frame
<b>ECL404.6</b>	Design Support Vector Machines
<b>Course Name: ECM401 Mini Project 1-B      Year of Study: 2020-201</b>	
<b>ECM401.1</b>	Write basic codes for the Arduino board using the IDE for utilizing the onboard resources.
<b>ECM401.2</b>	Apply the knowledge of interfacing different devices to the Arduino board to accomplish a given task.
<b>ECM401.3</b>	Design Arduino based projects for a given problem.
<b>ECM401.4</b>	Write code using python language using IDE for utilizing the onboard resources.
<b>ECM401.5</b>	Apply the knowledge of interfacing different devices to raspberry Pi board to accomplish a given task.
<b>ECM401.6</b>	Design Raspberry Pi based projects for a given problem.
<b>Course Name: ECC501 Digital Communication      Year of Study: 2022-23</b>	
<b>ECC501.1</b>	Understand the basics of digital communication, probability theory.
<b>ECC501.2</b>	Apply fundamental concept of information theory in source coding.
<b>ECC501.3</b>	Understand the basics of significance of line coding in digital communication
<b>ECC501.4</b>	Evaluate the effect of ISI on digital communication system

ECC501.5	Compare bandpass modulation and baseband modulation techniques.
ECC501.6	Evaluate performance of error control codes.
<b>Course Name: ECC502 Discrete Time Signal Processing</b> <b>Year of Study: 2022-23</b>	
ECC502.1	Understand the concepts of discrete-time Fourier transform and fast Fourier transform.
ECC502.2	Apply the knowledge of design of IIR digital filters to meet arbitrary specifications.
ECC502.3	Apply the knowledge of design of FIR digital filters to meet arbitrary specifications.
ECC502.4	Apply the knowledge of DSP processors for various applications.
ECC502.5	Design and simulate digital filters
ECC502.6	Apply algorithms of DSP for real time applications
<b>Course Name: ECC503 Digital VLSI</b> <b>Year of Study: 2022-23</b>	
ECC503.1	Know various tools and processes used in VLSI Design.
ECC503.2	Explain working of various CMOS combinational and sequential circuits used in VLSI Design.
ECC503.3	Derive expressions for performance parameters of basic building blocks like CMOS inverter.
ECC503.4	Relate performance parameters with design parameters of VLSI circuits.
ECC503.5	Select suitable circuit and design style for given application.

<b>ECC503.6</b>	Design and realize various combinational and sequential circuits for given specifications.
<b>Course Name: ECC504 Random Signal Analysis      Year of Study: 2022-23</b>	
<b>ECC504.1</b>	Apply theory of probability in identifying and solving relevant problems
<b>ECC504.2</b>	Differentiate continuous and discrete random variables and their distributions.
<b>ECC504.3</b>	Analyze mean, variance, and distribution function of random variables and functions of random variables
<b>ECC504.4</b>	Understand the concept of Multiple Random Variables and Central Limit Theorem
<b>ECC504.5</b>	Define a random process, determine the type of the process and find the response of LTI system for WSS process.
<b>ECC504.6</b>	Explain linear regression algorithms and apply the same for predictive applications.
<b>Course Name: ECCDLO5014 Data Structures and Algorithm      Year of Study: 2022-23</b>	
<b>ECCDLO5014 .1</b>	Compare functions using asymptotic analysis and describe the relative merits of worst-, average-, and best-case analysis
<b>ECCDLO5014 .2</b>	Apply various operations on Stack and Queue
<b>ECCDLO5014 .3</b>	Ability to demonstrate the operation of Linked list and apply it.
<b>ECCDLO5014 .4</b>	Ability to demonstrate and apply Trees & Graph data structures.
<b>ECCDLO5014 .5</b>	Become familiar with various Sorting and Searching Algorithms and their performance characteristics.
<b>ECCDLO5014 .6</b>	Describe the hash function and concepts of collision and its resolution methods

<b>Course Name: ECL501 Digital Communication Lab</b>		<b>Year of Study: 2022-23</b>
<b>ECL501.1</b>	Understand the basics of digital signal and significance of line coding in digital communication	
<b>ECL501.2</b>	Apply fundamental concept of information theory in source coding	
<b>ECL501.3</b>	Evaluate the effect of ISI on digital communication system	
<b>ECL501.4</b>	Compare band pass modulation techniques	
<b>ECL501.5</b>	Evaluate performance of error control codes	
<b>Course Name: ECL502 Discrete Time Signal Processing Lab</b>		<b>Year of Study: 2022-23</b>
<b>ECL502 .1</b>	Understand the relation between different transforms	
<b>ECL502 .2</b>	Understand the concepts of discrete-time Fourier transform, fast Fourier transform and apply in system analysis	
<b>ECL502 .3</b>	Design digital IIR and FIR filters to satisfy the given specifications and evaluate the frequency response and polezero representations	
<b>ECL502 .4</b>	Interpret the different realization structures of Digital IIR and FIR filters.	
<b>ECL502 .5</b>	Analyze the impact of hardware limitations on the performance of digital filters	
<b>Course Name: ECL503 Digital VLSI Lab</b>		<b>Year of Study: 2022-23</b>
<b>ECL503.1</b>	Write spice code for given combinational and sequential CMOS circuits.	
<b>ECL503.2</b>	Perform various analysis like operating point, dc, transient etc of given CMOS circuits.	

<b>ECL503.3</b>	Evaluate performance of given CMOS circuits
<b>ECL503.4</b>	Draw layout of given CMOS circuit and also able extract various parasitic using open source layout tool like Magic
<b>ECL503.5</b>	Design, simulate, and verify CMOS circuit for given specifications.
<b>Course Name: ECL504 Professional Communication &amp; Ethics-II Lab      Year of Study: 2022-23</b>	
<b>ECL504.1</b>	plan and prepare effective business/ technical documents which will in turn provide solid foundation for their future managerial roles.
<b>ECL504.2</b>	strategize their personal and professional skills to build a professional image and meet the demands of the industry.
<b>ECL504.3</b>	emerge successful in group discussions, meetings and result-oriented agreeable solutions in group communication situations.
<b>ECL504.4</b>	deliver persuasive and professional presentations.
<b>ECL504.5</b>	develop creative thinking and interpersonal skills required for effective professional communication.
<b>ECL504.6</b>	apply codes of ethical conduct, personal integrity and norms of organizational behaviour.
<b>Course Name: ECM501 Mini Project 2A Embedded System Project      Year of Study: 2022-23</b>	
<b>ECM501.1</b>	Understand the embedded systems with design metrics
<b>ECM501.2</b>	Understand microcontrollers and programming in Embedded C.
<b>ECM501.3</b>	Implementation of Embedded systems with different sensors and peripherals as IoT.
<b>ECM501.4</b>	Implementation of Embedded systems with different communication protocols as IoT.

<b>ECM501.5</b>	Analyze concepts of Real time operating systems
<b>ECM501.6</b>	Design embedded system applications using sensors, peripherals and RTOS
<b>Course Name: ECC601 Electromagnetics and Antenna</b> <b>Year of Study: 2022-23</b>	
<b>ECC601.1</b>	To describe electromagnetics fields including static and dynamic in terms of Maxwell's equations.
<b>ECC601.2</b>	To apply Maxwell's equation to solve various electromagnetic phenomena such as electromagnetic wave propagation in different mediums, power in EM waves.
<b>ECC601.3</b>	To derive the field equations for the basic radiating elements and describe basic antenna parameters like radiation pattern, directivity, gain etc
<b>ECC601.4</b>	Analyze Antenna Arrays (Linear Planar and Circular)
<b>ECC601.5</b>	Implement different types of the antenna structures such as Special Antenna(Yagi Uda, Log periodic, Helical, Microstrip antenna, Horn antenna and reflector antenna.
<b>ECC601.6</b>	Compare Ground Wave, Space wave and Sky wave (Electromagnetic Wave) Propagation
<b>Course Name: ECC602 Computer Communication Networks</b> <b>Year of Study: 2022-23</b>	
<b>ECC602.1</b>	Analyze network topologies, hardware devices, addressing schemes and the protocol stacks
<b>ECC602.2</b>	Compare various transmission media and broadband technologies
<b>ECC602.3</b>	Analyze the flow control, error control and the medium access control techniques.
<b>ECC602.4</b>	Judge network layer addressing and routing schemes.
<b>ECC602.5</b>	Analyze connection oriented and connectionless services.

ECC602.6	Apply the knowledge of application layer protocols
<b>Course Name: ECC603 Image Processing and Machine Vision</b>	
<b>Year of Study: 2022-23</b>	
ECC603.1	Understand fundamentals of image processing and machine vision
ECC603.2	Able to enhance the quality of image using spatial and frequency domain techniques for image enhancement
ECC603.3	Able to apply image morphology and restoration techniques
ECC603.4	Able to perform image segmentation techniques based on principle of discontinuity and similarity using various algorithms
ECC603.5	Able to represent boundaries and shapes using standard techniques
ECC603.6	Able to classify the object using different classification methods
<b>Course Name: ECC604 Artificial Neural Network and Fuzzy Logic</b>	
<b>Year of Study: 2022-23</b>	
ECC604.1	Comprehend the concepts of biological neurons and artificial neurons
ECC604.2	Analyze the feed-forward and feedback neural networks and their learning algorithms.
ECC604.3	Comprehend the neural network training and design concepts
ECC604.4	Build a simple CNN model and apply in image classification
ECC604.5	Analyze the application of neural networks and fuzzy logic to real world problems.
<b>Database Management System</b>	

<b>ECCDLO6014.1</b>	Describe the fundamentals of database systems, different data models and design issues in database
<b>ECCDLO6014.2</b>	Understand the basics model of relational Algebra, calculus, transaction management, concurrency control , database security and privacy
<b>ECCDLO6014.3</b>	Design ER diagram, relational schemas, apply concepts of normalization to relational database design
<b>ECCDLO6014.4</b>	Learning the programming languages of SQL
<b>ECCDLO6014.5</b>	Applying the concepts of normalization
<b>ECCDLO6014.6</b>	Implement views, triggers and querying the database using SQL.
<b>Electromagnetics and Antenna Lab</b>	
<b>ECL601.1</b>	Design various wire antennas like dipole , monopole, loop antenna
<b>ECL601.2</b>	Design of Broadband Antenna like Helical Antenna
<b>ECL601.3</b>	Analyze antenna arrays of isotropic or directional Sources.
<b>ECL601.4</b>	Analysis of Reflectors Antenna
<b>ECL601.5</b>	Measure various parameters (for e.g. HPBW, FBR, Gain etc.) for various antennas
<b>Computer Communication Networks Lab</b>	
<b>ECL602.1</b>	Design a small or medium sized computer network including media types, end devices, and interconnecting devices that meets a customer 's specific needs.

<b>ECL602.2</b>	Perform basic configurations on routers and Ethernet switches.
<b>ECL602.3</b>	Demonstrate knowledge of programming for network communications.
<b>ECL602.4</b>	Simulate computer networks and analyze the simulation results.
<b>ECL602.5</b>	Troubleshoot connectivity problems in a host occurring at multiple layers of the OSI model.
<b>ECL602.6</b>	Develop knowledge and skills necessary to gain employment as computer network engineer and network administrator
<b>Image Processing and Machine Vision Lab</b>	
<b>ECL603.1</b>	Perform enhancement of digital images in spatial and frequency domain
<b>ECL603.2</b>	Perform edge detection and morphological operations on digital images
<b>ECL603.3</b>	Classify patterns using standard Machine vision classification techniques like SVM
<b>ECL603.4</b>	Apply theoretical knowledge in image processing and machine vision to practical case studies
<b>Skill Lab: Linux and Networking and Server Configuration</b>	
<b>ECL604.1</b>	Install Linux using different platform and execute standard Linux commands.
<b>ECL604.2</b>	Describe the basic knowledge of Linux Operating System
<b>ECL604.3</b>	Deploy the system administrative functionality
<b>ECL604.4</b>	Solve the problems using shell script programming



ECC702.6	Analyze the emerging technologies for upcoming mobile communication systems.
<b>Course Name: ECCDLO 7013 Cloud Computing and Security</b>	
<b>Year of Study: 2022-23</b>	
ECCDLO 7013.1	Explain the fundamentals of cloud computing.
ECCDLO 7013.2	Interpret the significance of virtualization in the context of cloud computing
ECCDLO 7013.3	Describe cloud computing services working on AWS, Azure and Google cloud platforms
ECCDLO 7013.4	Explain application design aspects of cloud computing
ECCDLO 7013.5	Interpret security aspects to cloud computing.
ECCDLO 7013.6	Explain advances in cloud computing in terms of multimedia cloud, fog, edge computing and real applications of cloud.
<b>Course Name:ECCDLO 7014 Big Data Analytics</b>	
<b>Year of Study: 2022-23</b>	
ECCDLO 7014.1	Explain fundamentals of Big data analytics.
ECCDLO 7014.2	Explain how Hadoop framework can be used solve big data analytics problems.
ECCDLO 7014.3	Explain use of No SQL to handle big data analytics problems.
ECCDLO 7014.4	Apply Map reduce techniques to handle big data analytics problems.
ECCDLO 7014.5	Explain use of big data analytics techniques in finding similar items, mining data streams, link analysis and frequent itemset mining.
ECCDLO 7014.6	Explain applications of big data analytics in recommendation systems and mining social network graphs.

<b>Course Name: ECL701 Microwave Engineering Laboratory</b>		<b>Year of Study: 2022-23</b>
<b>ECL701.1</b>	Design Single or Double Stub Matching Network using Smith Chart for transmission lines.	
<b>ECL701.2</b>	Describe the types of waveguides, rectangular waveguides and field patterns	
<b>ECL701.3</b>	Understand the coupling mechanisms in waveguides and analyze the waveguide multiport junctions.	
<b>ECL701.4</b>	Explore the microwave linear tubes and analyze with microwave cross field tubes.	
<b>ECL701.5</b>	Understand the microwave solid state devices and avalanche transit time devices.	
<b>ECL701.6</b>	Demonstrate the microwave bench set up and conducting measurements of different parameter	
<b>Course Name: ECL702 Mobile Communication System Laboratory</b>		<b>Year of Study: 2022-23</b>
<b>ECL702.1</b>	Apply the fundamentals of Mobile communication system to design the Wireless networks & evaluate system capacity.	
<b>ECL702.2</b>	Apply radio propagation path loss & calculate spectral efficiency of TDMA.	
<b>ECL702.3</b>	Apply the number of PN bits, processing gain in DSSS system and find capacity of IS-95	
<b>ECL702.4</b>	Evaluate various parameters for GSM 1800 networks & understand the handover mechanism.	
<b>ECL702.5</b>	Evaluate the effects of cluster size on S/I & GSM frame structure.	
<b>ECL702.6</b>	Create the mobile communication based mini project for various applications using software on 3rd Generation & the Emerging Technology required for 4th Generation mobile systems	
<b>Course Name: ECP701 Major Project-I</b>		<b>Year of Study: 2022-23</b>

<b>ECP701.1</b>	Apply Engineering Knowledge and concepts to arrive at design solutions for a given problem.
<b>ECP701.2</b>	Analyze engineering problem using research literature to find gaps in existing knowledge.
<b>ECP701.3</b>	Apply research-based knowledge and design experiments to solve an engineering problem
<b>ECP701.4</b>	Identify the end user that shall benefit through the proposed solution of system and also demonstrate concern for environment and abide by professional ethics.
<b>ECP701.5</b>	Demonstrate teamwork and communication principles while planning projects, writing reports and giving presentations.
<b>ECP701.6</b>	Apply project life cycle principles by project scheduling and managing finances.

<b>Course Name: ECCDLO 7023 Internet Communication Engineering</b>	<b>Year of Study: 2022-23</b>
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<b>ECCDLO 7023 .1</b>	Compare the protocols at each layer of TCP/IP protocol suite
<b>ECCDLO 7023 .2</b>	Explain the internet security aspects of protocols at various layers of TCP/IP protocol suite
<b>ECCDLO 7023 .3</b>	Apply the various compression algorithms for audio, image & video coding.
<b>ECCDLO 7023 .4</b>	Categorize and design simple networked multimedia systems
<b>ECCDLO 7023 .5</b>	Compare integrated & differentiated services for quality of service.
<b>ECCDLO 7023 .6</b>	Explain a software defined Network.

<b>Course Name: ECC801 Optical Communication and Networks</b>	<b>Year of Study: 2022-23</b>
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<b>ECC801.1</b>	To understand types of fibers, cables and deployment, fundamental principles of optics and light wave, fabrication, techniques for optical fiber communication.
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<b>ECC801.2</b>	Apply dispersion & transmission losses in the optical fiber, communication with linear and nonlinear effects in fiber.
<b>ECC801.3</b>	Evaluate parameters for optical link power budget and rise time budget to analyze the link using various optical sources & detectors.
<b>ECC801.4</b>	Analyze optical networks system components & optical networks with SONET/SDH,PDH.
<b>ECC801.5</b>	Analyze optical networks using packet switching & access networks.
<b>ECC801.6</b>	Analyze transmission system model using network design and management.
<b>Course Name: ECL801 Optical Communication and Networks Laboratory      Year of Study: 2022-23</b>	
<b>ECL801.1</b>	Apply setting up analog & digital optical fiber waveguide to find fiber parameters and Numerical Aperture (NA) in optical fiber.
<b>ECL801.2</b>	Apply transmission characteristics to find losses in optical fiber link intensity modulation technique.
<b>ECL801.3</b>	Apply of optical power & fiber voice optical link using intensity modulation.
<b>ECL801.4</b>	Evaluate link power & rise time budget for the optical link with given parameters.
<b>ECL801.5</b>	--
<b>Course Name: ECP801 Major Project-II      Year of Study: 2022-23</b>	
<b>ECP801 .1</b>	Implement project using modern tools and techniques with latest hardware and software
<b>ECP801 .2</b>	Design project which solves research problem identifies by reviewing literature.
<b>ECP801 .3</b>	Demonstrate teamwork and communication principles while planning projects, writing reports and giving presentations.

<b>ECP801 .4</b>	Apply project life cycle principles by project scheduling and managing finances.
<b>ECP801 .5</b>	Understand project as an experience for lifelong learning in the field of technology by being able to engage in independent study of design solutions and implementation.
<b>ECP801 .6</b>	Design a project/product which will be useful to the society addressing environment concerns and abiding by ethical principles.
<b>Course Name: ECCDLO 8014 Web Design      Year of Study: 2022-23</b>	
<b>ECCDLO 8014.1</b>	Explain web system architecture and Internet protocols
<b>ECCDLO 8014.2</b>	Design web pages using HTML5 and CSS3 and Javascript.
<b>ECCDLO 8014.3</b>	Build responsive web pages using front-end framework Bootstrap.
<b>ECCDLO 8014.4</b>	Develop a web application using appropriate web development framework.
<b>ECCDLO 8014.5</b>	Apply the concepts of server-side programming using Laravel, PHP and AJAX.
<b>ECCDLO 8014.6</b>	Explain working of web services and architecture SOAP and REST
<b>Course Name: ECCDLO 8025 Augmented Reality and Virtual Reality      Year of Study: 2022-23</b>	
<b>ECCDLO 8025.1</b>	Identify and compare different Virtual and Augmented Reality Technologies and apply modeling techniques.
<b>ECCDLO 8025.2</b>	Identify and use AR-VR hardware components.
<b>ECCDLO 8025.3</b>	Apply concepts of Computer Vision for tracking in AR Systems.
<b>ECCDLO 8025.4</b>	Apply calibration techniques and registration for components in AR.

<b>ECCDLO 8025.5</b>	Design AR-VR application
<b>ECCDLO 8025.6</b>	Apply insights of AR-VR in different applications.

**Course outcomes of all dept (ODD & EVEN) A. Y. 2022-23 required in following format**

**SECOND YEAR- III SEM (A.Y. 2022-2023) (BATCH 2022-2023)**

**Department Name : Information Technology**

**Subject Name : Data Structure and Analysis**

**Course Code : C202**

<b>Course Code</b>	<b>Course/Lab Objectives</b>
<b>After the completion of the course the student should be able to</b>	
C202.1	The fundamental knowledge of data structures.
C202.2	The programming knowledge which can be applied to sophisticated data structures.
C202.3	The fundamental knowledge of stacks queue, linked list etc.
C202.4	The fundamental knowledge of Trees, Graphs etc.
C202.5	The fundamental knowledge of different sorting, searching, hashing and recursion techniques
C202.6	The real time applications for stacks, queue, linked list, trees, graphs etc.

**Department Name : Information Technology**

**Subject Name : Data Structure and Analysis**

**Course Code : C202**

<b>Course Code</b>	<b>Course/Lab Outcomes</b>
<b>After the completion of the course the student should be able to</b>	
C202.1	Classify and Apply the concepts of stacks, queues and linked list in real life problem solving.
C202.2	Classify, apply and analyze the concepts trees in real life problem solving.
C202.3	Illustrate and justify the concepts of graphs in real life problem solving.
C202.4	List and examine the concepts of sorting, searching techniques in real life problem solving.
C202.5	Use and identify the concepts of recursion, hashing in real life problem solving
C202.6	Examine and justify different methods of stacks, queues, linked list, trees and graphs to various applications.

**Department Name : Information Technology**

**Subject Name : Database Management System**

**Course Code : C203**

<b>Course Code</b>	<b>Course/Lab Objective</b>
<b>After the completion of the course the student should be able to</b>	
C203.1	To learn the basics and understand the need of database management system.
C203.2	To construct conceptual data model for real world applications
C203.3	To Build Relational Model from ER/EER
C203.4	To introduce the concept of SQL to store and retrieve data efficiently.
C203.5	To demonstrate notions of normalization for database design
C203.6	To understand the concepts of transaction processing- concurrency control & recovery procedures.

**Department Name : Information Technology**

**Subject Name : Database Management System**

**Course Code : C203**

<b>Course Code</b>	<b>Course/Lab Outcomes</b>
<b>After the completion of the course the student should be able to</b>	
C203.1	Identify the need of Database Management System.
C203.2	Design conceptual model for real life applications.
C203.3	Create Relational Model for real life applications
C203.4	Formulate query using SQL commands.
C203.5	Apply the concept of normalization to relational database design.
C203.6	Demonstrate the concept of transaction, concurrency and recovery.

<b>Department Name : Information Technology</b>	
<b>Subject Name : Data Structure Lab</b>	
<b>Course Code : C206</b>	
<b>Course Code</b>	<b>Course/Lab Objective</b>
<b>After the completion of the course the student should be able to</b>	

C206.1	To use data structures as the introductory foundation for computer automation to engineering problems.
C206.2	To use the basic principles of programming as applied to complex data structures.
C206.3	To learn the principles of stack, queue, linked lists and its various operations.
C206.4	To learn fundamentals of binary search tree, implementation and use of advanced tree like AVL, B trees and graphs.
C206.5	To learn about searching, hashing and sorting.
C206.6	To learn the applications of linked lists, stacks, queues, trees and graphs.

<b>Department Name : Information Technology</b>	
<b>Subject Name : Data Structure Lab</b>	
<b>Course Code : C206</b>	
<b>Course Code</b>	<b>Course/Lab Outcomes</b>
<b>After the completion of the course the student should be able to</b>	
C206.1	Understand and use the basic concepts and principles of various linked lists, stacks and queues.

C206.2	Understand the concepts and apply the methods in basic trees.
C206.3	Use and identify the methods in advanced trees.
C206.4	Understand the concepts and apply the methods in graphs.
C206.5	Understand the concepts and apply the techniques of searching, hashing and sorting
C206.6	Illustrate and examine the methods of linked lists, stacks, queues, trees and graphs to various real time problems

<b>Department Name : Information Technology</b>	
<b>Subject Name : SQL Lab</b>	
<b>Course Code : C207</b>	
<b>Course Code</b>	<b>Course/Lab Objective</b>
<b>After the completion of the course the student should be able to</b>	
C207.1	To identify and define problem statements for real life applications
C207.2	To construct conceptual data model for real life applications
C207.3	To Build Relational Model from ER/EER and demonstrate usage of relational algebra.

C207.4	To Apply SQL to store and retrieve data efficiently
C207.5	To implement database connectivity using JDBC
C207.6	To understand the concepts of transaction processing- concurrency control & recovery procedures.

<b>Department Name : Information Technology</b>	
<b>Subject Name : SQL Lab</b>	
<b>Course Code : C207</b>	
<b>Course Code</b>	<b>Course/Lab Outcomes</b>
<b>After the completion of the course the student should be able to</b>	
C207.1	Define problem statement and Construct the conceptual model for real life application.
C207.2	Create and populate a RDBMS using SQL.
C207.3	Formulate and write SQL queries for efficient information retrieval
C207.4	Apply view, triggers and procedures to demonstrate specific event handling
C207.5	Demonstrate database connectivity using JDBC.

C207.6	Demonstrate the concept of concurrent transactions.
<b>Department Name : Information Technology</b>	
<b>Subject Name : Java Lab</b>	
<b>Course Code : ITL304</b>	
<b>Course Code</b>	<b>Course/Lab Objective</b>
<b>After the completion of the course the student should be able to</b>	
<b>ITL304.1</b>	To understand the concepts of object-oriented paradigm in the Java programming language.
<b>ITL304.2</b>	To understand the importance of Classes & objects along with constructors, Arrays ,Strings and vectors
<b>ITL304.3</b>	To learn the principles of inheritance, interface and packages and demonstrate the concept of reusability for faster development.
<b>ITL304.4</b>	To recognize usage of Exception Handling, Multithreading, Input Output streams in various applications
<b>ITL304.5</b>	To learn designing, implementing, testing, and debugging graphical user interfaces in Java using Swings and AWT components that can react to different user events.
<b>ITL304.6</b>	To develop graphical user interfaces using JavaFX controls.

**Department Name : Information Technology**

**Subject Name : Java Lab**

**Course Code : ITL304**

**Course Code**

**Course/Lab Outcomes**

**After the completion of the course the student should be able to**

**ITL304.1**

Explain the fundamental concepts of Java Programming.

**ITL304.2**

Use the concepts of classes, objects, members of a class and the relationships among them needed for finding the solution to specific problem.

**ITL304.3**

Demonstrate how to extend java classes and achieve reusability using Inheritance, Interface and Packages.

**ITL304.4**

Construct robust and faster programmed solutions to problems using concept of Multithreading, exceptions and file handling

**ITL304.5**

Design and develop Graphical User Interface using Abstract Window Toolkit and Swings along with response to the events.

**ITL304.6**

Develop Graphical User Interface by exploring JavaFX framework based on MVC architecture.

**Department Name : Information Technology**

**Subject Name : Computer Network and Network Design**

**Course Code : C212**

Course Code	Course/Lab Objective
<b>After the completion of the course the student should be able to</b>	
C212.1	Understand the division of network functionalities into layers.
C212.2	Understand the types of transmission media along with data link layer concepts, design issues and protocols
C212.3	Analyze the strength and weaknesses of routing protocols and gain knowledge about IP addressing
C212.4	Understand the data transportation, issues and related protocols for end to end delivery of data.
C212.5	Understand the data presentation techniques used in presentation layer & client/server model in application layer protocols.
C212.6	Design a network for an organization using networking concepts

<b>Department Name : Information Technology</b>	
<b>Subject Name : Computer Network and Network Design</b>	
<b>Course Code : C212</b>	
Course Code	Course/Lab Outcomes
<b>After the completion of the course the student should be able to</b>	

C212.1	Describe the functionalities of each layer of the models and compare the Models.
C212.2	Categorize the types of transmission media and explain data link layer concepts, design issues and protocols.
C212.3	Analyze the routing protocols and assign IP address to networks.
C212.4	Explain the data transportation and session management issues and related protocols used for end to end delivery of data.
C212.5	List the data presentation techniques and illustrate the client/server model in application layer protocols.
C212.6	Use of networking concepts of IP address, Routing, and application services to design a network for an organization

<b>Department Name : Information Technology</b>	
<b>Subject Name : Operating System</b>	
<b>Course Code : C213</b>	
<b>Course Code</b>	<b>Course/Lab Objective</b>
<b>After the completion of the course the student should be able to</b>	
C213.1	To understand the major components of Operating System & its functions.

C213.2	To introduce the concept of a process and its management like transition, scheduling, etc.
C213.3	To understand basic concepts related to Inter-process Communication (IPC) like mutual exclusion, deadlock, etc. and role of an Operating System in IPC.
C213.4	To understand the concepts and implementation of memory management policies and virtual memory.
C213.5	To understand functions of Operating System for storage management and device management.
C213.6	To study the need and fundamentals of special-purpose operating system with the advent of new emerging technologies

<b>Department Name : Information Technology</b>	
<b>Subject Name : Operating System</b>	
<b>Course Code : C213</b>	
<b>Course Code</b>	<b>Course/Lab Outcomes</b>
<b>After the completion of the course the student should be able to</b>	
C213.1	Understand the basic concepts related to Operating System
C213.2	Describe the process management policies and illustrate scheduling of processes by CPU.
C213.3	Explain and apply synchronization primitives and evaluate deadlock conditions as handled by Operating System.

C213.4	Describe and analyze the memory allocation and management functions of Operating System.
C213.5	Analyze and evaluate the services provided by Operating System for storage management.
C213.6	Compare the functions of various special-purpose Operating Systems.

<b>Department Name : Information Technology</b>	
<b>Subject Name : Networking Lab</b>	
<b>Course Code : C216</b>	
<b>Course Code</b>	<b>Course/Lab Objective</b>
<b>After the completion of the course the student should be able to</b>	
C216.1	To get familiar with the basic network administration commands.
C216.2	To install and configure network simulator and learn basics of TCL scripting.
C216.3	To understand the network simulator environment and visualize a network topology and observe its performance
C216.4	To implement client-server socket programs.
C216.5	To observe and study the traffic flow and the contents of protocol frames.

C216.6	To design and configure a network for an organization
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**Department Name : Information Technology**

**Subject Name : Networking Lab**

**Course Code : C216**

Course Code	Course/Lab Outcomes
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**After the completion of the course the student should be able to**

C216.1	Execute and evaluate network administration commands and demonstrate their use in different network scenarios
C216.2	Demonstrate the installation and configuration of network simulator.
C216.3	Demonstrate and measure different network scenarios and their performance behavior.
C216.4	Implement the socket programming for client server architecture.
C216.5	Analyze the traffic flow of different protocols
C216.6	Design a network for an organization using a network design tool

**Department Name : Information Technology**

**Subject Name : Unix Lab**

**Course Code : C217**

**Course Code**

**Course/Lab Objective**

**After the completion of the course the student should be able to**

C217.1

To understand architecture and installation of Unix Operating System

C217.2

To learn Unix general purpose commands and programming in Unix editor environment

C217.3

To understand file system management and user management commands in Unix.

C217.4

To understand process management and memory management commands in Unix

C217.5

To learn basic shell scripting.

C217.6

To learn scripting using awk and perl languages.

**Department Name : Information Technology**

**Subject Name : Unix Lab**

**Course Code : C217**

<b>Course Code</b>	<b>Course/Lab Outcomes</b>
<b>After the completion of the course the student should be able to</b>	
C217.1	Understand the architecture and functioning of Unix
C217.2	Identify the Unix general purpose commands
C217.3	Apply Unix commands for system administrative tasks such as file system management and user management.
C217.4	Execute Unix commands for system administrative tasks such as process management and memory management
C217.5	Implement basic shell scripts for different applications
C217.6	Implement advanced scripts using awk & perl languages and grep, sed, etc. commands for performing various tasks.

**THIRD YEAR- V SEM (A.Y. 2022-2023)(BATCH 2020-2021)**

**Department Name : Information Technology**

**Subject Name : Internet Programming**

**Course Code : C301**

<b>Course Code</b>	<b>Course/Lab Objective</b>
<b>After the completion of the course the student should be able to</b>	
C301.1	To orient students to Web Programming fundamental.
C301.2	To expose students to JavaScript to develop interactive web page development
C301.3	To orient students to Basics of REACT along with installation
C301.4	To expose students to Advanced concepts in REACT
C301.5	To orient students to Fundamentals of node.js
C301.6	To expose students to node.js applications using express framework.

**Department Name : Information Technology**

**Subject Name : Internet Programming**

**Course Code : C301**

<b>Course Code</b>	<b>Course/Lab Outcomes</b>
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**After the completion of the course the student should be able to**

C301.1	Select protocols or technologies required for various web applications.
C301.2	Apply JavaScript to add functionality to web pages
C301.3	Design front end application using basic React.
C301.4	Design front end applications using functional components of React.
C301.5	Design back-end applications using Node.js.
C301.6	Construct web based Node.js applications using Express.

**Department Name : Information Technology**

**Subject Name : Compute Network Security**

**Course Code : C302**

<b>Course Code</b>	<b>Course/Lab Objective</b>
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**After the completion of the course the student should be able to**

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C302.1	The basic concepts of computer and Network Security
C302.2	Various cryptographic algorithms including secret key management and different authentication techniques.
C302.3	Different types of malicious Software and its effect on the security.
C302.4	Various secure communication standards including IPsec, SSL/TLS and email.
C302.5	The Network management Security and Network Access Control techniques in Computer Security.
C302.6	Different attacks on networks and infer the use of firewalls and security protocols.

**Department Name : Information Technology**

**Subject Name : Compute Network Security**

**Course Code : C302**

<b>Course Code</b>	<b>Course/Lab Outcomes</b>
<b>After the completion of the course the student should be able to</b>	
C302.1	Explain the fundamentals concepts of computer security and network security
C302.2	Identify the basic cryptographic techniques using classical and block encryption methods.

C302.3	Study and describe the system security malicious software.
C302.4	Describe the Network layer security, Transport layer security and application layer security
C302.5	Explain the need of network management security and illustrate the need for NAC
C302.6	Identify the function of an IDS and firewall for the system security

**Department Name : Information Technology**

**Subject Name : IP Lab**

**Course Code : C306**

<b>Course Code</b>	<b>Course/Lab Objective</b>
<b>After the completion of the course the student should be able to</b>	
C306.1	To orient students to HTML for making webpages
C306.2	To expose students to CSS for formatting web pages
C306.3	To expose students to developing responsive layout
C306.4	To expose students to JavaScript to make web pages interactive

C306.5	To orient students to React for developing front end applications
C306.6	To orient students to Node.js for developing backend applications

<b>Department Name : Information Technology</b>	
<b>Subject Name : IP Lab</b>	
<b>Course Code : C306</b>	
<b>Course Code</b>	<b>Course/Lab Outcomes</b>
<b>After the completion of the course the student should be able to</b>	
C306.1	Identify and apply the appropriate HTML tags to develop a webpage
C306.2	Identify and apply the appropriate CSS tags to format data on webpage
C306.3	Construct responsive websites using Bootstrap
C306.4	Use JavaScript to develop interactive web pages.
C306.5	Construct front end applications using React
C306.6	Construct back end applications using Node.js/Express

**Department Name : Information Technology**

**Subject Name : Security Lab**

**Course Code : C307**

<b>Course Code</b>	<b>Course/Lab Objective</b>
<b>After the completion of the course the student should be able to</b>	
C307.1	To apply the knowledge of symmetric cryptography to implement classical ciphers.
C307.2	To analyze and implement public key encryption algorithms, hashing and digital signature algorithms
C307.3	To explore the different network reconnaissance tools to gather information about networks
C307.4	To explore the tools like sniffers, port scanners and other related tools for analyzing.
C307.5	To Scan the network for vulnerabilities and simulate attacks.
C307.6	To set up intrusion detection systems using open-source technologies and to explore email security.

**Department Name : Information Technology**

**Subject Name : Security  
Lab**

**Course Code : C307**

<b>Course Code</b>	<b>Course/Lab Outcomes</b>
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**After the completion of the course the student should be able to**

C307.1	Illustrate symmetric cryptography by implementing classical ciphers.
C307.2	Demonstrate Key management, distribution and user authentication.
C307.3	Explore the different network reconnaissance tools to gather information about networks
C307.4	Use tools like sniffers, port scanners and other related tools for analyzing packets in a network.
C307.5	Use open-source tools to scan the network for vulnerabilities and simulate attacks
C307.6	Demonstrate the network security system using open source tools

**Department Name : Information Technology**

**Subject Name : Software Engineering**

**Course Code : C504**

<b>Course Code</b>	<b>Course/Lab Objective</b>
<b>After the completion of the course the student should be able to</b>	
C504.1	To provide the knowledge of software engineering discipline.
C504.2	To understand Requirements and analyze it
C504.3	To do planning and apply scheduling
C504.4	To apply analysis, and develop software solutions
C504.5	To demonstrate and evaluate real time projects with respect to software engineering principles
C504.6	Apply testing and assure quality in software solution.

**Department Name : Information Technology**

**Subject Name : Software Engineering**

**Course Code : C504**

<b>Course Code</b>	<b>Course/Lab Outcomes</b>
<b>After the completion of the course the student should be able to</b>	

C504.1	Understand and use basic knowledge in software engineering.
C504.2	Identify requirements, analyze and prepare models.
C504.3	Plan, schedule and track the progress of the projects
C504.4	Design & develop the software solutions for the growth of society
C504.5	To demonstrate and evaluate real time projects with respect to software engineering principle
C504.6	Apply testing and assure quality in software solution

**Department Name : Information Technology**

**Subject Name : Devops Lab**

**Course Code : ITL503**

<b>Course Code</b>	<b>Course/Lab Objective</b>
<b>After the completion of the course the student should be able to</b>	
ITL503 .1	To understand DevOps practices which aims to simplify Software Development Life Cycle
ITL503 .2	To be aware of different Version Control tools like GIT, CVS or Mercurial
ITL503 .3	To Integrate and deploy tools like Jenkins and Maven, which is used to build, test and deploy applications in DevOps environment

ITL503 .4	To be familiarized with selenium tool, which is used for continuous testing of applications deployed.
ITL503 .5	To use Docker to Build, ship and manage applications using containerization
ITL503 .6	To understand the concept of Infrastructure as a code and install and configure Ansible tool

**Department Name : Information Technology**

**Subject Name : Devops Lab**

**Course Code : ITL503**

<b>Course Code</b>	<b>Course/Lab Outcomes</b>
<b>After the completion of the course the student should be able to</b>	
ITL503 .1	To understand the fundamentals of DevOps engineering and be fully proficient with DevOps terminologies, concepts, benefits, and deployment options to meet your business requirements
ITL503 .2	To obtain complete knowledge of the “version control system” to effectively track changes augmented with Git and GitHub
ITL503 .3	To understand the importance of Jenkins to Build and deploy Software Applications on server environment
ITL503 .4	Understand the importance of Selenium and Jenkins to test Software Applications
ITL503 .5	To understand concept of containerization and Analyze the Containerization of OS images and deployment of applications over Docker

ITL503 .6	To Synthesize software configuration and provisioning using Ansible.

**Department Name : Information Technology**

**Subject Name : Entrepreneurship  
and E-business**

**Course Code : ITC503**

<b>Course Code</b>	<b>Course/Lab Objective</b>
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**After the completion of the course the student should be able to**

ITC503.1	Distinguish Entrepreneur and Entrepreneurship starting and feasibility study
ITC503.2	Realize the skills required to be an entrepreneur
ITC503.3	Acquaint the students with challenges of starting new ventures
ITC503.4	Identify the right sources of fund for starting a new business
ITC503.5	Be familiarized with concept of E-business Models
ITC503.6	Understand various E-business Strategies

**Department Name : Information Technology**

**Subject Name : Entrepreneurship  
and E-business**

**Course Code : ITC503**

<b>Course Code</b>	<b>Course/Lab Outcomes</b>
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**After the completion of the course the student should be able to**

ITC503.1	Understand the concept of entrepreneurship and its close relationship with enterprise and owner-management.
ITC503.2	Understand the nature of business development in the context of existing organizations and of new business start-ups
ITC503.3	Comprehended important factors for starting a new venture and business development
ITC503.4	Know issues and decisions involved in financing and resourcing a business start-up
ITC503.5	Describe various E-business Models
ITC503.6	Discuss various E-business Strategies

**Department Name : Information Technology**

**Subject Name : Advance DevOps Lab**

**Course Code : ITL504**

<b>Course Code</b>	<b>Course/Lab Objective</b>
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<b>After the completion of the course the student should be able to</b>	
<b>ITL504.1</b>	To understand DevOps practices and cloud native environments to achieve continuous software delivery pipelines and automated operations that address the gap between IT resources and growing cloud complexity.
ITL504.2	To Use Kubernetes services to structure N-tier applications.
<b>ITL504.3</b>	To be familiarized with Infrastructure as code for provisioning, compliance, and management of any cloud infrastructure, and service.
<b>ITL504.4</b>	To understand that security and speed in software development are not inversely-related objectives Internalizing the contribution of tools and automation in DevSecOps
<b>ITL504.5</b>	To understand various troubleshooting techniques by monitoring your entire infrastructure and business processes
<b>ITL504.6</b>	To understand how software and software-defined hardware are provisioned dynamically.

<b>Department Name : Information Technology</b>	
<b>Subject Name : Advance DevOps Lab</b>	
<b>Course Code : ITL504</b>	
<b>Course Code</b>	<b>Course/Lab Outcomes</b>
<b>After the completion of the course the student should be able to</b>	
<b>ITL504.1</b>	To understand the fundamentals of Cloud Computing and be fully proficient with Cloud based DevOps solution deployment options to meet your business requirements

ITL504.2	To deploy single and multiple container applications and manage application deployments with rollouts in Kubernetes
<b>ITL504.3</b>	To apply best practices for managing infrastructure as code environments and use terraform to define and deploy cloud infrastructure.
<b>ITL504.4</b>	To identify and remediate application vulnerabilities earlier and help integrate security in the development process using SAST Techniques.
<b>ITL504.5</b>	To use Continuous Monitoring Tools to resolve any system errors (low memory, unreachable server etc.) before they have any negative impact on the business productivity
<b>ITL504.6</b>	To engineer a composition of nano services using AWS Lambda and Step Functions with the Serverless Framework
<b>Department Name : Information Technology</b>	
<b>Subject Name : Business Intelligence Lab</b>	
<b>Course Code : C317</b>	
<b>Course Code</b>	<b>Course/Lab Objective</b>
<b>After the completion of the course the student should be able to</b>	
C317.1	To introduce the concept of data Mining as an important tool for enterprise data management and as a cutting-edge technology for building competitive advantage
C317.2	To enable students to effectively identify sources of data and process it for data mining
C317.3	To make students well versed in all data mining algorithms, methods, and tools.

C317.4	To learn how to gather and analyze large sets of data to gain useful business understanding.
C317.5	To impart skills that can enable students to approach business problems analytically by identifying opportunities to derive business value from data.
C317.6	To identify and compare the performance of business.

**Department Name : Information Technology**

**Subject Name : Business Intelligence Lab**

**Course Code : C317**

<b>Course Code</b>	<b>Course/Lab Outcomes</b>
<b>After the completion of the course the student should be able to</b>	
C317.1	Identify sources of Data for mining and perform data exploration
C317.2	Organize and prepare the data needed for data mining algorithms in terms of attributes and class inputs, training, validating, and testing files
C317.3	Implement the appropriate data mining methods like classification, clustering or association mining on large data sets using open-source tools like WEKA
C317.4	Implement various data mining algorithms from scratch using languages like Python/ Java etc.
C317.5	Evaluate and compare performance of some available BI packages

C317.6	Apply BI to solve practical problems: Analyze the problem domain, use the data collected in enterprise apply the appropriate data mining technique, interpret and visualize the results and provide decision support
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<b>Department Name : Information Technology</b>	
<b>Subject Name : Web Lab</b>	
<b>Course Code : C318</b>	
<b>Course Code</b>	<b>Course/Lab Objective</b>
<b>After the completion of the course the student should be able to</b>	
C318.1	Open Source Tools for Web Analytics and Semantic Web
C318.2	Programming in TypeScript for designing Web Applications.
C318.3	AngularJS Framework for Single Page Web Applications.
C318.4	AJAX for Rich Internet Applications.
C318.5	REST API and MongoDB for Frontend and Backend Connectivity.
C318.6	Flask Framework for building web applications.

**Department Name : Information Technology**

**Subject Name : Web Lab**

**Course Code : C318**

<b>Course Code</b>	<b>Course/Lab Outcomes</b>
<b>After the completion of the course the student should be able to</b>	
C318.1	Understand open source tools for web analytics and semantic web apps development and deployment
C318.2	Understand the basic concepts of TypeScript for designing web applications.
C318.3	Implement Single Page Applications using AngularJS Framework.
C318.4	Develop Rich Internet Applications using AJAX.
C318.5	Create REST Web services using MongoDB.
C318.6	Design web applications using Flask.

**FINAL YEAR- VII SEM (A.Y. 2022-2023) (BATCH(2019-2020))**

**Department Name : Information Technology**

**Subject Name : Infrastructure Security**

**Course Code : C404**

<b>Course Code</b>	<b>Course/Lab Objective</b>
<b>After the completion of the course the student should be able to</b>	
C404.1	To understand underlying principles of infrastructure security
C404.2	To explore software vulnerabilities, attacks and protection mechanisms To learn security aspects of wireless network infrastructure and protocols
C404.3	To investigate web server vulnerabilities and their countermeasures
C404.4	To develop policies for security management and mitigate security related risks in the organization
C404.5	To Learn the different attacks on Open Web Applications and Web services.
C404.6	To Learn the different security policies.

**Department Name : Information Technology**

**Subject Name : Infrastructure Security**

**Course Code : C404**

<b>Course Code</b>	<b>Course/Lab Outcomes</b>
<b>After the completion of the course the student should be able to</b>	
C404.1	Understand the concept of vulnerability , attacks and protection mechanism
C404.2	Analyze and evaluate software vulnerability and attack on database and operating system
C404.3	Explain the need of security protocol in the context of wireless communication
C404.4	Understand and explain various security solution for web and cloud infrastructure
C404.5	Understand and evaluate different attacks on open web application web services
C404.6	Design appropriate security policy to protect infrastructure professional

**Department Name : Information Technology**

**Subject Name : Artificial Intellegience**

**Course Code : C401**

<b>Course Code</b>	<b>Course/Lab Objective</b>
<b>After the completion of the course the student should be able to</b>	
C401.1	To create appreciation and understanding of both the achievements of AI and the theory underlying those achievements.
C401.2	To introduce the concepts of a Rational Intelligent Agent and the different types of Agents that can be designed to solve problems
C401.3	To review the different stages of development of the AI field from human like behavior to Rational Agents
C401.4	To impart basic proficiency in representing difficult real life problems in a state space representation so as to solve them using AI techniques like searching and game playing.
C401.5	To create an understanding of the basic issues of knowledge representation and Logic and blind and heuristic search, as well as an understanding of other topics such as minimal, resolution, etc. that play an important role in AI programs.
C401.6	To introduce advanced topics of AI such as planning, Bayes networks, natural language processing and Cognitive Computing

**Department Name : Information Technology**

**Subject Name : Artificial Intellegience**

**Course Code : C401**

<b>Course Code</b>	<b>Course/Lab Outcomes</b>
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**After the completion of the course the student should be able to**

C401.1	Understand the building blocks of AI as presented in terms of intelligent agents.
C401.2	Apply the appropriate search method on a given problem.
C401.3	Formulate and solve given problem using propositional and first order logic.
C401.4	Apply logic based techniques to perform inference or planning
C401.5	Apply the Bayesian approach to solve the problem with uncertain information
C401.6	Apply concept Natural Language processing to problems leading to understanding of cognitive computing

**Department Name : Information Technology**

**Subject Name : Advanced Security Lab**

**Course Code :**

Course Code	Course/Lab Objective
<b>After the completion of the course the student should be able to</b>	

	Implement and analyze program and database vulnerabilities Buffer overflow and SQL Injection.
	Explore and analyze different security tools to secure mobile devices, web browser, wireless network and router
	Explore reconnaissance, attack and forensics tools in Kali Linux
	Learn security of system using personal firewall installation
	Understand AAA using RADUIS
	Understand AAA using TACACS

**Department Name : Information Technology**

**Subject Name : Advanced Security Lab**

**Course Code :**

<b>Course Code</b>	<b>Course/Lab Outcomes</b>
<b>After the completion of the course the student should be able to</b>	
	Implement and analyze programe and database vulnerability ,buffer overflow and sql
	Explore and analyze different security tools to secure mobile devices, web browser wireless network and router

	Explore reconnaissance , attack and forencies tools in kali linux
	Learn security of system using personal firewall installation
	Understand AAA using RADUIS
	Understand AAA using TACACS

**Department Name : Information Technology**

**Subject Name : Intelligence System Lab**

**Course Code :**

<b>Course Code</b>	<b>Course/Lab Objective</b>
<b>After the completion of the course the student should be able to</b>	
	To introduce the concepts of a Rational Intelligent Agent and the different types of Agents that can be designed to solve problems
	To impart basic proficiency in representing difficult real life problems in a state space representation so as to solve them using AI techniques.
	To make students understand various AI methods like searching and game playing and how to apply them to solve real applications
	To explain to students the basic issues of knowledge representation and Logic so as to build inference engines

	To impart a basic understanding of some of the more advanced topics of AI such as planning
	To understand Bayes networks, natural language processing and introduce concept of cognitive computing.

<b>Department Name : Information Technology</b>	
<b>Subject Name : Intelligence System Lab</b>	
<b>Course Code :</b>	
<b>Course Code</b>	<b>Course/Lab Outcomes</b>
<b>After the completion of the course the student should be able to</b>	
	Design the building blocks of an Intelligent system using PEAS Environment.
	Implement Search techniques to solve the problem by analyzing problem state space.
	Implement algorithm for CSP and Game Playing.
	Understand the capability to represent real time problem domain using logic based techniques.
	Solve the problem with uncertain information using Bayesian approaches.
	Apply Concepts of NLP for development of chatbot.

**FOURTH YEAR- VIII SEM (A.Y. 2022-2023) (BATCH(2019-2020))**

**Department Name : Information Technology**

**Subject Name : Big Data Analytics**

**Course Code :**

<b>Course Code</b>	<b>Course/Lab Objective</b>
	<b>After the completion of the course the student should be able to</b>
	To provide an overview of an exciting growing field of Big Data analytics.
	To discuss the challenges traditional data mining algorithms face when analyzing Big Data.
	To introduce the tools required to manage and analyze big data like Hadoop, NoSql Map <sub>1</sub> Reduce.
	To teach the fundamental techniques and principles in achieving big data analytics with scalability and streaming capability.
	To introduce to the students several types of big data like social media, web graphs and data streams.
	To enable students to have skills that will help them to solve complex real-world problems in for decision support.

**Department Name : Information Technology**

**Subject Name : Big Data Analytics**

**Course Code :**

<b>Course Code</b>	<b>Course/Lab Outcomes</b>
<b>After the completion of the course the student should be able to</b>	
	Explain the motivation for big data systems and identify the main sources of Big Data in the real world
	Demonstrate an ability to use frameworks like Hadoop, NOSQL to efficiently store retrieve and process Big Data for Analytics.
	Implement several Data Intensive tasks using the Map Reduce Paradigm
	Apply several newer algorithms for Clustering Classifying and finding associations in Big Data
	Design algorithms to analyze Big data like streams, Web Graphs and Social Media data
	Design and implement successful Recommendation engines for enterprises.

**Department Name : Information Technology**

**Subject Name : Internet of Everything**

**Course Code :**

<b>Course Code</b>	<b>Course Outcomes</b>
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**After the completion of the course the student should be able to**

<b>Course Code</b>	<b>Course/Lab Objective</b>
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To learn the concepts of IOT.

To identify the different technology

To learn different applications in IOT

To learn different protocols used in IOT.

To learn the concepts of smart city development in IOT.

To learn how to analysis the data in IOT.

**Department Name : Information Technology**

**Subject Name : Internet of Everything**

**Course Code :**

<b>Course Code</b>	<b>Course Outcomes</b>
<b>After the completion of the course the student should be able to</b>	
<b>Course Code</b>	<b>Course/Lab Outcomes</b>
	Apply the concepts of IOT.
	Identify the different technology.
	Apply IOT to different applications.
	Analysis and evaluate protocols used in IOT.
	Design and develop smart city in IOT
	Analysis and evaluate the data received through sensors in IOT

**Department Name : Information Technology**

**Subject Name : Big Data Lab**

**Course Code :**

<b>Course Code</b>	<b>Course/Lab Objective</b>
<b>After the completion of the course the student should be able to</b>	

	To introduce the tools required to manage and analyze big data like Hadoop, NoSql
	To impart knowledge of Map reduce paradigm to solve complex problems Map-Reduce
	To introduce several new algorithms for big data mining like classification, clustering and finding frequent patterns.
	To introduce to the students several types of big data like social media, web graphs and data streams
	To identify various sources of Big data
	To enable students to have skills that will help them to solve complex real-world problems in for decision support.

**Department Name : Information Technology**

**Subject Name : Big Data Lab**

**Course Code :**

<b>Course Code</b>	<b>Course/Lab Outcomes</b>
<b>After the completion of the course the student should be able to</b>	
	Demonstrate capability to use Big Data Frameworks like Hadoop

	Program applications using tools like Hive,pig,NO SQL and MongoDB for Big data Applications
	Construct scalable algorithms for large Datasets using Map Reduce techniques
	Implement algorithms for clustering, classifying and finding associations in Big Data
	Design and implement algorithms to analyze Big data like streams, Web Graphs and Social Media data and construct recommendation systems
	Apply the knowledge of Big Data gained to fully develop a BDA applications for real life applications

**Department Name : Information Technology**

**Subject Name : Internet of Everything Lab**

**Course Code :**

<b>Course Code</b>	<b>Course Outcomes</b>
<b>After the completion of the course the student should be able to</b>	
<b>Course Code</b>	<b>Course/Lab Objective</b>
	To learn different types of sensors from Motes families.
	To design the problem solution as per the requirement analysis done using Motes sensors.
	To study the basic concepts of programming/sensors/ emulator like cooja etc.

	To design and implement the mini project intended solution for project based learning.
	To build and test the mini project successfully.
	To improve the team building, communication and management skills of the students

<b>Department Name : Information Technology</b>	
<b>Subject Name : Internet of Everything Lab</b>	
<b>Course Code :</b>	
<b>Course Code</b>	<b>Course/Lab Outcomes</b>
<b>After the completion of the course the student should be able to</b>	
	Identify the requirements for the real world problems
	Conduct a survey of several available literatures in the preferred field of study
	Study and enhance software/ hardware skills.
	Demonstrate and build the project successfully by hardware/sensor requirements, coding, emulating and testing.
	To report and present the findings of the study conducted in the preferred domain

Demonstrate an ability to work in teams and manage the conduct of the research study.

**Course outcomes of all dept (ODD & EVEN EM) required in following format****Subject Name :Engineering Mathematics I****Subject Code : FEC101****Course Code : FEC101**

<b>Course Code</b>	<b>Course Outcomes</b>
	<b>After the completion of the course the student should be able to</b>
FEC101.1	Illustrate the basic concepts of Complex numbers.
FEC101.2	Apply the knowledge of complex numbers to solve problems in hyperbolic functions and logarithmic function.
FEC101.3	Illustrate the basic principles of Partial differentiation.
FEC101.4	Illustrate the knowledge of Maxima, Minima and Successive differentiation.
FEC101.5	Apply principles of basic operations of matrices, rank and echelon form of matrices to solve simultaneous equations.
FEC101.6	Illustrate SCILAB programming techniques to the solution of linear and simultaneous algebraic equations.
<b>Subject Name : Engineering Physics-I</b>	
<b>Subject Code : FEC102</b>	
<b>Course Code : FEC102</b>	
FEC102.1	Illustrate the fundamentals of quantum mechanics and its application.
FEC102.2	Apply the X-ray diffraction techniques for explaining peculiar properties of crystal.
FEC102.3	Illustrate the working of various semiconductor for electronic devices.
FEC102.4	Employ the concepts of interference in thin films for instruments.
FEC102.5	Discuss the properties of Superconductors and Supercapacitors to apply them in novel applications.

FEC102.6	Discuss the properties of engineering materials for their current and futuristic frontier applications.
<b>Subject Name : Engineering Chemistry-I</b>	
<b>Subject Code : FEC103</b>	
<b>Course Code : FEC103</b>	
FEC103.1	Explain the concept of microscopic chemistry in terms of atomic and molecular orbital theory and relate it to diatomic molecules.
FEC103.2	Describe the concept of aromaticity and interpret it with relation to specific aromatic systems.
FEC103.3	Illustrate the knowledge of various types of intermolecular forces and relate it to real gases.
FEC103.4	4. Interpret various phase transformations using thermodynamics.
FEC103.5	Illustrate the knowledge of polymers, fabrication methods, conducting polymers in various industrial fields
FEC103.6	Analyze the quality of water and suggest suitable methods of treatment.
<b>Subject Name : Engineering Mechanics</b>	
<b>Subject Code : FEC104</b>	
<b>Course Code : FEC104</b>	
FEC104.1	Illustrate the concept of force, moment and apply the same along with the concept of equilibrium in two and three dimensional systems with the help of FBD

FEC104.2	Locate the centroid and understand its significance.
FEC104.3	Estimate friction force and required force to overcome friction.
FEC104.4	Analyse relation between velocity and acceleration of a particle by graphical and mathematical methods.
FEC104.5	Analyse types of motions and establish Kinematic relations for a rigid body.
FEC104.6	Analyse the body in motion using force and acceleration, work-energy, impulse-momentum principles
<b>Subject Name : Basic Electrical Engineering</b>	
<b>Subject Code : FEC105</b>	
<b>Course Code : FEC105</b>	
FEC105.1	Evaluate network theorems to determine the circuit response and behavior.
FEC105.2	Evaluate Single-phase Alternating Current circuits.
FEC105.3	Evaluate Three-phase Alternating Current circuits.
FEC105.4	Analyze the performance of single-phase transformer theoretically and graphically.

FEC105.5	Illustrate the working principle of three-phase machines.
FEC105.6	Illustrate the working principle of single-phase machines.
<b>Subject Name : Engineering Physics-I</b>	
<b>Subject Code : FEL101</b>	
<b>Course Code : FEL101</b>	
FEL101.1	Analyze the results based on performance of experiments on interference in thin films.
FEL101.2	Analyze the characteristics of semiconductor devices based on their experimental performance.
FEL101.3	Verify the theory learned in crystallography.
FEL101.4	Create and design models to address the technical problems and learning life skills.
<b>Subject Name : Engineering Chemistry-I</b>	
<b>Subject Code : FEL102</b>	
<b>Course Code : FEL102</b>	

FEL102.1	Determine Chloride content
FEL102.2	Determine free acid ph of different solutions
FEL102.3	Determine hardness of water sample
FEL102.4	Synthesize polymers, biodegradable plastics
FEL102.5	Determine Viscosity of oil
<b>Subject Name : Engineering Mechanics</b>	
<b>Subject Code : FEL103</b>	
<b>Course Code : FEL103</b>	
FEL103.1	Verify equations of equilibrium of coplanar force system
FEL103.2	Verify law of moments.
FEL103.3	Determine the centroid of plane lamina.
FEL103.4	Evaluate co-efficient of friction between the different surfaces in contact.

FEL103.5	Demonstrate the types of collision/impact and determine corresponding coefficient of restitution
FEL103.6	Differentiate the kinematics and kinetics of a particle.
<b>Subject Name : Basic Electrical Engineering</b>	
<b>Subject Code : FEL104</b>	
<b>Course Code : FEL104</b>	
FEL104.1	Analyze the behaviour of Direct Current circuits using network theorems.
FEL104.2	Perform experiment on single-phase Alternating Current circuits.
FEL104.3	Demonstrate experiment on three-phase Alternating Current circuits.
FEL104.4	Illustrate the performance of single-phase transformer and machines.
<b>Subject Name : Basic Workshop Practice I</b>	
<b>Subject Code : FEL105</b>	
<b>Course Code : FEL105</b>	

FEL105.1	Develop the necessary skill required to handle/use different fitting tools.
FEL105.2	Develop skill required for hardware maintenance.
FEL105.3	Able to install an operating system and system drives.
FEL105.4	Able to identify the network components and perform basic networking and crimping.
FEL105.5	Develop the necessary skill required to handle/use different plumping tools.
<b>Subject Name : Engineering Mathematics-II</b>	
<b>Subject Code : FEC201</b>	
<b>Course Code : FEC201</b>	
FEC201.1	Solve various types of First Order differential equation.
FEC201.2	Solve various types of Higher Order Differential equation.
FEC201.3	Illustrate the concepts of Beta and Gamma function,DUIS and rectification.
FEC201.4	Apply the concepts of Double integral

FEC201.5	Apply the concept of Triple integral.
FEC201.6	Apply the principles of Numerical Method for solving differential equation and numerical integration analytically and using Scilab also.
<b>Subject Name : Engineering Physics-II</b>	
<b>Subject Code : FEC202</b>	
<b>Course Code : FEC202</b>	
FEC202.1	Describe the phenomenon of diffractions through slits and its application.
FEC202.2	Apply the foundation of laser and fiber optics in development of modern communication technology.
FEC202.3	Relate the basics of electrodynamics which is prerequisite for satellite communications, antenna theory etc.
FEC202.4	Explain the fundamentals of relativity.
FEC202.5	Paraphrase the wide scope of nanotechnology in modern developments and its role in emerging innovating applications.
FEC202.6	Interpret basic sensing techniques for physical measurements in modern instrumentations.
<b>Subject Name : Engineering Chemistry-II</b>	

**Subject Code : FEC203**

**Course Code : FEC203**

FEC203.1	Distinguish the ranges of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques.
FEC203.2	Illustrate the concept of emission spectroscopy and describe the phenomena of fluorescence and phosphorescence in relation to it.
FEC203.3	Explain the concept of electrode potential and Nernst theory and relate it to electrochemical cells.
FEC203.4	Identify different types of corrosion and suggest control measures in industries.
FEC203.5	Illustrate the principles of green chemistry and study environmental impact.
FEC203.6	Explain the knowledge of determining the quality of fuel and quantify the oxygen required for combustion of fuel.

**Subject Name : Engineering Graphics**

**Subject Code : FEC204**

**Course Code : FEC204**

FEC204.1	Apply the basic principles of projections in Projection of Lines and Planes
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FEC204.2	Apply the basic principles of projections in Projection of Solids.
FEC204.3	Apply the basic principles of sectional views in Section of solids.
FEC204.4	Apply the basic principles of projections in converting 3D view to 2D drawing.
FEC204.5	Read a given drawing.
FEC204.6	Visualize an object from the given two views.
<b>Subject Name : C Programming</b>	
<b>Subject Code : FEC205</b>	
<b>Course Code : FEC205</b>	
FEC205.1	Understanding basic terminology, concept of data types, variables and operators in C Programming.
FEC205.2	Applying control statements and looping constructs in C.
FEC205.3	Applying function concept on problem statements.
FEC205.4	Applying concept of arrays, strings in C

FEC205.5	Applying concepts of structures and union.
FEC205.6	Applying dynamic memory concept by use of pointers.
<b>Subject Name : Professional Communication and Ethics- I</b>	
<b>Subject Code : FEC206</b>	
<b>Course Code : FEC206</b>	
FEC206.1	Eliminate barriers and use verbal/non-verbal cues at social and workplace situations.
FEC206.2	Employ listening strategies to comprehend wide-ranging vocabulary. grammatical structures, tone and pronunciation.
FEC206.3	Prepare effectively for speaking at social, academic and business situations.
FEC206.4	Use reading strategies for faster comprehension, summarization and evaluation of text.
FEC206.5	Acquire effective writing skills for drafting academic, business and technical documents
FEC206.6	Successfully interact in all kinds of settings, displaying refined grooming and social skills.
<b>Subject Name : Engineering Physics-II</b>	

**Subject Code : FEL201**

**Course Code : FEL201**

FEL201.1	Infer the output of the experiments based on diffraction through slit.
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FEL201.2	Analyze the result of the experiments using laser and optical fibre.
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FEL201.3	Analyze the result by performing the measurements using sensor.
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FEL201.4	Create and design models to address the technical problems and learning life skills.
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**Subject Name : Engineering Chemistry-II**

**Subject Code : FEL202**

**Course Code : FEL202**

FEL202.1	Determine moisture content
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FEL202.2	Determine saponification
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FEL202.3	Determine acid value of oil
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FEL202.4	Determine flash point of a lubricating oil
FEL202.5	Synthesize a biofuel.
<b>Subject Name : Engineering Graphics</b>	
<b>Subject Code : FEL203</b>	
<b>Course Code : FEL203</b>	
FEL203.1	Apply the basic principles of projections in 2D drawings using a CAD software.
FEL203.2	Create, Annotate, Edit and Plot drawings using basic AutoCAD commands and features.
FEL203.3	Apply the concepts of layers to create drawing.
FEL203.4	Apply basic AutoCAD skills to draw different views of a 3D object.
FEL203.5	Apply basic AutoCAD skills to draw the isometric view from the given two views.
<b>Subject Name : C Programming</b>	
<b>Subject Code : FEL204</b>	

**Course Code : FEL204**

FEL204.1	Understand basic terminology, concept of data types, variables and operators in C Programming.
FEL204.2	Apply control statements and looping constructs in C.
FEL204.3	Apply function concept on problem statements.
FEL204.4	Apply concept of arrays, strings, structures and union.
FEL204.5	Apply dynamic memory concept by use of pointers.

**Subject Name : Professional Communication and Ethics- I**

**Subject Code : FEL205**

**Course Code : FEL205**

FEL205.1	Listen and comprehend all types of spoken discoursesuccessfully
FEL205.2	Speak fluently and make effective professionalpresentations
FEL205.3	Read large quantities of text in a short time to comprehend,summaries and evaluate content

FEL205.4	Draft precise business letters, academic essays and technical guidelines.
FEL205.5	Dress finely and conduct themselves with panache in social, academic and professional situations.
<b>Subject Name : Basic Workshop practice-II</b>	
<b>Subject Code : FEL206</b>	
<b>Course Code : FEL206</b>	
FEL206.1	Develop the necessary skill required to handle/use different carpentry tools.
FEL206.2	Identify and understand the safe practices to adopt in electrical environment.
FEL206.3	Demonstrate the wiring practices for the connection of simple electrical load/ equipment.
FEL206.4	Design, fabricate and assemble pcb.
FEL206.5	Develop the necessary skill required to use different sheet metal and brazing tools.