MANJARA CHARITABLE TRUST

RAJIV GANDHI INSTITUTE OF TECHNOLOGY, MUMBAI

Department of Computer Engineering

Course Outcomes (R-2019 C Scheme) from Academic Year 2019-20

Subject Code	Subject Name	CO NO	COURSE OUTCOMES
CSC301	**Engineering Mathematics- III**	CSC 301.1	Understand the concept of Laplace transform and its application to solve the real integrals in engineering problems.
		CSC 301.2	Understand the concept of inverse Laplace transform of various functions and its applications in engineering problems.
		CSC 301.3	Expand the periodic function by using the Fourier series for real-life problems and complex engineering problems.
		CSC 301.4	Understand complex variable theory, application of harmonic conjugate to get orthogonal trajectories and analytic functions.
		CSC 301.5	Apply the concept of Correlation and Regression to the engineering problems in data science, machine learning, and AI.
		CSC 301.6	Understand the concepts of probability and expectation for getting the spread of the data and distribution of probabilities
CSC302	**Discrete Structures and Graph Theory**	CSC 302.1	Understand the notion of mathematical thinking, mathematical proofs and to apply them in problem solving.
		CSC 302.2	Ability to reason logically.
		CSC 302.3	Ability to understand relations, functions, Diagraph and Lattice.
		CSC 302.4	Ability to understand and apply concepts of graph theory in solving real world problems.
		CSC 302.5	Understand use of groups and codes in Encoding-Decoding.
		CSC 302.6	Analyze a complex computing problem and apply principles of discrete mathematics to identify solutions
CSC303	**Data structure**	CSC 303.1	Students will be able to implement Linear and Non-Linear data structures.
		CSC 303.2	Students will be able to handle various operations like searching, insertion, deletion and traversals on various data structures
		CSC 303.3	Students will be able to explain various data structures, related terminologies and its types.
		CSC 303.4	Students will be able to choose appropriate data structure and apply it to solve problems in various domains
		CSC 303.5	Students will be able to analyze and Implement appropriate searching techniques for a given problem.
		CSC 303.6	Students will be able to demonstrate the ability to analyze, design, apply and use data structures to solve engineering problems and evaluate their solutions.

Subject Code	Subject Name	CO NO	COURSE OUTCOMES
CSC304	**Digital Logic & Computer Organization and Architecture**	CSC 304.1	To learn different number systems and basic structure of computer system
		CSC 304.2	To demonstrate the arithmetic algorithms.
		CSC 304.3	To understand the basic concepts of digital components and processor organization
		CSC 304.4	To understand the generation of control signals of computer.
		CSC 304.5	To demonstrate the memory organization.
		CSC 304.6	To describe the concepts of parallel processing and different Buses.
CSC305	**Computer Graphics**	CSC 305.1	Describe the basic concepts of Computer Graphics.
		CSC 305.2	Demonstrate various algorithms for basic graphics primitives.
		CSC 305.3	Apply 2-D geometric transformations on graphical objects.
		CSC 305.4	Use various Clipping algorithms on graphical objects.
		CSC 305.5	Explore 3-D geometric transformations, curve representation techniques and projections methods.
		CSC 305.6	Explain visible surface detection techniques and Animation.
CSL301	**Data Structures Lab**	CSL 301.1	Students will be able to implement linear data structures & be able to handle operations like insertion, deletion, searching and traversing on them.
		CSL 301.2	Students will be able to implement nonlinear data structures & be able to handle operations like insertion, deletion, searching and traversing on them.
		CSL 301.3	Students will be able to choose appropriate data structure and apply it in various problems.
		CSL 301.4	Students will be able to select appropriate searching techniques for given problems.
CSL302	**Digital Logic & Computer Organization and Architecture Lab**	CSL 302.1	To understand the basics of digital components.
		CSL 302.2	Design the basic building blocks of a computer: ALU, registers, CPU and memory.
		CSL 302.3	To recognize the importance of digital systems in computer architecture.
		CSL 302.4	To implement various algorithms for arithmetic operations.
CSL303	**Computer Graphics Lab**	CSL 303.1	Implement various output and filled area primitive algorithms .
		CSL 303.2	Apply transformation, projection and clipping algorithms on graphical objects.
		CSL 303.3	Perform curve and fractal generation methods.
		CSL 303.4	Develop a Graphical application/Animation based on learned concept.

Subject Code	Subject Name	CO NO	COURSE OUTCOMES
CSL304	**Skill based Lab Course: Object Oriented Programming with Java**	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.
CSM301	**Mini Project A**	CSM301.1	Identify problems based on societal /research needs.
		CSM301.2	Apply Knowledge and skill to solve societal problems in a group.
		CSM301.3	Develop interpersonal skills to work as member of a group or leader.
		CSM301.4	Draw the proper inferences from available results through theoretical/experimental/simulations.
		CSM301.5	Analyse the impact of solutions in societal and environmental context for sustainable development.
		CSM301.6	Use standard norms of engineering practices
		CSM301.7	Excel in written and oral communication.
		CSM301.8	Demonstrate capabilities of self-learning in a group, which leads to lifelong learning.
		CSM301.9	Demonstrate project management principles during project work.
CSC401	**Engineering Mathematics-IV**	CSC 401.1	Apply the concepts of eigenvalues and eigenvectors in engineering problem.
		CSC 401.2	Use the concepts of Complex Integration for evaluating integrals, computing residues & evaluate various contour integrals.
		CSC 401.3	Apply the concept of Z- transformation and inverse in engineering problems.
		CSC 401.4	Use the concept of probability distribution and sampling theory to engineering problems.
		CSC 401.5	Apply the concept of Linear Programming Problems to optimization.
		CSC 401.6	Solve Non-Linear Programming Problems for optimization of engineering problems.
CSC402	**Analysis of Algorithms**	CSC 402.1	Analyse the running time and space complexity of algorithms.
		CSC 402.2	Describe, apply and analyse the complexity of divide and conquer strategy.
		CSC 402.3	Describe, apply and analyse the complexity of greedy strategy.

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		CSC 402.4	Describe, apply and analyse the complexity of dynamic programming strategy.
		CSC 402.5	Explain and apply backtracking, branch and bound.
		CSC 402.6	Explain and apply string matching techniques.
CSC403	**Database Management System.**	CSC 403.1	Recognize the need of database management system.
		CSC 403.2	Design ER and EER diagram for real life applications
		CSC 403.3	Construct relational model and write relational algebra queries.
		CSC 403.4	Construct relational model and write relational algebra queries.
		CSC 403.5	Apply the concept of normalization to relational database design.
		CSC 403.6	Describe the concept of transaction, concurrency and recovery.
CSC404	**Operating System**	CSC 404.1	Understand the objectives, functions and structure of OS.
		CSC 404.2	analyse the concept of process management and evaluate performance of process scheduling algorithms.
		CSC 404.3	Understand and apply the concepts of synchronization and deadlocks.
		CSC 404.4	Evaluate performance of Memory allocation and replacement policies.
		CSC 404.5	Understand the concepts of file management.
		CSC 404.6	Apply concepts of I/O management and analyze techniques of disk scheduling.
CSC405	**Microprocessor**	CSC 405.1	Describe core concepts of 8086 microprocessor.
		CSC 405.2	Interpret the instructions of 8086 and write assembly and Mixed language programs.
		CSC 405.3	Identify the specifications of peripheral chip.
		CSC 405.4	Design 8086 based system using memory and peripheral chips.
		CSC 405.5	Appraise the architecture of advanced processors.
		CSC 405.6	Understand hyperthreading technology.
CSL401	**Analysis of Algorithms Lab.**	CSL 401.1	Implement the algorithms using different approaches.
		CSL 401.2	analyse the complexities of various algorithms.
		CSL 401.3	Compare the complexity of the algorithms for specific problem.
CSL402	**Database Management system Lab.**	CSL402.1	Design ER /EER diagram and convert to relational model for the real-world application.
		CSL402.2	Apply DDL, DML, DCL and TCL commands
		CSL402.3	Write simple and complex queries
		CSL402.4	Use PL / SQL Constructs.

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		CSL402.5	Demonstrate the concept of concurrent transactions execution and frontend-backend connectivity.
CSL403	**Operating System Lab**	CSL 403.1	Demonstrate basic Operating system Commands, Shell scripts, System Calls and API wrt Linux
		CSL 403.2	Implement various process scheduling algorithms and evaluate their performance.
		CSL 403.3	Implement and analyze concepts of synchronization and deadlocks.
		CSL 403.4	Implement various Memory Management techniques and evaluate their performance.
		CSL 403.5	Implement and analyze concepts of virtual memory.
		CSL 403.6	Demonstrate and analyze concepts of file management and I/O management techniques.
CSL404	**Microprocessor Lab.**	CSL 404.1	Use appropriate instructions to program microprocessor to perform various task.
		CSL 404.2	Develop the program in assembly/ mixed language for Intel 8086 processor.
		CSL 404.3	Demonstrate the execution and debugging of assembly/ mixed language program.
CSL405	**Skill Base Lab Course: Python Programming.**	CSL405.1	To understand basic concepts in python.
		CSL405.2	To explore contents of files, directories and text processing with python.
		CSL405.3	To develop program for data structure using built in functions in python.
		CSL405.4	To explore django web framework for developing python-based web application.
		CSL405.5	To understand Multithreading concepts using python.
CSM401	**Mini Project B**	CSM401.1	Identify problems based on societal /research needs.
		CSM401.2	Apply Knowledge and 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.

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		CSM401.9	Demonstrate project management principles during project work.
CSC501	**Theoretical Computer Science**	CSC 501.1	Understand concepts of Theoretical Computer Science, difference and equivalence of DFA and NFA , languages described by finite automata and regular expressions.
		CSC 501.2	Design Context free grammer, pushdown automata to recognize the language.
		CSC 501.3	Develop an understanding of computation through Turing Machine.
		CSC 501.4	Acquire fundamental understanding of decidability and undecidability.
		CSC 501.5	Analyze the limitations of computational models and possible methods of proving them.
		CSC 501.6	Apply Automata Theory concepts in engineering applications like designing of compilers.
CSC502	**Software Engineering**	CSC 502.1	Identify requirements & assess the process models.
		CSC 502.2	Plan, schedule and track the progress of the projects.
		CSC 502.3	Design the software project.
		CSC 502.4	Do testing of software project.
		CSC 502.5	Identify risks, manage the change to assure quality in software projects.
		CSC 502.6	Use computer-aided software engineering (CASE) tools.
CSC 503	**Computer Network**	CSC 503.1	Demonstrate the concepts of data communication at physical layer and compare ISO - OSI model with TCP/IP model.
		CSC 503.2	Explore different design issues at data link layer.
		CSC 503.3	Design the network using IP addressing and sub netting / super netting schemes.
		CSC 503.4	Analyze various routing algorithms and protocols at network layer.
		CSC 503.5	Analyze transport layer protocols and congestion control algorithms.
		CSC 503.6	Explore protocols at application layer.
CSC 504	**Data Warehousing and Mining**	CSC 504.1	Understand data warehouse fundamentals and design data warehouse with dimensional modelling and apply OLAP operations.
		CSC 504.2	Understand data mining principles and perform Data preprocessing and Visualization.
		CSC 504.3	Identify appropriate data mining algorithms to solve real world problems.
		CSC 504.4	Compare and evaluate different data mining techniques like

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			classification, prediction, clustering and association rule mining
		CSC 504.5	Describe complex information and social networks with respect to web mining.
		CSC 504.6	Understand Partitioning Strategies.
CSDO501	**Probabilistic Graphical Models**	CSDO501.1	Understand basic concepts of probabilistic graphical modelling
		CSDO501.2	Model and extract inference from various graphical models like Bayesian Networks, Markov Models
		CSDO501.3	Perform learning and take actions and decisions using probabilistic graphical models
		CSDO501.4	Represent real world problems using graphical models; design inference algorithms; and learn the structure of the graphical model from data.
		CSDO501.5	Design real life applications using probabilistic graphical models.
CSDO501	**Internet Programming**	CSDO501.1	Implement interactive web page(s) using HTML and CSS.
		CSDO501.2	Design a responsive web site using JavaScript.
		CSDO501.3	Demonstrate database connectivity using JDBC.
		CSDO501.4	Demonstrate Rich Internet Application using Ajax.
		CSDO501.5	Demonstrate and differentiate various Web Extensions.
		CSDO501.6	Demonstrate web application using Reactive Js.
CSDO501	**Advance Database Management System**	CSDO501.1	Design distributed database using the various techniques for query processing.
		CSDO501.2	Measure query cost and perform distributed transaction management.
		CSDO501.3	Organize the data using XML and JSON database for better interoperability.
		CSDO501.4	Compare different types of NoSQL databases.
		CSDO501.5	Formulate NoSQL queries using Mongodb.
		CSDO501.6	Describe various trends in advance databases through temporal, graph based and spatial based databases.
CSL501	**Software Engineering Lab**	CSL501.1	Identify requirements and apply software process model to selected case study.
		CSL501.2	Develop architectural models for the selected case study.
		CSL501.3	Use computer-aided software engineering (CASE) tools.
CSL502	**Computer Network Lab**	CSL502.1	Design and setup networking environment in Linux.
		CSL502.2	Use Network tools and simulators such as NS2, Wireshark etc.

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			to explore networking algorithms and protocols.
		CSL502.3	Implement programs using core programming APIs for understanding networking concepts.
CSL503	**Data Warehousing and Mining Lab.**	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 & web mining algorithm.
CSL504	**Business Communication & Ethics**	CSL504.1	Plan and prepare effective business/ technical documents which will in turn provide solid foundation for their future managerial roles.
		CSL504.2	Strategize their personal and professional skills to build a professional image and meet the demands of the industry.
		CSL504.3	Emerge successful in group discussions, meetings and result-oriented agreeable solutions in group communication situations.
		CSL504.4	Deliver persuasive and professional presentations.
		CSL504.5	Develop creative thinking and interpersonal skills required for effective professional communication.
		CSL504.6	Aply codes of ethical conduct, personal integrity and norms of organizational behaviour.
CSM501	**Mini Project 2A**	CSM501.1	Identify societal/research/innovation/entrepreneurship problems through appropriate literature surveys.
		CSM501.2	Identify Methodology for solving above problem and apply engineering knowledge and skills to solve it .
		CSM501.3	Validate, Verify the results using test cases/benchmark data/theoretical/inferences/experiments/simulations.
		CSM501.4	Analyze and evaluate the impact of solution/product/research/innovation/entrepreneurship towards societal/environmental/sustainable development.
		CSM501.5	Use standard norms of engineering practices and project management principles during project work.
		CSM501.6	Communicate through technical report writing and oral presentation. ● The work may result in research/white paper/ article/blog writing and publication ● The work may result in business plan for entrepreneurship product created ● The work may result in patent filing
		CSM501.7	Gain technical competency towards participation in Competitions, Hackathons, etc.

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		CSM501.8	Demonstrate capabilities of self-learning, leading to lifelong learning.
		CSM501.9	Develop interpersonal skills to work as a member of a group or as leader.
CSC601	**System Programming and Compiler Construction**	CSC601.1	Identify the relevance of different system programs
		CSC601.2	Explain various data structures used for assembler and microprocessor design.
		CSC601.3	Distinguish between different loaders and linkers and their contribution in developing efficient user applications.
		CSC601.4	Understand fundamentals of compiler design and identify the relationships among different phases of the compiler.
		CSC601.5	Understand fundamentals of compiler design
		CSC601.6	Identify different compiler tools such as LEX, YACC for code generation
CSC602	**Cryptography & System Security.**	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
		CSC602.5	Identify and understand diferent tools for network security to prevent attacks on networks
CSC603	**Mobile Computing**	CSC603.1	To identify basic concepts and principles in computing, cellular architecture.
		CSC603.2	To describe the components and functioning of mobile networking.
		CSC603.3	To classify variety of security techniques in mobile network.
		CSC603.4	To apply the concepts of WLAN for local as well as remote applications.
		CSC603.5	To describe Long Term Evolution (LTE) architecture and its interfaces.

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		CSC603.6	To describe SON-NET architecture and its application
CSC604	**Artificial Intelligence**	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.
		CSC604.6	Design and implement expert systems for real world problems.
CSDO601	**Internet of Things**	CSDO601.1	Understand the concepts of IoT and the Things in IoT.
		CSDO601.2	Emphasize core IoT functional Stack and understand application protocols for IoT.
		CSDO601.3	Apply IoT knowledge to key industries that IoT is revolutionizing.
		CSDO601.4	Examines various IoT hardware items and software platforms used in projects.
		CSDO601.5	Identify sensor technologies for sensing real world entities and understand the role of IoT in various domains of Industry.
		CSDO601.6	Compare different Application protocols for IoT.
CSDLO 6012	**Digital Signal & Image Processing.**	CSDLO6012.1	Understand the concept of DT Signal and DT Systems
		CSDLO6012.2	Classify and analyze discrete time signals and systems.
		CSDLO6012.3	Implement Digital Signal Transform techniques DFT and FFT
		CSDLO6012.4	Use the enhancement techniques for digital Image Processing.
		CSDLO6012.5	Apply image segmentation techniques.
		CSDLO6012.6	Understand use of DSIP techniques to design real world DSIP applications
CSDLO 6013	**Quantitative Analysis.**	CSDO601.1	Recognize the need of Statistics and Quantitative Analysis.
		CSDO601.2	Apply the data collection and the sampling methods.
		CSDO601.3	Analyze data and calculate descriptive statistics.
		CSDO601.4	Analyze using concepts of Regression, Multiple Linear Regression.
		CSDO601.5	Formulate Statistical inference drawing methods.
		CSDO601.6	Apply Testing of hypotheses.
CSL601	**System Programming and**	CSL601.1	Generate machine code by implementing two pass assemblers.
		CSL601.2	Implement Two pass macro processor.

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	Compiler Construction Lab.	CSL601.3	Parse the given input string by constructing Top down/Bottom-up parser.
		CSL601.4	Identify and Validate tokens for given high level language and Implement synthesis phase of compiler.
		CSL601.5	Explore LEX & YACC tools.
CSL602	**Cryptography & System Security Lab**	CSL602.1	Apply the knowledge of symmetric and asymmetric cryptography to implement simple ciphers.
		CSL602.2	Explore the different network reconnaissance tools to gather information about networks
		CSL602.3	Explore and use tools like sniffers, port scanners and other related tools for analysing packets in a Network.
		CSL602.4	Set up firewalls and intrusion detection systems using open-source technologies and to explore email security.
		CSL602.5	Explore various attacks like buffer-overflow and web application attack.
CSL603	**Mobile Computing Lab.**	CSL603.1	Develop and demonstrate mobile applications using various tools .
		CSL603.2	Articulate the knowledge of GSM, CDMA & Bluetooth technologies and demonstrate it.
		CSL603.3	Students will able to carry out simulation of frequency reuse, hidden/exposed terminal problem.
		CSL603.4	Implement security algorithms for mobile communication network.
		CSL603.5	Demonstrate simulation and compare the performance of Wireless LAN.
CSL604	**Artificial Intelligence Lab.**	CSL604.1	Identify languages and technologies for Artificial Intelligence.
		CSL604.2	Understand and implement uninformed and informed searching techniques for real world problems.
		CSL604.3	Create a knowledge base using any AI language.
		CSL604.4	Design and implement expert systems for real world problems.
CSL605	**Cloud Computing.**	CSL605.1	Implement different types of virtualization techniques.
		CSL605.2	Analyze various cloud computing service models and implement them to solve the given problems
		CSL605.3	Design and develop real world web applications and deploy them on commercial cloud(s).
		CSL605.4	Explain major security issues in the cloud and mechanisms to address them.
		CSL605.5	Explore various commercially available cloud services and recommend the appropriate one for the given application.
		CSL605.6	Implement the concept of containerization.

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CSM601	**Mini Project 2B**	CSM601.1	Identify societal/research/innovation/entrepreneurship problems through appropriate literature surveys.
		CSM601.2	Identify Methodology for solving above problem and apply engineering knowledge and skills to solve it .
		CSM601.3	Validate, Verify the results using test cases/benchmark data/theoretical/inferences/experiments/simulations.
		CSM601.4	Analyze and evaluate the impact of solution/product/research/innovation/entrepreneurship towards societal/environmental/sustainable development.
		CSM601.5	Use standard norms of engineering practices and project management principles during project work.
		CSM601.6	Communicate through technical report writing and oral presentation. ● The work may result in research/white paper/ article/blog writing and publication ● The work may result in business plan for entrepreneurship product created ● The work may result in patent filing
		CSM601.7	Gain technical competency towards participation in Competitions, Hackathons, etc.
		CSM601.8	Demonstrate capabilities of self-learning, leading to lifelong learning.
		CSM601.9	Develop interpersonal skills to work as a member of a group or as leader.
CSC701	**Machine Learning**	CSC701.1	To acquire fundamental knowledge of developing machine learning models.
		CSC701.2	To select, apply and evaluate an appropriate machine learning model for the given
		CSC701.3	To demonstrate ensemble techniques to combine predictions from different models.
		CSC701.4	To demonstrate the dimensionality reduction techniques.
		CSC701.5	To implement an appropriate machine learning model for the given application.
		CSC701.6	Able to use and evaluate an appropriate machine learning model for the given application using performance matrics.
CSC702	**Big Data Analysis**	CSC702.1	Understanding of building blocks of big data analytics
		CSC702.2	Apply fundamental enabling techniques like Hadoop and MapReduce in solving real world problems
		CSC702.3	Understand different NoSQL systems and how it handles big data.
		CSC702.4	Apply advanced techniques for emerging applications like stream analytics.

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		CSC702.5	Achieve adequate perspectives of big data analytics in various applications like recommender systems, social media applications, etc.
		CSC702.6	Apply statistical computing techniques and graphics for analysing big data.
CSDC 7011	**Machine Vision**	CSDC7011.1	Elaborate the components of Machine Vision Application
		CSDC7011.2	Perform image ,video preprocessing operations
		CSDC7011.3	Explain various transformations, interpolation.
		CSDC7011.4	Elaborate motion tracking in video.
		CSDC7011.5	analyse and implement appropriate filtering techniques for a given problem.
		CSDC7011.6	Develop applications based on machine vision
CSDC 7013	**Natural Language Processing**	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.
CSDC 7022	**Blockchain**	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
ILO 7013	**Management of Information System**	ILO7013.1	Explain how information systems Transform Business
		ILO7013.2	Identify the impact information systems have on an organization
		ILO7013.3	Describe IT infrastructure and its components and its current trends
		ILO7013.4	Understand the principal tools and technologies for accessing information from databases to improve business performance and decision making
		ILO7013.5	Identify the types of systems used for enterprise-wide

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			knowledge management and how they provide value for businesses
		ILO7013.6	Identify the tools for MIS
ILO 7016	**Cyber Security and Laws**	ILO7016.1	Understand the concept of cybercrime and its effect on outside world
		ILO7016.2	Interpret and apply IT law in various legal issues
		ILO7016.3	Distinguish different aspects of cyber law
		ILO7016.4	Apply Information Security Standards compliance during software design and development
		ILO7016.5	Examine software vulnerabilities and security solutions to reduce the risk of exploitation
		ILO7016.6	analyse the cyber security needs of an organization.
ILO 7017	**Disaster Management & Mitigation Measures**	ILO7017.1	Get to know natural as well as manmade disaster and their extent and possible effects on the economy.
		ILO7017.2	Plan of national importance structures based upon the previous history.
		ILO7017.3	Get acquainted with government policies, acts and various organizational structure associated with an emergency.
		ILO7017.4	Get to know the simple do's and don'ts in such extreme events and act accordingly
		ILO7017.5	Get to know about financial relief measures
		ILO7017.6	Proposed effective strategies for disaster prevention and mitigation
CSL701	**Machine Learning Lab**	CSL701.1	To implement an appropriate machine learning model for the given application.
		CSL701.2	To implement ensemble techniques to combine predictions from different models.
		CSL701.3	To implement the dimensionality reduction techniques.
CSL 702	**Big Data Analytics Lab**	CSL702.1	To interpret business models and scientific computing paradigms, and apply software tools for big data analytics.
		CSL702.2	To implement algorithms that uses Map Reduce to apply on structured and unstructured data
		CSL702.3	To perform hands-on NoSql databases such as Cassandra, HadoopHbase, MongoDB, etc.
		CSL702.4	To implement various data streams algorithms.
		CSL702.5	To develop and analyze the social network graphs with data visualization techniques.
CSP 701	**Major Project 1**	CSP 701.1	To develop the understanding of the problem domain through extensive review of literature.

Subject Code	Subject Name	CO NO	COURSE OUTCOMES
		CSP 701.2	To Identify and analyze the problem in detail to define its scope with problem specific data.
		CSP 701.3	To know various techniques to be implemented for the selected problem and related technical skills through feasibility analysis.
		CSP 701.4	To design solutions for real-time problems that will positively impact society and environment.
		CSP 701.5	To develop clarity of presentation based on communication, teamwork and leadership skills.
		CSP 701.6	To inculcate professional and ethical behavior.
CSC801	**Distributed Computing**	CSC801.1	Demonstrate the knowledge of basic elements and concepts related to distributed system technologies.
		CSC801.2	Illustrate the middleware technologies that support distributed applications such as RPC, RMI and Object-based middleware.
		CSC801.3	Analyze the various techniques used for clock synchronization, mutual exclusion and deadlock.
		CSC801.4	Demonstrate the concepts of Resource and Process management.
		CSC801.5	Demonstrate the concepts of Consistency, Replication Management and fault Tolerance
		CSC801.6	Apply the knowledge of Distributed File systems in building large-scale distributed applications.
CSDC 8013	**Applied Data Science**	CSDC8013.1	To gain fundamental knowledge of the data science process.
		CSDC8013.2	To apply data exploration and visualization techniques.
		CSDC8013.3	To apply anomaly detection techniques.
		CSDC8013.4	To gain an in-depth understanding of time-series forecasting.
		CSDC8013.5	Apply different methodologies and evaluation strategies.
		CSDC8013.6	To apply data science techniques to real world applications.
CSDC 8023	**Social Media Analytics**	CSDC8023.1	Understand the concept of Social media
		CSDC8023.2	Understand the concept of social media Analytics and its significance.
		CSDC8023.3	Learners will be able to analyze the effectiveness of social media
		CSDC8023.4	Learners will be able to use different Social media analytics tools effectively and efficiently.
		CSDC8023.5	Learners will be able to use different effective Visualization techniques to represent social media analytics.
		CSDC8023.6	Acquire the fundamental perspectives and hands-on skills needed to work with social media data.

Subject Code	Subject Name	CO NO	COURSE OUTCOMES
ILO 8028	**Institute Level Optional Course-2 (Digital Business Management)**	ILO8028.1	Identify Drivers of digital business
		ILO8028.2	Ilustrate various approaches andtechniques for E-busniess
		ILO8028.3	Prepare E-business Plan
		ILO8028.4	Identify various security approaches for digital business
		ILO8028.5	Identify different strategies and ehics in digital business
		ILO8028.6	Understand steps in digital business develoment
CSL801	**Distributed Computing Lab**	CSL801.1	Develop test and debug usingMessage-Oriented Communication or RPC/RMI based client-server programs.
		CSL801.2	Implement techniques for clock synchronization.
		CSL801.3	Implement techniques for Election Algorithms.
		CSL801.4	Demonstrate mutual exclusion algorithms and deadlock handling
		CSL801.5	Implement techniques of resource and process management.
		CSL801.6	Describe the concepts of distributed File Systems with some case studies.
CSL8023	**Department Level Optional Course - 5 Lab (Applied Data Science Lab)**	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.
CSDL 8023	**Department Level Optional Course-6 Lab (Social Media Analytics Lab)**	CSDL8023.1	Understand characteristics and types of social media networks.
		CSDL8023.2	Use social media analytics tools for business
		CSDL8023.3	Collect, monitor , store and track social media data
		CSDL8023.4	Analyze and visualize social media data from multiple platforms
		CSDL8023.5	Design and develop content and structure based social media analytics models.
		CSDL8023.6	Design and implement social media analytics applications for business.
CSP 801	**Major Project 2**	CSP 801.1	To develop the understanding of the problem domain through extensive review of literature.Implement solutions for the selected problem by applying technical and professional skills.
		CSP 801.2	Analyze impact of solutions in societal and environmental context for sustainable development.
		CSP 801.3	Collaborate best practices along with effective use of modern tools.
		CSP 801.4	Develop proficiency in oral and written communication with effective leadership and teamwork.

Subject Code	Subject Name	CO NO	COURSE OUTCOMES
		CSP 801.5	Nurture professional and ethical behavior.
		CSP 801.6	Gain expertise that helps in building lifelong learning experience.