Mahatma Gandhi Mission's
College of Engineering and Technology
(Affiliated to University of Mumbai and Approved by, AICTE, New Delhi.)
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DEPARTMENT OF COMPUTER ENGINEERING

Program Outcomes (POs)

PO 1	Engineering Knowledge: Apply the knowledge of mathematics science engineering fundamentals, and an engineering specialization to the solution of complex engineering problem
PO 2	Problem Analysis: Identify, formulate, review research, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, naturalizing sciences, and engineering sciences.
PO 3	Design/Development of Solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO 4	Conduct Investigations of Complex Problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO 5	Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO 6	The Engineer and Society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO 7	Environment and Sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge and need for sustainable development.
PO 8	Ethics: Apply ethical principles and commit to professional ethics, responsibilities, and norms of the engineering practice.
PO 9	Individual and Team Work: Function effectively as an individual and as a member or leader in diverse teams and individual and as a member or leader in diverse teams and in multidisciplinary settings.
PO 10	Communication: Communicate effectively on complex engineering activities with the engineering community and with society, such as being able to comprehend and write effective reports and design documentation, give and receive clear instructions.
PO 11	Project Management and Finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work as a member and leader in a team to manage projects and in multidisciplinary environments.
PO 12	Life-Long Learning: Recognize the need for and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change.

Program Specific Outcomes (PSOs)

PSO1	Acquire skills to design, analyse and develop algorithms and implement them using high-level programming languages
PSO2	Contribute their engineering skills in computing and information engineering domains like network design and administration, database design and knowledge engineering.
PSO3	Develop strong skills in systematic planning, developing, testing implementing and providing IT solutions for different domains which helps in the betterment of life.

Course Outcomes [CO]
Computer Engineering Department AY 2022-23

CSC301- Engineering Mathematics-III

Name of the Course	CO Code	Course Outcome (CO)
Engineering Mathematics -III	1	Understand the concept of Laplace transform and its application to solve the real integrals in engineering problems.
	2	Understand the concept of inverse Laplace transform of various functions and its applications in engineering problems.
	3	Expand the periodic function by using the Fourier series for real-life problems and complex engineering problems.
	4	Understand complex variable theory, application of harmonic conjugate to get orthogonal trajectories and analytic functions.
	5	Apply the concept of Correlation and Regression to the engineering problems in data science, machine learning, and AI.
	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

Name of the Course	CO Code	Course Outcome (CO)
Discrete Structures and Graph Theory	1	Understand the notion of mathematical thinking, mathematical proofs and to apply them in problem solving.
	2	Ability to reason logically
	3	Ability to understand relations, functions, Diagraph and Lattice.
	4	Ability to understand and apply concepts of graph theory in solving real world problems.
	5	Understand use of groups and codes in Encoding-Decoding
	6	Analyze a complex computing problem and apply principles of discrete mathematics to identify solutions

CSC303- Data Structure

Name of the Course	CO Code	Course Outcome (CO)
Data Structure	1	Students will be able to implement Linear and Non-Linear data structures
	2	Students will be able to handle various operations like searching, insertion, deletion and traversals on various data structures.
	3	Students will be able to explain various data structures, related terminologies and its types.
	4	Students will be able to choose appropriate data structure and apply it to solve problems in various domains.
	5	Students will be able to analyze and Implement appropriate searching techniques for a given problem
	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.

CSC304- Digital Logic & Computer Organization and Architecture

Name of the Course	CO Code	Course Outcome (CO)
Digital Logic & Computer Organization and Architecture	1	To learn different number systems and basic structure of computer system.
	2	To demonstrate the arithmetic algorithms.
	3	To understand the basic concepts of digital components and processor organization.
	4	To understand the generation of control signals of computer.
	5	To demonstrate the memory organization.
	6	To describe the concepts of parallel processing and different Buses.

CSC305- Computer Graphics

Name of the Course	CO Code	Course Outcome (CO)
Computer Graphics	1	Describe the basic concepts of Computer Graphics
	2	Demonstrate various algorithms for basic graphics primitives
	3	Apply 2-D geometric transformations on graphical objects.
	4	Use various Clipping algorithms on graphical objects
	5	Explore 3-D geometric transformations, curve representation techniques and projections methods
	6	Explain visible surface detection techniques and Animation.

CSL301 - Data Structures Lab

Name of the Course	CO Code	Course Outcome (CO)
Data Structures Lab	1	Students will be able to implement linear data structures & be able to handle operations like insertion, deletion, searching and traversing on them.
	2	Students will be able to implement nonlinear data structures & be able to handle operations like insertion, deletion, searching and traversing on them
	3	Students will be able to choose appropriate data structure and apply it in various problems
	4	Students will be able to select appropriate searching techniques for given problems.

CSL302 - Digital Logic & Computer Organization and Architecture Lab

Name of the Course	CO Code	Course Outcome (CO)
Digital Logic & Computer Organization and Architecture Lab	1	To understand the basics of digital components
	2	Design the basic building blocks of a computer: ALU, registers, CPU and memory
	3	To recognize the importance of digital systems in computer architecture
	4	To implement various algorithms for arithmetic operations.

CSL303 - Computer Graphics Lab

Name of the Course	CO Code	Course Outcome (CO)
Computer Graphics Lab	1	Implement various output and filled area primitive algorithms
	2	Apply transformation, projection and clipping algorithms on graphical objects.
	3	Perform curve and fractal generation methods.
	4	Develop a Graphical application/Animation based on learned concept

CSL304- Skill based Lab Course: Object Oriented Programming with Java

Name of the Course	CO Code	Course Outcome (CO)
Skill based Lab Course: Object Oriented Programming with Java	1	To apply fundamental programming constructs.
	2	To illustrate the concept of packages, classes and objects.
	3	To elaborate the concept of strings arrays and vectors.
	4	To implement the concept of inheritance and interfaces.
	5	To implement the notion of exception handling and multithreading.
	6	To develop GUI based application.

CSM301 Mini Project 1-A

Name of the Course	CO Code	Course Outcome (CO)
Mini Project 1- A	1	Identify problems based on societal /research needs
	2	Apply Knowledge and skill to solve societal problems in a group
	3	Develop interpersonal skills to work as member of a group or leader.
	4	Draw the proper inferences from available results through theoretical/ experimental/simulations.
	5	Analyze the impact of solutions in societal and environmental context for sustainable development.
	6	Use standard norms of engineering practices
	7	Excel in written and oral communication
	8	Demonstrate capabilities of self-learning in a group, which leads to lifelong learning.
	9	Demonstrate project management principles during project work.

CSC401- Engineering Mathematics-IV

Name of the Course	CO Code	Course Outcome (CO)
Engineering Mathematics-IV	1	Apply the concepts of eigenvalues and eigenvectors in engineering problems.
	2	Use the concepts of Complex Integration for evaluating integrals, computing residues & evaluate various contour integrals.
	3	Apply the concept of Z- transformation and inverse in engineering problems
	4	Use the concept of probability distribution and sampling theory to engineering problems.
	5	Apply the concept of Linear Programming Problems to optimization
	6	Solve Non-Linear Programming Problems for optimization of engineering problems.

CSC402- Analysis of Algorithms

Name of the Course	CO Code	Course Outcome (CO)
Analysis of Algorithms	1	Analyze the running time and space complexity of algorithms
	2	Describe, apply and analyze the complexity of divide and conquer strategy
	3	Describe, apply and analyze the complexity of greedy strategy.
	4	Describe, apply and analyze the complexity of dynamic programming strategy
	5	Explain and apply backtracking, branch and bound
	6	Explain and apply string matching techniques.

CSC403- Database Management System

Name of the Course	CO Code	Course Outcome (CO)
Database Management System	1	Recognize the need of database management system
	2	Design ER and EER diagram for real life applications
	3	Construct relational model and write relational algebra queries.
	4	Formulate SQL queries
	5	Apply the concept of normalization to relational database design.
	6	Describe the concept of transaction, concurrency and recovery.

CSC404- Operating System

Name of the Course	CO Code	Course Outcome (CO)
Operating System	1	Understand the objectives, functions and structure of OS
	2	Analyze the concept of process management and evaluate performance of process scheduling algorithms
	3	Understand and apply the concepts of synchronization and deadlocks
	4	Evaluate performance of Memory allocation and replacement policies
	5	Understand the concepts of file management. Apply concepts of I/O management and analyze techniques of disk scheduling.

CSC405- Microprocessor

Name of the Course	CO Code	Course Outcome (CO)
Microprocessor	1	Describe core concepts of 8086 microprocessor
	2	Interpret the instructions of 8086 and write assembly and Mixed language programs.
	3	Identify the specifications of peripheral chip
	4	Design 8086 based system using memory and peripheral chips
	5	Appraise the architecture of advanced processors
	6	Understand hyperthreading technology

CSL401 - Analysis of Algorithms Lab

Name of the Course	CO Code	Course Outcome (CO)
Analysis of Algorithms Lab	1	Implement the algorithms using different approaches
	2	Analyze the complexities of various algorithms.
	3	Compare the complexity of the algorithms for specific problem.

CSL402 - Database Management system Lab

Name of the Course	CO Code	Course Outcome (CO)
Database Management system Lab	1	Design ER /EER diagram and convert to relational model for the realworld application.
	2	Apply DDL, DML, DCL and TCL commands
	3	Write simple and complex queries
	4	Use PL / SQL Constructs.
	5	Demonstrate the concept of concurrent transactions execution and frontend-backend connectivity

CSL403 - Operating System Lab

Name of the Course	CO Code	Course Outcome (CO)
Operating System Lab	1	Demonstrate basic Operating system Commands, Shell scripts, System Calls and API wrt Linux
	2	Implement various process scheduling algorithms and evaluate their performance.
	3	Implement and analyze concepts of synchronization and deadlocks.
	4	Implement various Memory Management techniques and evaluate their performance.
	5	Implement and analyze concepts of virtual memory
	6	Demonstrate and analyze concepts of file management and I/O management techniques.

CSL404- Microprocessor Lab

Name of the Course	CO Code	Course Outcome (CO)
Microprocessor Lab	1	Use appropriate instructions to program microprocessor to perform various task
	2	Develop the program in assembly/ mixed language for Intel 8086 processor
	3	Demonstrate the execution and debugging of assembly/ mixed language program

CSL405- Skill Base Lab Course: Python Programming

Name of the Course	CO Code	Course Outcome (CO)
Skill Base Lab Course: Python Programming	1	To understand basic concepts in python.
	2	To explore contents of files, directories and text processing with python
	3	To develop program for data structure using built in functions in python.
	4	To explore django web framework for developing python-based web application.
	5	To understand Multithreading concepts using python.

CSM401- Mini Project 1- B

Name of the Course	CO Code	Course Outcome (CO)
Mini Project 1- B	1	Identify problems based on societal /research needs
	2	Apply Knowledge and skill to solve societal problems in a group
	3	Develop interpersonal skills to work as member of a group or leader.
	4	Draw the proper inferences from available results through theoretical/ experimental/simulations.
	5	Analyze the impact of solutions in societal and environmental context for sustainable development.
	6	Use standard norms of engineering practices
	7	Excel in written and oral communication
	8	Demonstrate capabilities of self-learning in a group, which leads to lifelong learning.
	9	Demonstrate project management principles during project work.

CPC501- Theoretical Computer Science

Name of the Course	CO Code	Course Outcome (CO)
Theoretical Computer Science	1	Understand concepts of Theoretical Computer Science, difference and equivalence of DFA and NFA , languages described by finite automata and regular expressions.
	2	Design Context free grammer, pushdown automata to recognize the language.
	3	Develop an understanding of computation through Turing Machine
	4	Acquire fundamental understanding of decidability and undecidability.

CSC502- Software Engineering

Name of the Course	CO Code	Course Outcome (CO)
	1	Identify requirements & assess the process models.
	2	Plan, schedule and track the progress of the projects.
	3	Design the software projects.
Software Engineering	4	Do testing of software project
	5	Identify risks, manage the change to assure quality in software projects.

CSC503- Computer Network

Name of the Course	CO Code	Course Outcome (CO)
Computer Network	1	Demonstrate the concepts of data communication at physical layer and compare ISO - OSI model with TCP/IP model.
	2	Explore different design issues at data link layer.
	3	Design the network using IP addressing and sub netting / supernetting schemes.
	4	Analyze transport layer protocols and congestion control algorithms.
	5	Explore protocols at application layer

CSC504 - Data Warehousing and Mining

Name of the Course	CO Code	Course Outcome (CO)
	1	Understand data warehouse fundamentals and design data warehouse with dimensional modelling and apply OLAP operations.
	2	Understand data mining principles and perform Data preprocessing and Visualization.
	3	Identify appropriate data mining algorithms to solve real world problems
Data Warehousing and Mining	4	Compare and evaluate different data mining techniques like classification, prediction, clustering and association rule mining
	5	Describe complex information and social networks with respect to web mining.

CSDLO5012- Internet Programming

Name of the Course	CO Code	Course Outcome (CO)
Internet Programming	1	Implement interactive web page(s) using HTML and CSS.
	2	Design a responsive web site using JavaScript and demonstrate database connectivity using JDBC
	3	Demonstrate Rich Internet Application using Ajax and demonstrate and differentiate various Web Extensions
	4	Demonstrate web application using Reactive Js

CSL501- Software Engineering Lab

Name of the Course	CO Code	Course Outcome (CO)
Software Engineering Lab	1	Identify requirements and apply software process model to selected case study.
	2	Develop architectural models for the selected case study
	3	Use computer-aided software engineering (CASE) tools.

CSL502- Computer Network Lab

Name of the Course	CO Code	Course Outcome (CO)
Computer Network Lab	1	Design and setup networking environment in Linux.
	2	Use Network tools and simulators such as NS2, Wireshark etc. to explore networking algorithms and protocols.
	3	Implement programs using core programming APIs for understanding networking concepts.

CSL503- Data Warehousing and Mining Lab

Name of the Course	CO Code	Course Outcome (CO)
Data Warehousing and Mining Lab	1	Design data warehouse and perform various OLAP operations.
	2	Implement data mining algorithms like classification
	3	Implement clustering algorithms on a given set of data sample
	4	Implement Association rule mining & web mining algorithm.

CSL504- Professional Communication & Ethics II

Name of the Course	CO Code	Course Outcome (CO)
Professional Communication & Ethics II	1	Plan and prepare effective business/ technical documents which will in turn provide solid foundation for their future managerial roles.
	2	Strategize their personal and professional skills to build a professional image and meet the demands of the industry.
	3	Emerge successful in group discussions, meetings and result-oriented agreeable solutions in group communication situations.
	4	Deliver persuasive and professional presentations.
	5	Develop creative thinking and interpersonal skills required for effective professional communication.
	6	Apply codes of ethical conduct, personal integrity and norms of organizational behaviour.

CSM501- Mini Project 2A

Name of the Course	CO Code	Course Outcome (CO)
Mini Project 2A	1	Identify societal/research/innovation/entrepreneurship problems through appropriate literature surveys
	2	Identify Methodology for solving above problem and apply engineering knowledge and skills to solve it
	3	Validate, Verify the results using test cases/benchmark data/theoretical/ inferences/experiments/simulations
	4	Analyze and evaluate the impact of solution/product/research/innovation /entrepreneurship towards societal/environmental/sustainable development
	5	Use standard norms of engineering practices and project management principles during project work
	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.
	7	Gain technical competency towards participation in Competitions, Hackathons, etc.
	8	Demonstrate capabilities of self-learning, leading to lifelong learning
	9	Develop interpersonal skills to work as a member of a group or as leader

CSC601- System Programming and Compiler Construction

Name of the Course	CO Code	Course Outcome (CO)
System Programming and Compiler Construction	1	Identify the relevance of different system programs.
	2	Explain various data structures used for assembler and microprocessor design..
	3	Distinguish between different loaders and linkers and their contribution in developing efficient user applications
	4	Understand fundamentals of compiler design and identify the relationships among different phases of the compiler

CSC602 - Cryptography and System Security

Name of the Course	CO Code	Course Outcome (CO)
Cryptography and System Security	1	Understand system security goals and concepts, classical encryption techniques and acquire fundamental knowledge on the concepts of modular arithmetic and number theory.
	2	Understand, compare and apply different encryption and decryption techniques to solve problems related to confidentiality and authentication
	3	Apply different message digest and digital signature algorithms to verify integrity and achieve authentication and design secure applications.
	4	Understand network security basics, analyse different attacks on networks and evaluate the performance of firewalls and security protocols like SSL, IPSec, and PGP
	5	Analyze and apply system security concept to recognize malicious code.

CSC603 - Mobile Computing

Name of the Course	CO Code	Course Outcome (CO)
Mobile Computing	1	To identify basic concepts and principles in computing, cellular architecture
	2	To describe the components and functioning of mobile networking
	3	To classify variety of security techniques in mobile network.
	4	To apply the concepts of WLAN for local as well as remote applications
	5	To describe Long Term Evolution (LTE) architecture and its interfaces.

CSC604 - Artificial Intelligence

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

CSDLO6011- Internet of Things

Name of the Course	CO Code	Course Outcome (CO)
Internet of Things	1	Understand the concepts of IoT and the Things in IoT
	2	Emphasize core IoT functional Stack and understand application protocols for IoT
	3	Apply IoT knowledge to key industries that IoT is revolutionizing.
	4	Examines various IoT hardware items and software platforms used in projects.

CSL601- System Programming and Compiler Construction Lab

Name of the Course	CO Code	Course Outcome (CO)
System Programming and Compiler Construction Lab	1	Generate machine code by implementing two pass assemblers
	2	Implement Two pass macro processor
	3	Parse the given input string by constructing Top down/Bottom-up parser
	4	Identify and Validate tokens for given high level language and Implement synthesis phase of compiler.
	5	Explore LEX & YACC tools.

CSL602- Cryptography & System Security Lab

Name of the Course	CO Code	Course Outcome (CO)
Cryptography & System Security Lab	1	Apply the knowledge of symmetric and asymmetric cryptography to implement simple ciphers.
	2	Explore the different network reconnaissance tools to gather information about networks.
	3	Explore and use tools like sniffers, port scanners and other related tools for analysing packets in a Network.
	4	Set up firewalls and intrusion detection systems using open-source technologies and to explore email security.
	5	Explore various attacks like buffer-overflow and web application attack**.**

CSL603- Mobile Computing Lab

Name of the Course	CO Code	Course Outcome (CO)
Mobile Computing Lab	1	Develop and demonstrate mobile applications using various tools
	2	Articulate the knowledge of GSM, CDMA & Bluetooth technologies and demonstrate it.
	3	Students will able to carry out simulation of frequency reuse, hidden/exposed terminal problem.
	4	Implement security algorithms for mobile communication network
	5	Demonstrate simulation and compare the performance of Wireless LAN

CSL604- Artificial Intelligence Lab

Name of the Course	CO Code	Course Outcome (CO)
Artificial Intelligence Lab	1	Identify languages and technologies for Artificial Intelligence
	2	Understand and implement uninformed and informed searching techniques for real world problems.
	3	Create a knowledge base using any AI language.
	4	Design and implement expert systems for real world problems.

CSL605- Cloud Computing

Name of the Course	CO Code	Course Outcome (CO)
Cloud Computing	1	Implement different types of virtualization techniques
	2	Analyze various cloud computing service models and implement them to solve the given problems.
	3	Design and develop real world web applications and deploy them on commercial cloud(s).
	4	Explain major security issues in the cloud and mechanisms to address them..
	5	Explore various commercially available cloud services and recommend the appropriate one for the given application.
	6	Implement the concept of containerization

CSM601: Mini-Project

Name of the Course	CO Code	Course Outcome (CO)
Mini-Project	1	Identify societal/research/innovation/entrepreneurship problems through appropriate literature surveys
	2	Identify Methodology for solving above problem and apply engineering knowledge and skills to solve it
	3	Validate, Verify the results using test cases/benchmark data/theoretical/ inferences/experiments/simulations
	4	Analyze and evaluate the impact of solution/product/research/innovation /entrepreneurship towards societal/environmental/sustainable development
	5	Use standard norms of engineering practices and project management principles during project work
	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
	7	Gain technical competency towards participation in Competitions, Hackathons, etc.
	8	Demonstrate capabilities of self-learning, leading to lifelong learning.
	9	Develop interpersonal skills to work as a member of a group or as leader

CSC701 - Machine Learning

Name of the Course	CO Code	Course Outcome (CO)
Machine Learning	1	To acquire fundamental knowledge of developing machine learning models.
	2	To select, apply and evaluate an appropriate machine learning model for the given
	3	To demonstrate ensemble techniques to combine predictions from different models.
	4	To demonstrate the dimensionality reduction techniques.

CSC702 - Big Data Analysis

Name of the Course	CO Code	Course Outcome (CO)
Big Data Analysis	1	Understand the building blocks of Big Data Analytics.
	2	Apply fundamental enabling techniques like Hadoop and MapReduce in solving real world problems.
	3	Understand different NoSQL systems and how it handles big data.
	4	Apply advanced techniques for emerging applications like stream analytics.
	5	Achieve adequate perspectives of big data analytics in various applications like recommender systems, social media applications, etc.
	6	Apply statistical computing techniques and graphics for analyzing big data.

CSDC7013- Natural Language Processing

Name of the Course	CO Code	Course Outcome (CO)
Natural Language Processing	1	To describe the field of natural language processing.
	2	To design language model for word level analysis for text processing.
	3	To design various POS tagging techniques and parsers.
	4	To design, implement and test algorithms for semantic and pragmatic analysis.
	5	To formulate the discourse segmentation and anaphora resolution.
	6	To apply NLP techniques to design real world NLP applications.

CSDC7022- Blockchain

Name of the Course	CO Code	Course Outcome (CO)
Blockchain	1	Explain blockchain concepts.
	2	Apply cryptographic hash required for blockchain.
	3	Apply the concepts of smart contracts for an application.
	4	Design a public blockchain using Ethereum.
	5	Design a private blockchain using Hyperledger.
	6	Use different types of tools for blockchain applications.

ILO 7016- Cyber Security and Laws

Name of the Course	CO Code	Course Outcome (CO)
Cyber Security and Laws	1	Understand the concept of cybercrime and its effect on outside world
	2	Interpret and apply IT law in various legal issues
	3	Distinguish different aspects of cyber law
	4	Apply Information Security Standards compliance during software design and development

CSL70011- Machine Learning Lab

Name of the Course	CO Code	Course Outcome (CO)
Machine Learning Lab	1	To implement an appropriate machine learning model for the given application.
	2	To implement ensemble techniques to combine predictions from different models.
	3	To implement the dimensionality reduction techniques.

CSL7012- Big Data Analytics Lab

Name of the Course	CO Code	Course Outcome (CO)
Big Data Analytics Lab	1	To interpret business models and scientific computing paradigms, and apply software tools for big data analytics.
	2	To implement algorithms that uses Map Reduce to apply on structured and unstructured data
	3	To perform hands-on NoSql databases such as Cassandra, HadoopHbase, MongoDB, etc.
	4	To implement various data streams algorithms.
	5	To develop and analyze the social network graphs with data visualization techniques.

CSDL7013- Natural Language processing Lab

Name of the Course	CO Code	Course Outcome (CO)
Natural Language processing Lab	1	Apply various text processing techniques.
	2	Design language model for word level analysis.
	3	Model linguistic phenomena with formal grammar.
	4	Design, implement and analyze NLP algorithms.
	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.
	6	Implement proper experimental methodology for training and evaluating empirical NLPsystems.

CSDL7022 - Blockchain Lab

Name of the Course	CO Code	Course Outcome (CO)
Blockchain Lab	1	Creating Cryptographic hash using merkle tree.
	2	Design Smart Contract using Solidity.
	3	Implementing ethereum blockchain using Geth.
	4	Demonstrate the concept of blockchain in real world application.

CSP701: Major Project 1

Name of the Course	CO Code	Course Outcome (CO)
Major Project 1	1	To develop the understanding of the problem domain through extensive review ofliterature.
	2	To Identify and analyze the problem in detail to define its scope with problem specific data.
	3	To know various techniques to be implemented for the selected problem and relatedtechnical skills through feasibility analysis.
	4	To design solutions for real-time problems that will positively impact society andenvironment..
	5	To develop clarity of presentation based on communication, teamwork and leadershipskills.
	6	To inculcate professional and ethical behavior.

CSC801 - Distributed Computing

Name of the Course	CO Code	Course Outcome (CO)
Distributed Computing	1	Demonstrate the knowledge of basic elements and concepts related to distributed system technologies.
	2	Illustrate the middleware technologies that support distributed applications such as RPC, RMI and Object-based middleware.
	3	Analyze the various techniques used for clock synchronization, mutual exclusion and deadlock.
	4	Demonstrate the concepts of Resource and Process management.
	5	Demonstrate the concepts of Consistency, Replication Management and fault Tolerance.
	6	Apply the knowledge of Distributed File systems in building large-scale distributed applications.

CSDC8012-Digital Forensics

Name of the Course	CO Code	Course Outcome (CO)
Digital Forensics	1	Discuss the phases of Digital Forensics and methodology to handle the computer security incident.
	2	Describe the process of collection, analysis and recovery of the digital evidence.
	3	Explore various tools to analyze malwares and acquired images of RAM/hard drive.
	4	Acquire adequate perspectives of digital forensic investigation in mobile devices
	5	Analyze the source and content authentication of emails and browsers.
	6	Produce unambiguous investigation reports which offer valid conclusions.

CSDC8023- Social Media Analytics

Name of the Course	CO Code	Course Outcome (CO)
Social Media Analytics	1	Understand the concept of Social media
	2	Understand the concept of social media Analytics and its significance.
	3	Learners will be able to analyze the effectiveness of social media
	4	Learners will be able to use different Social media analytics tools effectively and efficiently.
	5	Learners will be able to use different effective Visualization techniques to represent social media analytics.
	6	Acquire the fundamental perspectives and hands-on skills needed to work with social media data.

ILO8029- Environmental Management

Name of the Course	CO Code	Course Outcome (CO)
Environmental Managementt	1	Understand the concept of environmental management
	2	Understand ecosystem and interdependence, food chain etc.
	3	Understand and interpret environment related legislations

CSL801 - Distributed Computing Lab

Name of the Course	CO Code	Course Outcome (CO)
Distributed Computing Lab	1	Develop test and debug using Message-Oriented Communication or RPC/RMI basedclient-server programs.
	2	Implement techniques for clock synchronization.
	3	Implement techniques for Election Algorithms.
	4	Demonstrate mutual exclusion algorithms and deadlock handling.
	5	Implement techniques of resource and process management.
	6	Describe the concepts of distributed File Systems with some case studies.

CSDL8022- Digital Forensics Lab

Name of the Course	CO Code	Course Outcome (CO)
Digital Forensics Lab	1	Explore various forensics tools and use them to acquire, duplicate and analyze data and recover deleted data.
	2	Implement penetration testing using forensics tools.
	3	Explore various forensics tools and use them to acquire and analyze live and static data.
	4	Verification of source and content authentication of emails and browsers.
	5	Demonstrate Timeline Report Analysis using forensics tools.
	6	Discuss real time crime forensics investigations scenarios.

CSDL8023- Social Media Analytics Lab

Name of the Course	CO Code	Course Outcome (CO)
Social Media Analytics Lab	1	Understand characteristics and types of social media networks.
	2	Use social media analytics tools for business
	3	Collect, monitor , store and track social media data
	4	Analyze and visualize social media data from multiple platforms
	5	Design and develop content and structure based social media analytics models.
	6	Design and implement social media analytics applications for business.

CSP801- Major Project 2

Name of the Course	CO Code	Course Outcome (CO)
Major Project 2	1	Implement solutions for the selected problem by applying technical andprofessional skills.
	2	Analyze impact of solutions in societal and environmental context for sustainabledevelopment.
	3	Collaborate best practices along with effective use of modern tools.
	4	Develop proficiency in oral and written communication with effective leadershipand teamwork.
	5	Nurture professional and ethical behavior.
	6	Gain expertise that helps in building lifelong learning experience.