	COURSE OUTCOMES
Department of COMP , CAY- (Even semester, 2023-24)	

Course Name:	Engineering Mathematics-IV		
Course Code	CSC401		
Faculty Name:	Satyanarayana Nagula		
Year	2	**Sem**	IV

CO Number	**Course Outcome**
CSC401.1	Students will be able to obtain Eigen values and Eigen vectors for a given square matrix
CSC401.2	Students will be able to (i) find properties of Eigen values and Eigen vectors (ii) Check if a matrix is derogatory or not
CSC401.3	Students will be able to (i) Construct diagonal matrices using the concept of similarity (ii) Verify Cayley- Hamilton theorem (iii) Obtain functions of square matrices (iv) Obtain moments and probabilities of
CSC401.4	Students will be able to (i) Obtain probabilities and z-values for normal distributions (ii) Obtain Taylor's and Laurent Series (iii) Locate zeros and poles and find residues at poles (iv) Obtain Z transform for
CSC401.5	method
CSC401.6	Students will be able to (i) perform tests of significance for large and small samples Chi-square test to test to check independence of attributes and 'goodness of fit' (ii) Apply Big – M method and Dual Simplex

Course Name:	Analysis of Algorithm		
Course Code	CSC402		
Faculty Name:	Phiroj Shaikh		
Year	2	**Sem**	IV

CO Number	**Course Outcome**
CSC402.1	Analyze the running time and space complexity of Algorithms
CSC402.2	Describe, analyze and apply the complexity of Divide and Conquer Strategy.
CSC402.3	Describe, analyze and apply the complexity of Greedy Strategy.
CSC402.4	Describe, analyze and apply the complexity of Dynamic Programming Strategy.
CSC402.5	Explain and apply Backtracking and Branch and Bound Strategy.
CSC402.6	Explain and apply String Matching Techniques.

Course Name:	Data Base Management System		
Course Code	CSC403		
Faculty Name:	Sana Shaikh		
Year	2	**Sem**	IV

CO Number	**Course Outcome**
CSC403.1	Recognize the need for a database management system.
CSC403.2	Summarize the concept of transaction, concurrency and recovery.
CSC403.3	Formulate SQL queries to manage the database system.
CSC403.4	Analyze and apply the concept of normalization to relational database design.
CSC403.5	Validate relational model and write relational algebra queries.
CSC403.6	Design ER and EER diagrams for real life applications.

Course Name:	Operating System		
Course Code	CSC404		
Faculty Name:	Dipti Jadhav		
Year	2	**Sem**	IV

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

Course Name:	Microprocessor		
Course Code	CSC405		
Faculty Name:	Sejal Chopra		
Year	2	Sem	IV

CO Number	Course Outcome
CSC405.1	Ability to explain the various architectures and internal working of x86 processors.
CSC405.2	Ability to use and apply appropriate instructions to program a microprocessor to perform various tasks.
CSC405.3	Ability to describe the concept and working of Interrupts.
CSC405.4	Ability to identify and describe the functions and features of different peripheral chips.
CSC405.5	Ability to appraise the structural modifications of advanced processors.
CSC405.6	Ability to interface and design system using memory chips and peripheral chips for 16 bit 8086 microprocessor.

Course Name:	Analysis of Algorithm Lab		
Course Code	CSL401		
Faculty Name:	Phiroj Shaikh		
Year	2	Sem	IV

CO Number	Course Outcome
CSL401.1	Students will be able to understand the fundamental algorithmic characteristics
CSL401.2	Students will be able to compare the complexities of various algorithms.
CSL401.3	Students will be able to analyze complexity and implement algorithms based on Divide and Conquer, Greedy Strategy
CSL401.4	Students will be able to analyze complexity and implement algorithms based on Dynamic Programming
CSL401.5	Students will be able to analyze complexity and implement algorithms based on Backtracking, Branch & Bound Strategy
CSL401.6	Students will be able to design algorithms based on String Matching.

Course Name:	Database Management System Lab		
Course Code	CSL402		
Faculty Name:	Sana Shaikh		
Year	2	Sem	IV

CO Number	Course Outcome
CSL402.1	Identify the need for the case study and detailed statement of the problem.
CSL402.2	Write simple and complex queries.
CSL402.3	Execute SQL commands on databases.
CSL402.4	Design ER /EER diagram and convert to relational model for the real world application.
CSL402.5	Experimenting views, joins and triggers for specific tasks.
CSL402.6	Demonstrate the concept of concurrent transactions execution and frontend-backend connectivity.

Course Name:	Operating System Lab		
Course Code	CSL403		
Faculty Name:	Dipti Jadhav		
Year	2	Sem	IV

CO Number	Course Outcome
CSL403.1	Demonstrate basic Operating system Commands, Shell scripts, System Calls and API wrt 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

Course Name:	Microprocessor Lab		
Course Code	CSL404		
Faculty Name:	Sejal Chopra		
Year	2	Sem	IV

CO Number	Course Outcome

CSL404.1	Ability to explain and identify different instructions of 8086 microprocessor.
CSL404.2	Ability to use and apply appropriate instructions to program a microprocessor to perform various tasks.
CSL404.3	Ability to perform arithmetic operations using assembly language programming.
CSL404.4	Ability to write assembly code based on array operations.
CSL404.5	Ability to develop the program in mixed language.
CSL404.6	Ability to write and execute assembly code for code conversions

Course Name:	Skill base Lab course: Python Programming		
Course Code	CSL405		
Faculty Name:	Imran Mirza		
Year	2	**Sem**	IV

CO Number	Course Outcome
CSL405.1	Identify and use basic concepts in python
CSL405.2	Explain operations of files, directories and text processing with python.
CSL405.3	Able to apply concepts of data structure using built in functions in python.
CSL405.4	Able to analyze multi-threading concepts using python
CSL405.5	Compare NumPy and Pandas library for working with large data sets.
CSL405.6	Design GUI and create an application using different python concepts.

Course Name:	Mini Project – 2 A		
Course Code	CSM401		
Faculty Name:	Shainila Shaikh		
Year	2	**Sem**	IV

CO Number	Course Outcome
CSM401.1	Validate, Verify the results using test cases/benchmark data/theoretical/ inferences/ experiments/ simulations.
CSM401.2	Communicate through competitions and technical report writing effectively for project related activities and findings.
CSM401.3	Use standard norms of engineering practices and project management principles during project work.
CSM401.4	Analyze and evaluate the impact of solution/product/research/innovation /entrepreneurship towards societal/environmental/sustainable development.
CSM401.5	Demonstrate capabilities of self-learning, leading to lifelong learning
CSM401.6	Develop interpersonal skills to work as a member of a group or as a leader.

Course Name:	System Programming and Compiler Construction		
Course Code	CSC601		
Faculty Name:	Mayura Gahvane		
Year	3	**Sem**	VI

CO Number	Course Outcome
CSC601.1	Students will be able to identify and state the basics of system programs such as editor, compiler, assembler, linker, loader and macro processor.
CSC601.2	Students will be able to explain different system programs and its working.
CSC601.3	Students will be able to examine different data structures and passes of system software like assembler, linker, loader and Macro Processor.
CSC601.4	Students will be able to distinguish between different loaders and linkers and their contribution in developing user application.
CSC601.5	Students will be able to evaluate the need of synthesis phase to produce object code optimized in terms of high execution speed and less memory usage.
CSC601.6	Students will be able to design different parsers for given context free grammar.

Course Name:	Crytpography and System Security		
Course Code	CSC602		
Faculty Name:	Sejal Chopra		
Year	3	**Sem**	VI

CO Number	Course Outcome
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	Compare and apply different encryption and decryption techniques to solve problems related to confidentiality and authentication
CSC602.3	Apply the knowledge of cryptographic checksums and evaluate the performance of different message digest algorithms for verifying the integrity of varying message sizes.
CSC602.4	Apply different digital signature algorithms to achieve authentication and design secure applications

CSC602.5	Evaluate network security basics, analyze different attacks on networks and evaluate the performance of firewalls and security protocols like SSL, IPSec, and PGP.
CSC602.6	Analyze and apply system security concept to recognize malicious code.

Course Name:	Mobile Computing		
Course Code	CSC603		
Faculty Name:	Amiyakumar Tripathy		
Year	3	**Sem**	VI

CO Number	**Course Outcome**
CSC603.1	Identify basic concepts and principles in mobile communication and computing
CSC603.2	Express the components and functioning of mobile networking
CSC603.3	Apply the concepts of WLAN for local as well as remote applications
CSC603.4	Classify variety of security techniques in mobile network
CSC603.5	Apply the concepts of mobility management
CSC603.6	Describe Long Term Evolution (LTE) architecture and its interfaces

Course Name:	Artificial Intelligence		
Course Code	CSC604		
Faculty Name:	Kalpita Wagaskar		
Year	3	**Sem**	VI

CO Number	**Course Outcome**
CSC604.1	Students will be able to describe the basic building blocks of an intelligent agent.
CSC604.2	Students will be able to distinguish and explain various problem solving method and knowledge representation technique.
CSC604.3	Students will be able to apply the various forms of learning and record the results of the same.
CSC604.4	Students will be able to desive models for reasoning with uncertainty as well as the use of unreliable information and analyze the optimization techniques.
CSC604.5	Students will be able to critique and justify different AI techniques and compare the results f the same and explore the game playing theory/.
CSC604.6	Students will be able to design and develop AI applications in real world scenarios. And create and solve story problems with first order logic equation.

Course Name:	Internet of Things		
Course Code	CSDLO6011		
Faculty Name:	Mr. Ankur		
Year	3	**Sem**	VI

CO Number	**Course Outcome**
CSDLO6011.1	Understand the concepts of IoT.
CSDLO6011.2	Classify the things in IoT about networks,sensors,actuators.
CSDLO6011.3	Emphasize core IoT functional Stack
CSDLO6011.4	Differentiate application protocols for IoT.
CSDLO6011.5	Apply IoT knowledge to key industries that IoT is revolutionizing.
CSDLO6011.6	Examines various IoT hardware items and software platforms used in projects.

Course Name:	Quantitative Anaylsis		
Course Code	CSDLO6013		
Faculty Name:	Dipti Jadhav		
Year	3	**Sem**	VI

CO Number	**Course Outcome**
CSDLO6013.1	To Understand the concept of data collection & sampling methods
CSDLO6013.2	Recognize the need for Statistics and Quantitative Analysis
CSDLO6013.3	Apply the data collection and sampling methods.
CSDLO6013.4	Analyze using concepts of Regression, Multiple Linear Regression
CSDLO6013.5	Formulate Statistical inference drawing methods.
CSDLO6013.6	Apply Testing of hypothese

Course Name:	System Programming and Compiler Construction Lab
Course Code	CSL601

Faculty Name:	Mayura Gahvane		
Year	3	**Sem**	VI

CO Number	**Course Outcome**
CSL601.1	Identify and validate different tokens for given high level language code.
CSL601.2	Understand and implement pass1 of two pass assembler.
CSL601.3	Construct different databases of Two pass macro processor
CSL601.4	Parse the given input string by constructing Top down/ Bottom up parser.
CSL601.5	Implement and compare the code optimization Techniques of synthesis phase.
CSL601.6	Develop different phases of system software using tools such as LEX and YACC tools.

Course Name:	Cryptography and System Security Lab		
Course Code	CSL602		
Faculty Name:	Sejal Chopra		
Year	3	**Sem**	VI

CO Number	**Course Outcome**
CSL602.1	Apply the knowledge of symmetric cryptography to implement simple ciphers.
CSL602.2	Analyze and implement public key algorithms like RSA and El Gamal.
CSL602.3	Analyze and evaluate performance of hashing algorithms
CSL602.4	Explore the different network reconnaissance tools to gather information about networks and utilize tools like sniffers, port scanners and other related tools for analyzing packets in a network.
CSL602.5	Set up firewalls and intrusion detection systems using open source technologies and to explore email security.
CSL602.6	Explore various attacks like buffer-overflow, and web-application attacks.

Course Name:	Mobile Computing Lab		
Course Code	CSL603		
Faculty Name:	Dr. Amiya T.		
Year	3	**Sem**	VI

CO Number	
CSL603.1	Demonstrate mobile applications using various tools
CSL603.2	Articulate the knowledge of GSM, CDMA & Bluetooth technologies and demonstrate it.
CSL603.3	Carry out simulation of frequency reuse, hidden terminal problem
CSL603.4	Develop security algorithms for mobile communication network
CSL603.5	Demonstrate simulation and compare the performance of Wireless LAN
CSL603.6	Implement mobile node discovery and route maintains.

Course Name:	Artificial Intelligence Lab		
Course Code	CSL604		
Faculty Name:	Kalpita Wagaskar		
Year	3	**Sem**	VI

CO Number	**Course Outcome**
CSL604.1	To realize the basic techniques to build intelligent systems
CSL604.2	To create knowledge base and apply appropriate search techniques used in problem solving.
CSL604.3	To formulate a given Problem using rules of AI
CSL604.4	To impement the FOL in python
CSL604.5	Apply the supervised/unsupervised learning algorithm.
CSL604.6	Design and implement expert systems for real world problems.

Course Name:	Skill base Lab course: Cloud Computing		
Course Code	CSL605		
Faculty Name:	Priya Kaul		
Year	3	**Sem**	VI

CO Number	**Course Outcome**
CSL605.1	To recall and list different virtualization techniques.

CSL605.2	To explain and categorize various cloud computing service models, applying them to address problems.
CSL605.3	To utilize design principles to create and deploy real-world web applications on commercial cloud platforms
CSL605.4	To examine major cloud security issues, breaking them down and proposing relevant mechanisms for resolution.
CSL605.5	To assess and compare commercially available cloud services, recommending the most suitable one for a given application
CSL605.6	To Implement containerization concepts to develop and execute practical solutions.

Course Name:	Mini Project – 2 B		
Course Code	CSM601		
Faculty Name:	Mayura Gavhane		
Year	3	**Sem**	VI

CO Number	Course Outcome
CSM601.1	
CSM601.2	
CSM601.3	Use standard norms of engineering practices and project management principles during project work.
CSM601.4	Analyze and evaluate the impact of solution/product/research/innovation/entrepreneurship towards societal/environmental/sustainable development.
CSM601.5	Demonstrate capabilities of self-learning, leading to lifelong learning.
CSM601.6	Develop interpersonal skills to work as a member of a group or as a leader.

Course Name:	Statistical Learning For Data Science		
Course Code	HDSC601		
Faculty Name:	Revathy Sundararajan		
Year	3	**Sem**	VI

CO Number	Course Outcome
HDSC 601.1	Define Probabilities, types of data, statistical measures, different types of sampling, Type 1 and Type 2 errors
HDSC 601.2	Draw Scatter diagrams, Obtain Box plot, conditional probabilities using Bayes' theorem, coefficient of correlation and determination, Rank correlation
HDSC 601.3	Apply Binomial, Poisson, Uniform and Gaussian (Normal) distributions to obtain probabilities
HDSC 601.4	Choose appropriate methods of sampling, use Chi-square distribution to fit and to check independence of attributes
HDSC 601.5	Evaluate patterns in Time series, non parametric tests
HDSC 601.6	Develop linear and multiple regression models

Course Name:	Social Media Analytics		
Course Code	CSDC8023		
Faculty Name:	Sana Shaikh		
Year		**Sem**	

CO Number	Course Outcome
CSDC8023.1	Define the concept of Social media.
CSDC8023.2	Summarize the concept of social media Analytics and its significance.
CSDC8023.3	Use different Social media analytics tools effectively and efficiently.
CSDC8023.4	Analyze the effectiveness of social media.
CSDC8023.5	Validate different effective Visualization techniques to represent social media analytics.
CSDC8023.6	Develop the fundamental perspectives and hands-on skills needed to work with social media data.

Course Name:	Distributed Computing		
Course Code	CSC801		
Faculty Name:	Pooja Bansode		
Year	4	**Sem**	VIII

CO Number	Course Outcome
CSC801.1	Demonstrate the knowledge of basic elements, and concepts related to distributed system technologies.
CSC801.2	Illustrate the middleware technologies supporting distributed applications, including RPC, RMI, and Object-based middleware.
CSC801.3	Analyze the various techniques used for clock synchronizatioln, mutual exclusion and deadlock.
CSC801.4	Demonstrate the concepts of Resource and process management.
CSC801.5	Demonstrate the concept of Consistency, Replication Management and fault tolerance.
CSC801.6	Apply the knowledge of Distributed file sytem in building large-scale distributed application.

Course Name:	Digital Forensic		
Course Code	CSDC8012		
Faculty Name:	Mayura Gavhane		
Year		Sem	

CO Number	Course Outcome
CSDC8012.1	Recall the various phases involved in Digital Forensics and articulate the methodology for managing computer security incidents.
CSDC8012.2	Summarize the steps involved in collecting, analyzing, and recovering digital evidence.
CSDC8012.3	Apply different tools for the analysis of malware and the examination of RAM/hard drive images.
CSDC8012.4	Examine diverse viewpoints concerning digital forensic investigations on mobile devices.
CSDC8012.5	Develop an integrated analysis detailing the authentication processes of emails and browsers.
CSDC8012.6	Critically evaluate the content of investigation reports, ensuring clarity and validity in the presented conclusions.

Course Name:	Deep Learning		
Course Code	CSDC8011		
Faculty Name:	Priya Kaul		
Year	4	Sem	VIII

CO Number	Course Outcome
CSDC8011.1	To recall fundamental concepts related to Neural Networks.
CSDC8011.2	To explain the concepts of Training, Optimization and Regularization in Deep Neural Networks
CSDC8011.3	To Develop a suitable Deep Neural Network model for applications using Unsupervised Learning: Autoencoders.
CSDC8011.4	To Examine recent trends and applications in Convolutional Neural Networks (CNN) and Supervised Learning.
CSDC8011.5	To Assess the effectiveness of different approaches in designing and training Recurrent Neural Networks (RNN).
CSDC8011.6	To Generate innovative solutions by synthesizing knowledge to address recent trends and applications in Generative Adversarial Network (GAN).

Course Name:	Text, Web and Social Media Analytics		
Course Code	HDSC801		
Faculty Name:	Pooja Bansode		
Year	4	Sem	VIII

CO Number	Course Outcome
HDSC801.1	Extract information from the text and perform data pre-processing.
HDSC801.2	Apply clustering and classification algorithms on textual data and perform prediction.
HDSC801.3	Apply various web mining techniques to perform mining, searching and spamming of web data.
HDSC801.4	Provide solutions to the emerging problems with social media using behaviour analytics and Recommendation systems.
HDSC801.5	Apply machine learning techniques to perform sentiment analysis on data from social media.

Course Name:	Social Media Analytics Lab		
Course Code	CSDL8023		
Faculty Name:	Sana Shaikh		
Year		Sem	

CO Number	Course Outcome
CSDL8023.1	Define characteristics and types of social media networks.
CSDL8023.2	To learn various social media analytics tools and evaluation matrices.
CSDL8023.3	To collect and store social media data.
CSDL8023.4	To analyze and visualize social media data.
CSDL8023.5	To design and develop social media analytics models.
CSDL8023.6	To design and build a social media analytics application.

Course Name:	Distributed Computing Lab		
Course Code	CSL801		
Faculty Name:	Pooja Bansode		
Year	4	Sem	VIII

CO Number	Course Outcome

CSL801.1	Develop test and debug using Message-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

Course Name:	Digital Forensic Lab		
Course Code	CSDL8022		
Faculty Name:	Mayura Gavhane		
Year		**Sem**	

CO Number	**Course Outcome**
CSDL8022.1	Explore various forensics tools and use them to acquire, duplicate and analyze data and recover deleted data.
CSDL8022.2	Implement penetration testing using forensics tools.
CSDL8022.3	Apply diverse forensics tools to acquire, duplicate, and analyze both live and static data in the context of forensic investigations.
CSDL8022.4	Analyze the processes involved in the verification of source and content authentication in emails and browsers within a forensic context.
CSDL8022.5	Demonstrate Timeline Report Analysis using forensics tools.
CSDL8022.6	Discuss real time crime forensics investigations scenarios.

Course Name:	Deep Learning Lab		
Course Code	CSDL8021		
Faculty Name:	Priya Kaul		
Year	4	**Sem**	VIII

CO Number	**Course Outcome**
CSDL8021.1	To recall the implementation of basic neural network models for learning logic functions.
CSDL8021.2	To explain the design and training process of feedforward neural networks using various learning algorithms.
CSDL8021.3	To develop and implement deep learning models, including Autoencoders, CNNs, RNNs, and LSTMs.
CSDL8021.4	To evaluate the effectiveness of different learning algorithms in designing and training feedforward neural networks.
CSDL8021.5	To assess the performance of deep learning models, identifying strengths and weaknesses in their application.
CSDL8021.6	To Generate innovative solutions by combining knowledge to design and train complex deep learning models for diverse applications.

Course Name:	Major Project		
Course Code	CSP801		
Faculty Name:	Sana Shaikh		
Year	4	**Sem**	VIII

CO Number	**Course Outcome**
CSP801.1	Identify best practices along with effective use of modern tools.
CSP801.2	Relate and Gain expertise that helps in building lifelong learning experience.
CSP801.3	Develop proficiency in oral and written communication with effective leadership and teamwork.
CSP801.4	Analyze impact of solutions in societal and environmental context for sustainable development.
CSP801.5	Justify professional and ethical behavior.
CSP801.6	Implement solutions for the selected problem by applying technical and professional skills.