Department of IT, CAY- (Even semester, 2022-23)

Course Name:	Engineering Mathematics-IV			
Course Code	ITC401			
Faculty name	Satyanarayana Nagula			
Year	2	**Sem**	IV	
CO Number	**Course Outcome**			
ITC401.1	Students will be able to obtain Eigen values and Eigen vectors for a given square matrix			
ITC401.2	Students will be able to (i) Infer properties of Eigen values and Eigen vectors (ii) Check if a matrix is derogatory or not			
ITC401.3	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 Binomial, Poisson and			
ITC401.4	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 standard functions and their			
ITC401.5	Students will be able to (i) Evaluate integrals using Cauchy's theorems (ii) Use Linear and Nonlinear Programming methods to solve optimization problems (iii) Evaluate Z transform using partial and convolution method			
ITC401.6	Students will be able to (i) perform tests of significance for large and small samples Chi-square test to test to check			

Course Name:	Computer Network and Network Design		
Course Code	ITC402		
Faculty Name:	Nilesh G		
Year	2	**Sem**	IV
CO Number	**Course Outcome**		
ITC402.1	Describe the functionalities of each layer of the models and compare the Models.		
ITC402.2	Categorize the types of transmission media and explain data link layer concepts, design issues and protocols.		
ITC402.3	Analyze the routing protocols and assign IP address to networks.		
ITC402.4	Explain the data transportation and session management issues and related protocols used for end to end delivery of data.		
ITC402.5	List the data presentation techniques and illustrate the client/server model in application layer protocols.		
ITC402.6	Use of networking concepts of IP address, Routing, and application services to design a network for an organization		

Course Name:	Operating System		
Course Code	ITC403		
Faculty Name:	Tayyabali Sayyad		
Year	2	**Sem**	IV

CO Number	Course Outcome
ITC403.1	Understand the basic concepts related to Operating System.
ITC403.2	Describe the process management policies and illustrate scheduling of processes by CPU.
ITC403.3	Explain and apply synchronization primitives and evaluate deadlock conditions as handled by Operating System.
ITC403.4	Describe and analyze the memory allocation and management functions of Operating System.
ITC403.5	Analyze and evaluate the services provided by Operating System for storage management.
ITC403.6	Compare the functions of various special-purpose Operating Systems.

Course Name:	Automata Theory		
Course Code	ITC404		
Faculty name	Udaychandra		
Year	2	**Sem**	IV

CO Number	Course Outcome
ITC404.1	Students will be able to list and define various machines , grammars and language
ITC404.2	Students will be able to explain the working of various machines , grammars and language
ITC404.3	Students will be apply concept of acceptor and rejector to various machines.
ITC404.4	Students will be able to analyze various machines, grammar and languages suitability to solve problem.
ITC404.5	Students will able to be select various machines, grammar and languages suitability to solve problem.
ITC404.6	Students will be able to analyze various machines, grammar and languages suitability to solve problem.

Course Name:	Computer Organization and Architecture		
Course Code	ITC405		
Faculty Name:	Janhavi B		
Year	2	**Sem**	IV

CO Number	Course Outcome
ITC405.1	Demonstrate the fundamentals of Digital Logic Design
ITC405.2	Describe basic organization of computer, the architecture of 8086 microprocessor and implement assembly language programming for 8086 microprocessors.
ITC405.3	Demonstrate control unit operations and conceptualize instruction level parallelism.
ITC405.4	List and Identify integers and real numbers and perform computer arithmetic operations on integers.
ITC405.5	Categorize memory organization and explain the function of each element of a memory hierarchy.
ITC405.6	Examine different methods for computer I/O mechanism.

Course Name:	Network lab		
Course Code	ITL401		
Faculty Name:	Nilesh		
Year	2	Sem	IV

CO Number	Course Outcome
ITL401.1	Execute and evaluate network administration commands and demonstrate their use in different network scenarios
ITL401.2	Demonstrate the installation and configuration of network simulator.
ITL401.3	Demonstrate and measure different network scenarios and their performance behavior.
ITL401.4	Implement the socket programming for client server architecture.
ITL401.5	Analyze the traffic flow of different protocols
ITL401.6	Design a network for an organization using a network design tool

Course Name:	Unix Lab		
Course Code	ITL402		
Faculty Name:	Tayyabali		
Year	2	Sem	IV

CO Number	Course Outcome
ITL402.1	Understand the architecture and functioning of Unix
ITL402.2	Identify the Unix general purpose commands
ITL402.3	Apply Unix commands for system administrative tasks such as file system management and user management
ITL402.4	Execute Unix commands for system administrative tasks such as process management and memory management
ITL402.5	Implement basic shell scripts for different applications
ITL402.6	Implement advanced scripts using awk & perl languages and grep, sed, etc. commands for performing various tasks.

Course Name:	Microprocessor Lab		
Course Code	ITL403		
Faculty Name:	Janhavi B.		
Year	2	Sem	IV

CO Number	Course Outcome
ITL403.1	Demonstrate various components and peripheral of computer system
ITL403.2	Analyze and design combinational circuits
ITL403.3	Build a program on a microprocessor using arithmetic & logical instructions of 8086
ITL403.4	Develop the assembly level programming using 8086 loop instruction set

ITL403.5	Write programs based on string and procedure for 8086 microprocessor.
ITL403.6	Design interfacing of peripheral devices with 8086 microprocessor

Course Name:	Python Lab (SBL)		
Course Code	ITL404		
Faculty Name:	Shiv Negi		
Year	2	**Sem**	IV

CO Number	**Course Outcome**
ITL404.1	Understand the structure, syntax, and semantics of the Python language
ITL404.2	Interpret advanced data types and functions in python
ITL404.3	illustrate the concepts of object-oriented programming as used in Python
ITL404.4	Create Python applications using modules, packages, multithreading and exception
ITL404.5	Gain proficiency in writing File Handling programs ,also create GUI applications
ITL404.6	Design and Develop cost-effective robust applications using the latest Python trends

Course Name:	Mini Project – 1 B Based for Python basedautomation projects		
Course Code	ITM401		
Faculty Name:	Shiv Negi		
Year	2	**Sem**	IV

CO Number	**Course Outcome**
ITM401.1	Identify problems based on societal /research needs
ITM401.2	Use standard norms of engineering practices
ITM401.3	Apply Knowledge and skill to solve societal problems in a group
ITM401.4	Excel in written and oral communication.
ITM401.5	Develop interpersonal skills to work as member of a group or leader.
ITM401.6	Demonstrate project management principles during project work.

Course Name:	Data Mining and Business Intelligence		
Course Code	ITC601		
Faculty name	Aruna Khubalkar		
Year	3	Sem	VI

CO Number	Course Outcome
ITC601.1	Identify sources of data for mining. Also define metrics to measure the performance of various data mining algorithms.

ITC601.2	Demonstrate an understanding of the importance of data warehousing and data mining and the principles of business intelligence. Also describe various data mining algorithms.
ITC601.3	Organize and Prepare the data needed for data mining using preprocessing techniques. Also solve appropriate data mining methods like classification, clustering or Frequent Pattern mining on given data sets.
ITC601.4	Perform exploratory analysis of the data to be used for mining.
ITC601.5	Evaluate different data mining methods like classification, clustering or Frequent Pattern mining.
ITC601.6	Design BI to solve practical problem : Analyze the problem domain, data and interpret / visualize the results and provide decision support.

Course Name:	Web X.0		
Course Code	ITC602		
Faculty name	Vaishali K.		
Year	3	**Sem**	VI

CO Number	**Course Outcome**
ITC602.1	Understand the basic concepts related to web analytics and semantic web.
ITC602.2	Understand how TypeScript can help you eliminate bugs in your code and enable you to scale your code.
ITC602.3	Understand AngularJS framework and build dynamic, responsive single-page web applications.
ITC602.4	Apply MongoDB for frontend and backend connectivity using REST API.
ITC602.5	Apply Flask web development framework to build web applications with less code.
ITC602.6	Develop Rich Internet Application using proper choice of Framework.

Course Name:	Wireless Technology		
Course Code	ITC603		
Faculty name	Tayyabali Sayyad		
Year	3	**Sem**	VI

CO Number	**Course Outcome**
ITC603.1	Describe the basic concepts of Wireless Network and Wireless Generations
ITC603.2	Demonstrate and Evaluate the various Wide Area Wireless Technologies
ITC603.3	Analyze the prevalent IEEE standards used for implementation of WLAN and WMAN Technologies
ITC603.4	Appraise the importance of WPAN, WSN and Ad-hoc Networks
ITC603.5	Analyze various Wireless Network Security Standards
ITC603.6	Review the design considerations for deploying the Wireless Network Infrastructure

Course Name:	AI and DS – 1		
Course Code	ITC604		
Faculty name	Sunantha K.		
Year	3	Sem	VI

CO Number	Course Outcome
ITC604.1	Develop a basic understanding of the building blocks of AI as presented in terms of intelligent agents.
ITC604.2	Apply an appropriate problem-solving method and knowledge-representation scheme
ITC604.3	Develop an ability to analyse and formalize the problem (as a state space, graph, etc). They will be able to evaluate and select the appropriate search method.
ITC604.4	Apply problem solving concepts with data science and will be able to tackle them from a statistical perspective.
ITC604.5	Choose and apply appropriately from a wider range of exploratory and inferential methods for analysing data and will be able to evaluate and interpret the results contextually
ITC604.6	Understand and apply types of machine learning methods for real world problems.

Course Name:	Ethical Hacking and Forensic		
Course Code	ITDLO-II-6014		
Faculty name	Janhavi Baikerikar		
Year	3	Sem	VI

CO Number	Course Outcome
ITDO6014.1	Define the concept of ethical hacking and its associated applications in Information Communication Technology (ICT) world.
ITDO6014.2	Underline the need of digital forensic and role of digital evidences
ITDO6014.3	Explain the methodology of incident response and various security issues in ICT world, and identify digital forensic tools for data collection
ITDO6014.4	Recognize the importance of digital forensic duplication and various tools for analysis to achieve adequate perspectives of digital forensic investigation in various applications /devices like Windows/Unix system.
ITDO6014.5	Apply the knowledge of IDS to secure network and performing router and network analysis
ITDO6014.6	List the method to generate legal evidence and supporting investigation reports and will also be able to use various digital forensic tools

Course Name:	BI Lab		
Course Code	ITL601		
Faculty name	Aruna Khubalkar		
Year	3	Sem	VI

CO Number	Course Outcome

ITL601.1	Identify sources of Data for mining
ITL601.2	Organize the data needed for data mining algorithms in terms of attributes and class inputs, training, validating, and testing files.
ITL601.3	Prepare the data needed for data mining algorithm. Also Implement the appropriate data mining methods like classification, clustering or association mining on large data sets using open source tools like WEKA or languages like
ITL601.4	Perform data exploration to prepare data for data mining.
ITL601.5	Evaluate and compare performance of some available BI packages.
ITL601.6	Apply BI to solve practical problems : Analyze the problem domain, use the data collected in enterprise apply the appropriate data mining technique, interpret and visualize the results and provide decision support.

Course Name:	Web Lab		
Course Code	ITL602		
Faculty name	Vaishali K.		
Year	3	Sem	VI

CO Number	**Course Outcome**
ITL602.1	Understand open source tools for web analytics and semantic web apps development & deployment.
ITL602.2	Understand the basic concepts of TypeScript for designing web applications.
ITL602.3	Implement Single Page Applications using AngularJS Framework.
ITL602.4	Develop Rich Internet Applications using AJAX.
ITL602.5	Create REST Web services using MongoDB.
ITL602.6	Design web applications using Flask.

Course Name:	Sensor Lab		
Course Code	ITL603		
Faculty name	Prof Vaishali		
Year	3	Sem	VI

CO Number	**Course Outcome**
ITL603.1	Differentiate between various wireless communication technologies based on the range of communication, cost, propagation delay, power and throughput.
ITL603.2	Conduct a literature survey of sensors used in real world wireless applications.
ITL603.3	Demonstrate the simulation of WSN using the Network Simulators (Contiki/Tinker CAD/ Cup carbon etc)
ITL603.4	Demonstrate and build the project successfully by hardware/sensor requirements, coding, emulating and testing
ITL603.5	Report and present the findings of the study conducted in the preferred domain
ITL603.6	Demonstrate the ability to work in teams and manage the conduct of the research study.

Course Name:	MAD & PWA Lab		
Course Code	ITL604		
Faculty name	Nilesh G.		
Year	3	Sem	VI

CO Number	**Course Outcome**
ITL604.1	Define the basics of the Flutter framework and concepts of PWA.
ITL604.2	Understand cross platform mobile application development using Flutter framework and various PWA frameworks
ITL604.3	Use of dart language to develop flutter application and PWA applications
ITL604.4	Analyze and Build production ready Flutter App by incorporating backend services
ITL604.5	Choose appropriate libraries for problem solving
ITL604.6	Design, Develop a responsive User Interface by applying PWA Design techniques and interactive Flutter App and

Course Name:	DS using Python Skill based Lab		
Course Code	ITL605		
Faculty name	Sunantha K.		
Year	3	Sem	VI

CO Number	**Course Outcome**
ITL605.1	Understand the concept of Data science process and associated terminologies to solve real-world problems.
ITL605.2	Analyze the data using different statistical techniques and visualize the outcome using different types of plots
ITL605.3	Analyze and apply the supervised machine learning techniques like Classification, Regression or Support Vector Machine on data for building the models of data and solve the problems.
ITL605.4	Apply the different unsupervised machine learning algorithms like Clustering, Decision Trees, Random Forests or Association to solve the problems
ITL605.5	Design and Build an application that performs exploratory data analysis using Apache Spark.
ITL605.6	Design and develop a data science application that can have data acquisition, processing, visualization and statistical analysis methods with supported machine learning technique to solve the real-world problem

Course Name:	Mini Project – 2 B Based on ML		
Course Code	ITM601		
Faculty name	Sunantha K.		
Year	3	Sem	VI

CO Number	**Course Outcome**
ITM605.1	Identify problems based on societal /research needs.

ITM605.2	Apply Knowledge and skill to solve societal problems in a group.
ITM605.3	Develop interpersonal skills to work as member of a group or leader.
ITM605.4	Draw the proper inferences from available results through theoretical/ experimental/simulations
ITM605.5	Analyse the impact of solutions in societal and environmental context for sustainable development
ITM605.6	Use standard norms of engineering practices
ITM605.7	Excel in written and oral communication.
ITM605.8	Demonstrate capabilities of self-learning in a group, which leads to life long learning
ITM605.9	Demonstrate project management principles during project work.

Course Name:	Blockchain and DLT		
Course Code	ITC801		
Faculty name	Sushree S.		
Year	4	**Sem**	VIII

CO Number	**Course Outcome**
ITC801.1	List the basic Terms & definition of Blockchain and Distributed Ledger Technology.
ITC801.2	Interpret the knowledge of the Bitcoin network, nodes, keys, wallets and transactions
ITC801.3	Select smart contracts in Ethereum using different development frameworks.
ITC801.4	Compare smart contracts in Ethereum using different development frameworks.
ITC801.5	Summarize different Crypto assets and Crypto currencies
ITC801.6	Develop applications in permissioned Hyperledger Fabric network.

Course Name:	Big Data Analytics		
Course Code	ITDO8011		
Faculty name	Udaychandra Nayak		
Year	4	**Sem**	VIII

CO Number	**Course Outcome**
ITDO8011.1	To provide an overview of an exciting growing field of Big Data analytics.
ITDO8011.2	To discuss the challenges traditional data mining algorithms face when analyzing Big Data.
ITDO8011.3	To introduce the tools required to manage and analyze big data like Hadoop, NoSql MapReduce.
ITDO8011.4	To teach the fundamental techniques and principles in achieving big data analytics with scalability and streaming, capability.
ITDO8011.5	To introduce to the students several types of big data like social media, web graphs and data streams.

ITDO8011.6	To enable students to have skills that will help them to solve complex real-world problems in decision support.

Course Name:	Clould Computing and Services		
Course Code	ITDO8024		
Faculty name	Sushree S.		
Year	4	**Sem**	VIII

CO Number	**Course Outcome**
ITDO8024.1	List the basics terms of cloud computing like service models, deployment models and its architecture.
ITDO8024.2	Describe and apply virtualization in cloud computing.
ITDO8024.3	Illustrate different cloud computing services .
ITDO8024.4	Compare various services provided by Amazon Web Services cloud platform.
ITDO8024.5	Summarize the functionality of Openstack cloud platform & Severless computing.
ITDO8024.6	Formulate a plan to mitigate security and privacy concerns in cloud computing.

Course Name:	Blockchain Lab		
Course Code	ITL801		
Faculty name	Sushree S.		
Year	4	**Sem**	VIII

CO Number	**Course Outcome**
ITL801.1	List smart contract on local Blockchain.
ITL801.2	Understand smart contract on Ethereum test networks.
ITL801.3	Deploy smart contract using Remix IDE and Metamask.
ITL801.4	Compare Cryptocurrency contracts.
ITL801.5	Evaluate chain code in Hyperledger Fabric.
ITL801.6	Develop and test a Full-fledged DApp using Ethereum/Hyperledger.

Course Name:	Cloud Computing		
Course Code	ITL802		
Faculty name	Sushree S.		
Year	4	**Sem**	VIII

CO Number	**Course Outcome**
ITL802.1	List different types of virtualization techniques.

ITL802.2	Understand various cloud computing service models
ITL802.3	Select commercial CSP
ITL802.4	Analyze major security issues in the cloud
ITL802.5	Evaluate various commercially available cloud services and recommend the appropriate one for the given application.
ITL802.6	Design the cloud config for given problem with cost estimate.

Course Name:	Major Project-II			
Course Code	ITP801			
Faculty name	Sunantha K.			
Year	4	Sem	VIII	

CO Number	**Course Outcome**
ITM801.1	Identify problems based on societal /research needs.
ITM801.2	Apply Knowledge and skill to solve societal problems in a group
ITM801.3	Develop interpersonal skills to work as member of a group or leader.
ITM801.4	Draw the proper inferences from available results through theoretical/ experimental/simulations
ITM801.5	Analyse the impact of solutions in societal and environmental context for sustainable development.
ITM801.6	Use standard norms of engineering practices
ITM801.7	Excel in written and oral communication
ITM801.8	Demonstrate capabilities of self-learning in a group, which leads to life long learning
ITM801.9	Demonstrate project management principles during project work