Course Outcomes

Computer Science and Engineering (Data Science)

2022-26 Batch

1**. Course Name: Engineering Mathematics-I**

Course Code: 4MATH1011

CO1: Apply the knowledge of calculus to analyse and approximate the functions.

CO2: Calculate rates of change of multivariate functions.

CO3: Solve multiple integrals for computing area and volume.

CO4: Make use of Gradient, divergence and curl for solving Engineering problems.

CO5: Use the concept vector integration to solve the flow problems.

2. Course Name: Engineering Physics

Course Code: 4PHYS1011

CO1: Plot the I-V characteristics of photo-diode, LED and solar cells.

CO2: Make use of Lasers and Optical fibres for different industrial applications.

CO3: Explain the use of Semiconducting and Superconducting materials for different engineering applications.

CO4: Analyze the applications of quantum mechanics in technology.

CO5: Analyze the results obtained in different experiments.

3. Course Name: Elements Of Electrical Engineering

Course Code: 4ENEE1081

CO1: Analyze electrical circuits by relevant Laws in DC circuits.

CO2: Demonstrate the single phase and three-phase power generation by using the phasor diagrams.

CO3: Analyze digital circuits

CO4: Demonstrate the knowledge of Karnaugh maps by simplifying the algebraic equations and design the combinational circuits.

4. Course Name: Elements Of Computer Engineering

Course Code: 4CSGC1011

CO1: Demonstrate functioning of different sub-systems, OS and different types of OS.

CO2: Use different types of data structures, operations and algorithms.

CO3: Describe the fundamental elements of relational database management systems.

CO4: Comprehend the layered protocol model & Classification of networks.

CO5: Demonstrate need for Linux OS and Linux commands.

5. Course Name: Computer Aided Engineering Drawing

Course Code: 4ENME1011

CO1: Illustrate competence in basics of orthographic projections of points, lines, planes and solids in three different views.

CO2: Apply the concepts of orthographic projections for simple objects.

CO3: Develop surfaces of solids of simple objects.

6. Course Name: Engineering Mathematics II

Course Code: 4MATH1021

CO1: Solve first order linear ordinary differential equations

CO2: Solve higher order differential equations arising through physical processes.

CO3: Construct a variety of partial differential equations and solve them.

CO4: Use periodic signals to represent periodic functions in the form of Fourier series.

CO5: Make use of matrix theory for solving system of linear equations.

7. Course Name: Engineering Chemistry

Course Code: 4CHEM1012

CO1: Explain the construction and working of Energy storage devices.

CO2: Explain corrosion of metals, factors and prevention techniques.

CO3: Explain the importance of the modern emerging field of nanotechnology.

CO4: Use instruments which give quick and accurate results for material analysis.

CO5: Carry out different types of titrations for estimation of concentration of an analyte.

8. Course Name: Elements Of Mechanical Engineering and Workshop

Course Code: 4ENME1022

CO1: Recognizes the impact of energy sources on the environment and sustainability.

CO2: Explain the working principles of water, vapour and gas-powered systems.

CO3: Discuss the working principles of refrigeration systems and IC engines.

CO4: Compute various performance parameters of IC engines.

CO5: Demonstrate soldering, brazing and welding of sheet metal & welded joints.

9. Course Name: Elements Of Civil Engineering

Course Code: 4ENCV1011

CO1: Explain the basics of Civil Engineering and related fields.

CO2: Develop working models with the laws of mechanics.

CO3: Analyze equilibrium of coplanar, concurrent and non-concurrent forces.

CO4: Determine centroid and moment of inertia of simple geometric figures.

CO5: Apply D'Alembert's principle in any specific application.

10. Course Name: Problem Solving Using Python

Course Code: 4CSPL1011

CO1: Understand the basis of algorithm problem solving

CO2: Read/Write simple simple python programs

CO3: Develop python programs with conditionals and loops

CO4: Use python functions and python data structures

CO5: Read and write data from/to files in python programs

11.Course Name: Engineering Mathematics-III

Course code : 4MATH2131

CO1: Explain the propositional, predicate logic and truth table by evaluating correctness of argument

CO2: Discuss the type of relationship and apply the knowledge using the Hasse diagram.

CO3: Demonstrate the knowledge of combinatorics by solving relevant problems.

CO4: Apply binomial, Poisson, normal and exponential probability distributions to solve engineering problem

CO5: Construct elementary regression models by the method of least squares

12. Course Name: Problem Solving And Programming Using C

Course code : 4CSPL1111

CO1: Explain the basic computer concepts and programming principles of C language

CO2: Develop C programs to solve simple mathematical, engineering problems using conditionals and looping constructs

CO3: Develop C programs to demonstrate the applications of arrays in C

CO4: Execute programs to demonstrate the basic concepts of Strings and Pointers

CO5: Develop C programs to demonstrate the applications of functions in C

13. Course Name: Data Structures

Course code : 4CSPL1022

CO1: Choose appropriate data structure as applied to specified problem Definition

CO2: Handle operations like searching, insertion, deletion, traversing mechanism etc. on various data structures

CO3: Apply concepts learned in various domains like DBMS, compiler etc.

CO4: Use linear and non-linear data structures like stacks, queues, linked lists

CO5: write the programs using data structures in any programming language

14. Course Name: Introduction to Artificial Intelligence

Course code : 4AIML1011

CO1 : Elucidate the basic concepts of Artificial Intelligence
CO2 : Analyze Artificial Intelligence techniques, such as search algorithms, for problem solving
CO3 : Apply techniques of Knowledge Representation and Planning
CO4 : Apply knowledge of reasoning in the presence of in complete or uncertain information
CO5 : Explain different forms of Learning L2

15. Course Name: WEB DEVELOPMENT USING PYTHON AND DJANGO

Course code : 4CSPL2011

CO1: Create database using SQLite.

CO2: Create web client programs using python.

CO3: Create web server programs using python.

CO4: Create a website using the Django framework.

CO5:Create to-do applications using Django and React JS.

16. Course Name: Engineering Mathematics IV

Course code : 4MATH2021

CO1 : Explain the concept of testing of hypothesis for small and large samples
CO2 : Apply the knowledge and skills of numerical methods to solve algebraic and transcendental equations
CO3 : Apply the simplex algorithm to solve a linear programming problem

CO4: Solve linear recurrence relations by recognizing homogeneity, linearity and constant co-efficients

CO5: Explain the basic concepts of graph theory.

17. Course Name: PYTHON FOR DATA SCIENCE(P) (MOOC)

Course code : 4CSPL3011

CO1 : Analyze data science applications
CO2 : Apply data collection and wrangling technique
CO3 : Analyze how to manipulate the uncharted data sets using NumPy
CO4 : Analyze how to manipulate the uncharted data sets using Pandas
CO5 : ply visualization techniques

18. Course Name: Database Management Systems

Course code : 4CSGC2021

CO1: Differentiate database systems from file system by understanding the features of database system and design a ER model for a database system
CO2: Develop solutions to a broad range of query and data update problems using relational algebra and SQL.
CO3: Apply the normalization theory in relational databases for removing anomalies.
CO4:Compare database storage and access techniques for file organization, index ing methods
CO5:.Analyze the basic issues of transaction processing and concurrency control.

19. Course Name: Inferential Statistics

Course Code: 4CSDS2011

CO1: To apply concepts of probability such as Axioms of Probability, Association Rule Mining and Baye's Theorem, Random variables, mathematical expectation, variance, discrete and continuous distributions.
CO2: To apply and visualize, concepts of distributions such as Binomial, Normal, Poisson, Geometric, Uniform , Exponential, Chi-Square, Student's t-distribution and F-distribution
CO3: To apply the concepts of sampling, Central Limit Theorem, Maximum Likelihood Estimation and Confidence Intervals.
CO4:To use Hypothesis Testing.
CO5:To apply ANOVA and correlation analysis

20. Course Name: Data Visualization

Course Code: 4CSDS2021

CO1:Explain the basic concepts of data visualization
CO2:Analyze the basic visualization tools to understand the data
CO3;Apply specialized visualization tools to make effective decisions
CO4:Illustrate the advanced visualization tools
CO5:Analyze geospatial data using visualization tools

21. Course Name: MAKINGWITHELECTRONICS

Course Code: CPSES1011

CO1: Demonstrate the interfacing of basic input and output devices using Arduino.
CO2: Explain the working principles of various sensors and renewable energy sources.
CO3: Apply the understanding of Arduino programming by interfacing sensors and communication devices.
CO4:Demonstrate the interfacing of basic input and output devices using Raspberry Pi.
CO5:Analyze and Build area l-time application employing Arduino/RaspberryPi

22. Course Name: Operating System for DS

Course Code: 4CSDS1011

CO1:Students will be able to explain the key principles and functions of operating systems, including process management, memory management, and file systems
CO2:Students will demonstrate the ability to apply various scheduling algorithms and evaluate their performance characteristics through simulations and experiments.
CO3:Students will develop skills in using operating system tools and commands to monitor and manage system resources effectively.
CO4:.Students will design and implements operating system components, such as process schedulers or memory allocators, to solve practical problems.
CO5:Students will analyze case studies and research papers on advanced operating system topics, critically evaluate their implications, and propose solutions to complex engineering problems.

23. Course Name: No-SQLDatabase

Course Code: 4CSDS3042

CO1: Understand the fundamental concepts and principles of No SQL databases, including their advantages over traditional relational databases.
CO2: Gain practical knowledge of Hadoop Distributed File System (HDFS) and its deployment in various configuration.
CO3: Develop proficiency in using Apache Hive for data warehousing and analysis, including creating tables, querying data, and integrating with other big data processing frameworks
CO4: Master the configuration and usage of HB as for storing and managing large-scaled istributed data with efficient data modeling techniques.
CO5: Acquire comprehensive knowledge of Mongo DB, including its data model, replication mechanisms, query language, and scalability features.

24. Course Name: BigDataAnalytics(P)

Course Code: 4CSDS2051

CO1:Understand the fundamental concepts of big data analytics and its significance in various industries.
CO2:Analyze large volumes of structured and unstructured data using appropriate tools and techniques.
CO3:Design and implement scalable data processing pipelines for big data analytics applications.
CO4:Evaluate and apply advanced machine learning algorithms to extract insights and patterns from big data.
CO5:Develop practical skills in handling real-world big data challenges and deploying analytical solutions

25. Course Name: DIGITALIMAGEPROCESSING

Course Code: 4AIML3101

CO1:Discuss digital image fundamentals.
CO2:Articulate image enhancement and restoration techniques.
CO3:Examining image compression Techniques.
CO4:Implementing image segmentation Techniques.
CO5:Representation and recognition of images.

26. Course Name: DataMiningforAI(MOOC)

Course Code: 4AIML3111

CO1:To have knowledge in Data mining concepts
CO2:To apply Data mining concepts in different fields
CO3:Understanding of different types of Algorithms
CO4:Implementing Data mining Techniques
CO5:Understanding of differences between the data mining algorithms

27. Course Name: RLanguage(MOOC)

Course Code: 4AIML3121

CO1: Understand the Installation steps and fundamental functions of R language
CO2: Apply the Conditional constructs and data management in data processing
CO3: Use the data management concepts in the programming
CO4:Understand the Data Frames and its use in data processing
CO5:Apply the data visualization tools to plot the data in different formats

28. Course Name: Cryptography(MOOC)

Course Code: 4CSGC3041

CO1: Explain the different concepts of cryptography
CO2:Describe the principles of symmetric and asymmetric cryptography
CO3: To apply the asymmetric key encipherment techniques
CO4:To apply the concepts of hashing algorithms
CO5:Understanding the real life examples of Cryptography

29. Course Name: Software Security (MOOC)

Course Code: 4CSGC3051

CO1: Understand the basics of secure programming

CO2: Understand the most frequent programming errors leading to software vulnerabilities

CO3: Identify and analyze security problems in software

CO4: To fix software flaws and bugs in various software

CO5: Understanding to prevent the cybercrime

30. Course Name: Secure Coding

Course Code: 4CSGC3061

CO1: Understand the concept of secure programming

CO2: Design and develop of secure programming Concept

CO3: Apply the Robust Programming concept in token generation

CO4: Implement and develop some case studies

CO5:Analyze and use some test method for detecting flaws

31. Course Name: Advanced Java

Course Code: 4CSPL3041

CO1: Understand and implement advanced Java concepts

CO2: Design and implement server-side programs using Servlets and JSP

CO3: Implements applications using Java Server Faces

CO4: Incorporate cutting-edge frameworks in web application development

CO5: Design and implementation of ORM mapping using Hibernates

32. Course Name: Scripting Languages

Course Code: 4CSPL3051

CO1: Comprehend the differences between typical scripting languages and typical system and application programming languages.

CO2: Gain knowledge of the strengths and weakness of Perl, TCL and Ruby; and select an appropriate language for solving a given problem.

CO3: Acquire programming skills in scripting language.

CO4: Understanding the text manipulation through Perl

CO5: Understanding of how applications communicating with each other and how a widget toolkit used for building GUI in many languages.

33. Course Name: Kotlin (OO+ Functional) (MOOC)

Course Code: 4CSPL3061

CO1: To learn a readable, pragmatic, safe, and interoperable programming language

CO2: To think about nullability from the start by integrating nullability into the type system

CO3: Acquire programming skills in Kotlin

CO4: Understanding the Android development through Kotlin

CO5: To aid scalability in large-scale software development

34. Course Name: Network Programming in Unix & C

Course Code: 4CSPL3071

CO1: Identify interfaces and frameworks for developing network applications.

CO2: Solve the socket functions for data communication.

CO3: Design TCP echo client server program.

CO4: Develop UDP Client Server programs using socket functions.

CO5: Analyze the difference between broadcast and multicast programs.

35. Course Name: Python for Networking

Course Code: 4CSPL3081

CO1: Demonstrate the basic elements of a relational database management system.

CO2: Identify the data models for relevant problems

CO3: Design entity relationship and convert entity relationship diagrams into RDBMS and formulate SQL queries on the respect data into RDBMS and formulate SQL queries on the data.

CO4: Demonstrate their understanding of key notions of query evaluation and optimization techniques.

CO5: Extend normalization for the development of application softwares.

36. Course Name: Client-Server Technologies

Course Code: 4CSGC3071

CO1: Recognize and describe the working of Computer Networks, Client server computing.

CO2: Illustrate reference models with layers, protocols and interfaces.

CO3: Summarize functionalities of different Layers.

CO4: Combine and distinguish functionalities of different Layers.

CO5: Model the Client- Server computing using different media.

37. Course Name: Multivariate Statistical Analysis For DS

Course Code : 4CSDS2071

CO1 : Demonstrate proficiency in visualizing and exploring multivariate datasets.

CO2 : Perform multivariate analysis of variance (MANOVA) and interpret results.

CO3 : Build and validate multivariate linear regression models to analyze relationships between multiple variables.

CO4 : Apply multivariate statistical methods for classification and clustering tasks.

CO5 : Evaluate and interpret results of multivariate analysis using appropriate statistical techniques.

38. Course Name : Mobile Application Development

Course Code : 4CSGC2051

CO1 : Demonstrate proficiency in developing mobile applications for Android and iOS platforms.
CO2 : Design intuitive and user-friendly mobile user interfaces (UI) following best practices.
CO3 : Develop cross-platform mobile applications using frameworks like Flutter.
CO4 : Test and debug mobile applications to ensure functionality, performance, and reliability.
CO5 : Deploy mobile applications to app stores and understand the app monetization process.

39. Course Name : Machine Learning for Beginners

Course Code : 4CSGC2101

CO1 : Demonstrate proficiency in implementing and evaluating supervised and unsupervised learning algorithms.
CO2 : Apply model evaluation techniques and strategies to select optimal machine learning models.
CO3 : Explore real-world applications of machine learning and understand their impact on various industries.
CO4 : Develop and present machine learning solutions using real-world datasets.
CO5 : Gain practical experience and confidence in applying machine learning techniques to solve real-world problems.

40. Course Name : Advanced Python for Artificial Intelligence

Course Code : 4AIML3141

CO1 : Demonstrate proficiency in applying advanced Python concepts to artificial intelligence projects.
CO2 : Manipulate and analyze data efficiently using NumPy and Pandas in artificial intelligence tasks.
CO3 : Implement machine learning algorithms and evaluate model performance using scikit-learn.
CO4 : Build and train deep learning models using TensorFlow and Keras for various artificial intelligence applications.
CO5 : Apply natural language processing techniques to analyze and process text data for artificial intelligence tasks.

41. Course Name : Recommender Systems

Course Code : 4AIML2081

CO1 : Demonstrate an understanding of various recommendation algorithms and their applications.
CO2 : Implement collaborative filtering, content-based filtering, and hybrid recommender systems using Python.
CO3 : Evaluate the performance of recommender systems using appropriate evaluation metrics and techniques.
CO4 : Explore advanced topics in recommender systems and apply them to solve real-world recommendation problems.
CO5 : Develop practical skills in building and deploying recommender systems for personalized recommendations.

42. Course Name : Introduction to Pattern Recognition

Course Code : 4AIML3151

CO1 : Demonstrate an understanding of various pattern recognition algorithms and their applications.
CO2 : Implement feature extraction, selection, and representation techniques for pattern recognition tasks.
CO3 : Evaluate the performance of classification and clustering algorithms using appropriate metrics.
CO4 : Explore advanced topics in pattern recognition and apply them to solve real-world problems.
CO5 : Develop practical skills in building and deploying pattern recognition systems for different applications.

43. Course Name : Ethical Hacking

Course Code : 4CSGC3141

CO1 : Demonstrate an understanding of ethical hacking concepts, methodologies, and techniques.
CO2 : Perform reconnaissance, scanning, enumeration, exploitation, and post-exploitation techniques using ethical hacking tools.
CO3 : Identify and exploit common vulnerabilities in systems and networks.
CO4 : Analyze security weaknesses and recommend remediation measures based on ethical hacking assessments.
CO5 : Apply ethical hacking principles and practices to enhance the overall security posture of organizations.

44. Course Name : Malware Analysis

Course Code : 4CSGC3151

CO1 : Demonstrate an understanding of malware analysis concepts, techniques, and tools. CO2 : Perform static and dynamic analysis of malware samples to identify malicious behavior.
CO3 : Extract and analyze indicators of compromise (IOCs) for threat detection and mitigation.
CO4 : Apply behavioral analysis and reverse engineering techniques to understand malware behavior.
CO5 : Develop practical skills in malware triage, incident response, and threat intelligence analysis.

45. Course Name : Object Oriented Analysis Design

Course Code : 4CSPL3111

CO1: To learn a readable, pragmatic, safe, and interoperable programming language
CO2: To think about nullability from the start by integrating nullability into the type system
CO3: Acquire programming skills in Kotlin
CO4: Understanding the Android development through Kotlin
CO5: To aid scalability in large-scale software development

46. Course Name : Application Development using MERN Stack

Course Code : 4CSPL3131

CO1 :Demonstrate proficiency in backend API development using Node.js and Express.js.
CO2 :Develop interactive user interfaces and SPAs using React and React hooks.
CO3 : Implement authentication and authorization mechanisms in MERN stack applications.
CO4 : Perform database operations and data manipulation using MongoDB.
CO5 : Develop and deploy full-stack web applications using the MERN stack

47. Course Name : Advanced Computer Networks

Course Code : 4CSPL3081

CO1 : Demonstrate an understanding of advanced network protocols and their configuration in network devices.
CO2 : Implement Quality of Service (QoS) policies and traffic engineering mechanisms to optimize network performance.
CO3 : Design and implement network security solutions using cryptographic algorithms and secure protocols.
CO4 ; Deploy and manage Software-Defined Networking (SDN) infrastructure for network automation and orchestration.
CO5 : Configure and manage network virtualization and cloud networking environments for scalable network deployments.

48. Course Name : Wireless Technologies

Course Code : 4CSGC3161

CO1 : Demonstrate an understanding of wireless communication principles and protocols.
CO2 : Configure and secure wireless networks using Wi-Fi, Bluetooth, and cellular standards.
CO3 : Design and deploy wireless sensor networks (WSNs) for monitoring and control applications.
CO4 : Analyze and optimize the performance of wireless communication systems.
CO5 : Explore emerging trends in wireless technologies and their applications in real-world scenarios

49. Course Name : Multimedia Networking

Course Code : 4CSPL3171

CO1 : Demonstrate an understanding of multimedia networking principles and protocols.
CO2 : Configure and troubleshoot multimedia streaming solutions and QoS mechanisms.
CO3 : Design and implement multimedia security solutions for protecting multimedia content.
CO4 :Analyze multimedia traffic patterns and performance metrics in network simulations.
CO5 :Explore multimedia applications and evaluate their impact on networked systems.

Course Outcomes

Computer Science and Engineering (Data Science)

2023-27 Batch

1. **Course Name: Engineering Mathematics-I**

   Course Code: 4MATH1011

   CO1: Apply the knowledge of calculus to analyse and approximate the functions.

   CO2: Calculate rates of change of multivariate functions.

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   CO5: Use the concept vector integration to solve the flow problems.

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   CO1: Plot the I-V characteristics of photo-diode, LED and solar cells.

   CO2: Make use of Lasers and Optical fibres for different industrial applications.

   CO3: Explain the use of Semiconducting and Superconducting materials for different engineering applications.

   CO4: Analyze the applications of quantum mechanics in technology.

   CO5: Analyze the results obtained in different experiments.

3. **Course Name: Elements of Electrical and Electronics Engineering**

   Course Code: 4ENEE1081

   CO1: Analyze electrical circuits by relevant Laws in DC circuits.

   CO2: Demonstrate the single phase and three-phase power generation by using the phasor diagrams.

   CO3: Analyze digital circuits

   CO4: Demonstrate the knowledge of Karnaugh maps by simplifying the algebraic equations and design the combinational circuits.

4. Course Name: Elements of Computer Engineering

Course Code: 4CSGC1011

CO1: Demonstrate functioning of different sub-systems, OS and different types of OS.

CO2: Use different types of data structures, operations and algorithms.

CO3: Describe the fundamental elements of relational database management systems.

CO4: Comprehend the layered protocol model & Classification of networks.

CO5: Demonstrate the need for Linux OS and Linux commands.

5. Course Name: Computer Aided Engineering Drawing

Course Code: 4ENME1011

CO1: Illustrate competence in basics of orthographic projections of points, lines, planes and solids in three different views.

CO2: Apply the concepts of orthographic projections for simple objects.

CO3: Develop surfaces of solids of simple objects.

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Course Code: 4MATH1021

CO1: Solve first order linear ordinary differential equations

CO2: Solve higher order differential equations arising through physical processes.

CO3: Construct a variety of partial differential equations and solve them.

CO4: Use periodic signals to represent periodic functions in the form of Fourier series.

CO5: Make use of matrix theory for solving system of linear equations.

7. Course Name: Engineering Chemistry

Course Code: 4CHEM1012

CO1: Explain the construction and working of Energy storage devices.

CO2: Explain corrosion of metals, factors and prevention techniques.

CO3: Explain the importance of the modern emerging field of nanotechnology.

CO4: Use instruments which give quick and accurate results for material analysis.

CO5: Carry out different types of titrations for estimation of concentration of an analyte

8. Course Name: Elements Of Mechanical Engineering and Workshop

Course Code: 4ENME1022

CO1: Recognizes the impact of energy sources on the environment and sustainability.
CO2: Explain the working principles of water, vapour and gas-powered systems.
CO3: Discuss the working principles of refrigeration systems and IC engines.
CO4: Compute various performance parameters of IC engines.
CO5: Demonstrate soldering, brazing and welding of sheet metal & welded joints.

9. Course Name: Elements of Civil Engineering

Course Code: 4ENCV1011

CO1: Explain the basics of Civil Engineering and related fields.
CO2: Develop working models with the laws of mechanics.
CO3: Analyze equilibrium of coplanar, concurrent and non-concurrent forces.
CO4: Determine centroid and moment of inertia of simple geometric figures.
CO5: Apply D'Alembert's principle in any specific application.

10. Course Name: Problem Solving Using Python

Course Code: 4CSPL1011

CO1: Understand the basis of algorithm problem solving
CO2: Read/Write simple python programs
CO3: Develop python programs with conditionals and loops
CO4: Use python functions and python data structures
CO5: Read and write data from/to files in python programs

11. Course Name: Probability and Statistics
Course code :4MATH2041

CO1: Apply Binomial and Normal distribution concepts to solve probability problems
CO2: Apply the knowledge of covariance and correlation to solve joint probability problems
CO3: Explain the concept of testing of hypothesis for small and large samples
CO4: Solve continuous and discontinuous piecewise linear functions using linear least square
CO5: Apply least square techniques in solving various engineering problems

12. Course Name: Programming in C and Data Structures

Course code :4CSPL1121

CO1: Explain the basic computer concepts and programming principles of C language
CO2: Develop C programs to solve simple mathematical, engineering problems using conditionals and looping constructs
CO3: Use different types of data structures, operations and algorithms
CO4: Use different types of data structures, operations and algorithms
CO5: Implement and utilize stack, queue, linked list, tree, and graph data structures in problem solving

13. Course Name: Artificial Intelligence

Course code : 4AIML1022

CO1: Elucidate the basic concepts of Artificial Intelligence
CO2: Analyze Artificial Intelligence techniques, such as search algorithms, for problem solving.
CO3: Apply techniques of Knowledge Representation and Planning.
CO4: Apply knowledge of reasoning in the presence of incomplete or uncertain information.
CO5: Explain different forms of Learning.

14. Course Name: DATA VISUALIZATION

Course code : 4CSDS202

CO1: Explain The basic concepts of data visualization
CO2: Analyze the basic visualization tools to understand the data
CO3: Apply specialized visualization tools to make effective decisions
CO4: Illustrate the advanced visualization tools
CO5: Analyze geospatial data using visualization tools

15. Course Name: Discrete Mathematics and Combinatorics

Course code: 4MATH2051

CO1: Explain the propositional, predicate logic and truth table by evaluating correctness of argument. -L2

CO2: Discus the type of relationship and apply the knowledge using the Hasse diagram. L2

CO3: Demonstrate the knowledge of combinatorics by solving relevant problems. - L2

CO4: Explain the basic concepts of graph theory. L2

CO5: Solve linear recurrence relations by recognizing homogeneity, linearity and constant coefficients. L3

16. Course Name: Database Management Systems

Course code:4CSGC2021

CO1: Differentiate database systems from file system by understanding the features of database system and design a ER model for a database system.

CO2: Develop solutions to a broad range of query and data update problems using relational algebra and SQL.

CO3: Apply The Normalization Theory in relational databases for removing anomalies.

CO4: Compare database storage and access techniques for file organization, indexing methods.

CO5: Analyze the basic issues of transaction processing and concurrency control.

17. Course Name: Introduction to Big Data Analytics

Course code:4CSDS2054

CO1: Understand the fundamental concepts of big data analytics and its significance in various industries.

CO2: Analyze large volumes of structured and unstructured data using appropriate tools and techniques.

CO3: Design and implement scalable data processing pipelines for big data analytics applications.

CO4: Evaluate and apply advanced machine learning algorithms to extract insights and patterns from big data.

CO5: Develop practical skills in handling real-world big data challenges and deploying analytical solutions.

18. Course Name: Web Development Using Python And Django

Course code: 4CSPL2012

CO1: Create Database Using SQLite

CO2: Create webclient programs using python

CO3: Create Web Server Programs Using python

CO4: Createwebsite usingDjango framework

CO5: Create To-doapplicationusingDjangoandReact JS

19. Course Name: Making With Electronics

Course code: CPSES1011

CO1: Demonstrate the interfacing of basic input and output devices using Arduino.

CO2: Explain the working principles of various sensors and renewable energy sources.

CO3: Apply the understanding of Arduino programming by interfacing sensors and communication devices.

CO4: Demonstrate the interfacing of basic input and output devices using Raspberry Pi.

CO5: Analyze and Build a real-time application employing Arduino / Raspberry Pi.