

MAJOR DISCIPLINE - COMPUTER SCIENCE

PROGRAMME OUTCOME

PO1. CRITICAL THINKING

- Analyze information objectively and make a reasoned judgment
- Draw reasonable conclusions from a set of information, and discriminate between useful and less useful details to solve problems or make decisions
- Identify logical flaws in the arguments of others
- Evaluate data, facts, observable phenomena, and research findings to draw valid and relevant results that are domain-specific

PO2. COMPLEX PROBLEM-SOLVING

- Solve different kinds of problems in familiar and no-familiar contexts and apply the learning to real-life situations
- Analyze a problem, generate and implement a solution and to assess the success of the plan
- Understand how the solution will affect both the people involved and the surrounding environment

PO3. CREATIVITY

- Produce or develop original work, theories and techniques
- Think in multiple ways for making connections between seemingly unrelated concepts or phenomena
- Add a unique perspective or improve existing ideas or solutions
- Generate, develop and express original ideas that are useful or have values

PO4. COMMUNICATION SKILLS

- Convey or share ideas or feelings effectively
- Use words in delivering the intended message with utmost clarity
- Engage the audience effectively
- Be a good listener who are able to understand, respond and empathize with the speaker
- Confidently share views and express himself/herself

PO5. LEADERSHIP QUALITIES

- Work effectively and lead respectfully with diverse teams
- Build a team working towards a common goal
- Motivate a group of people and make them achieve the best possible solution.
- Help and support others in their difficult times to tide over the adverse situations with courage



PO6. LEARNING 'HOW TO LEARN' SKILLS

- Acquire new knowledge and skills, including 'learning how to learn' skills, that are necessary for pursuing learning activities throughout life, through self-paced and self-directed learning
- Work independently, identify appropriate resources required for further learning
- Acquire organizational skills and time management to set self-defined goals and targets with timelines
- Inculcate a healthy attitude to be a lifelong learner

PO7. DIGITAL AND TECHNOLOGICAL SKILLS

- Use ICT in a variety of learning and work situations, access, evaluate, and use a variety of relevant information sources
- Use appropriate software for analysis of data
- Understand the pitfalls in the digital world and keep safe from them

PO8. VALUE INCULCATION

- Embrace and practice constitutional, humanistic, ethical, and moral values in life including universal human values of truth, righteous conduct, peace, love, nonviolence, scientific temper, citizenship values
- Formulate a position/argument about an ethical issue from multiple perspectives
- Identify ethical issues related to work, and follow ethical practices, including avoiding unethical behaviour such as fabrication, falsification or misrepresentation of data, or committing plagiarism, and adhering to intellectual property rights
- Adopt an objective, unbiased, and truthful actions in all aspects of work



MAJOR DISCIPLINE - COMPUTER SCIENCE

PROGRAMME SPECIFIC OUTCOME

- PSO1.** Exhibit profound understanding of theoretical Computer Science Concepts with a focus on ethical implications and life-long learning.
- PSO2.** Cultivate critical and creative problem-solving skills for designing sustainable solutions to real life problems
- PSO3.** Encourage experiential learning and team work by providing hands-on experience in emerging technologies across diverse computing domains
- PSO4.** Utilise advanced analytical principles in high quality research and development, maintaining rigorous ethical and Quality Standards



MAJOR DISCIPLINE - COMPUTER SCIENCE

COURSE OUTCOME

SEMESTER 1

UK1DSCCSC100-ESSENTIALS OF COMPUTER SCIENCE

- CO1. Summarise the basic concepts about computer
- CO2. Illustrate internet basics and tools usage
- CO3. Make use of emerging technologies in Computer Science
- CO4. Identify some foundation level tools used in Artificial Intelligence

UK1DSCCSC101-PROGRAMMING USING C

- CO1. Illustrate the concepts and structure of a C program.
- CO2. Make use of control structures, arrays and strings.
- CO3. Develop programs using functions and pointers.
- CO4. Demonstrate the concepts of structures, union and files.

UK1DSCCSC102-DIGITAL ELECTRONICS

- CO1. Explain the fundamentals of number systems.
- CO2. Develop digital circuits using logic gates.
- CO3. Use the principles of Boolean algebra for simplifying logical expressions.
- CO4. Construct various combinational digital circuits.

UK1DSCCSC103-INTRODUCTION TO WEB PROGRAMMING

- CO1. Illustrate the basic features of HTML5
- CO2. Use advanced HTML features for web designing
- CO3. Develop basic stylesheets in various CSS levels
- CO4. Develop stylesheets for high level visual designs

UK1DSCCSC104-INFORMATICS

- CO1. Explain the basics of computers
- CO2. Identify the skills for higher education
- CO3. Apply Softwares/Tools for Informatics
- CO4. Use different Digital Marketing/ Artificial Intelligence tools for Business

UK1DSCCSC105-INTERNET TECHNOLOGY

- CO1. Summarise about Network Technologies
- CO2. Outline structure of a Web Page
- CO3. Cite techniques used in Internet Protocol
- CO4. Develop Web pages using HTML



UKIDSCCSC106-DATA SCIENCE FUNDAMENTALS

- CO1. Discuss about the fundamentals of Data Science
- CO2. Illustrate the usage of Data Pre-processing techniques
- CO3. Use data science concepts in real world problems
- CO4. Build Data Analytics and management Skill

UKIDSCCSC107-INTRODUCTION TO ARTIFICIAL INTELLIGENCE

- CO1. Infer basic ideas about Artificial Intelligence (AI) and Intelligent Agents
- CO2. Demonstrate the different searching techniques practised in AI
- CO3. Summarise knowledge representation and reasoning in the context of AI
- CO4. Illustrate AI Problems and different ways of problem solving

UKIDSCCSC108-HEALTH INFORMATICS

- CO1. Explain the basic concepts of Health Informatics
- CO2. Illustrate the role of Healthcare Data Analytics and Electronic Health Records
- CO3. Summarise Data Standards and Medical Coding concepts
- CO4. Infer the role of privacy, security and ethics in health systems

UK1MDCCSC100-WEB DESIGNING USING HTML5 AND CSS3

- CO1. Illustrate the basic features of HTML5
- CO2. Use advanced HTML features for web designing
- CO3. Develop basic stylesheets in various CSS levels
- CO4. Build websites using HTML and CSS

UK1MDCCSC101-INTRODUCTION TO IT

- CO1. Summarise the basic ideas of Computer Technologies
- CO2. Identify Computer Hardware components
- CO3. Explain the basics of Software
- CO4. Discuss the tools and applications of Network

UK1MDCCSC102-BASICS OF MICROPROCESSORS

- CO1. Demonstrate the basic architecture and Instruction set of 8085 microprocessor.
- CO2. Use 8085 Instruction set, Learn Fetch, Decode, Execute operations and timing diagrams.
- CO3. Illustrate 8086 architecture, instruction set and the timing diagram for 8086 microprocessors.
- CO4. Develop Assembly Language Programs

UK1MDCCSC103-INTRODUCTION TO DATA SCIENCE

- CO1. Discuss about the fundamentals of Data Science
- CO2. Illustrate the usage of Data Pre-processing techniques
- CO3. Use data science concepts in real world problems
- CO4. Build Data Analytics and management Skill



UK1MDCCSC104-ANIMATION USING BLENDER

- CO1. Outline fundamental aspects of Blender
- CO2. Develop knowledge of Blender interface elements, such as panels, menus, and editor.
- CO3. Use basic modelling techniques in Blender
- CO4. Develop models of various objects

UK1MDCCSC105-HEALTH INFORMATICS

- CO1. Explain the basic concepts of Health Informatics
- CO2. Illustrate the role of Healthcare Data Analytics and Electronic Health Records
- CO3. Summarise Data Standards and Medical Coding concepts
- CO4. Infer the role of privacy, security and ethics in health systems

UK1MDCCSC106-ENVIRONMENTAL INFORMATICS

- CO1. Summarise the basic concepts of Environmental Informatics
- CO2. Illustrate the role of Decision Support Systems and Remote Sensing
- CO3. Demonstrate the concept of Geographic Information System.
- CO4. Comprehend the role of GIS tools in various applications

SEMESTER 2

UK2DSCCSC100-FREE AND OPEN SOURCE SOFTWARES

- CO1. Differentiate Open Source and Proprietary software
- CO2. Explain about open-source software and open-source ecosystem
- CO3. Illustrate the role of open-source projects, open-source ethics and its social impact
- CO4. Articulate the benefits, features, licensing and applications of Open-source technologies

UK2DSCCSC101-PYTHON PROGRAMMING

- CO1. Use basic concepts of Python Programming
- CO2. List mutable and immutable data types in Python
- CO3. Illustrate flow control techniques in python programming
- CO4. Make use of object-oriented concepts in python programming

UK2DSCCSC102-COMPUTER SYSTEM MANAGEMENT

- CO1. Summarise about Operating Systems
- CO2. Experiment with desktop activities
- CO3. Illustrate disk fragmentation and partitioning activities
- CO4. Experiment with basic Operating system security

UK2DSCCSC103-INTRODUCTION TO BIOMETRIC SYSTEMS

- CO1. Restate the basic characteristics of Biometrics systems.
- CO2. Illustrate the role of fingerprint recognition in Biometrics

- CO3. Summarize about face and iris recognition systems
- CO4. Outline the role of additional traits in biometrics system

UK2DSCCSC104-E-COMMERCE

- CO1. Summarise basic concepts of E-commerce
- CO2. Identify various types of E-commerce strategies
- CO3. Explain E-commerce Technology Infrastructure
- CO4. Differentiate between various digital commerce technologies and tools

UK2DSCCSC105-MULTIMEDIA SYSTEMS

- CO1. Infer basic multimedia concepts
- CO2. Interpret the various multimedia representations
- CO3. Develop basic multimedia content
- CO4. Summarise programming aspects applicable for multimedia

UK2DSCCSC106-PYTHON FOR DATA ANALYTICS

- CO1. Familiarize Data Analytics Lifecycle and Python basics
- CO2. Experiment with Python Data Structures and Modules
- CO3. Use Pandas library, data frames, and data extraction methods.
- CO4. Experiment with Python libraries Matplotlib and Seaborn for data visualization of both categorical and continuous variables.

UK2DSCCSC107-R PROGRAMMING FOR DATA SCIENCE

- CO1. Demonstrate the basic features used in R Programming
- CO2. Illustrate the concepts of data visualization and its usage in various scenarios.
- CO3. Examine different functions used in advanced R Programming
- CO4. Experiment with different ways of Data Analysis techniques

UK2DSCCSC102-KNOWLEDGE REPRESENTATION AND INTELLIGENT AGENTS

- CO1. Interpret the efficiency of different algorithm design methods
- CO2. Apply heuristic search techniques
- CO3. Demonstrate problem-solving skills
- CO4. Distinguish between the types of intelligent agents

UK2DSCCSC109-HEALTH DATA ANALYTICS AND ELECTRONIC HEALTH RECORDS SYSTEM

- CO1. Outline basic concepts on EHR
- CO2. Relate with the regulations applicable in EHR
- CO3. Identify security issues in EHR and solutions available
- CO4. Summarize on Medical Big Data



UK2MDCCSC100-DIGITAL MARKETING

- CO1. Infer about various types of digital marketing (DM) and marketing environment
- CO2. Discuss about the payment systems and security strategies adopted in e-banking
- CO3. Identify the challenges involved in digital marketing strategies
- CO4. Use different digital marketing techniques

UK2MDCCSC101-OFFICE AUTOMATION

- CO1. Use different types of software to create, edit, format, save and print office documents.
- CO2. Experiment with advanced features of word processor
- CO3. Manipulate data using spreadsheet software.
- CO4. Develop professional presentations using Presentation software.

UK2MDCCSC102-SOCIAL MEDIA MANAGEMENT

- CO1. Restate the concepts in social media and relevance of popular social media platforms
- CO2. Illustrate the role of social networks, microblogging and discussion boards
- CO3. Summarise about Social news, Q&A sites, Mobile computing and Location marketing
- CO4. Experiment with social media tools used

UK2MDCCSC103-DIGITAL LOGIC SYSTEMS

- CO1. Summarize the concepts of number systems and digital logic.
- CO2. Illustrate the basic laws of Boolean algebra and concepts of logic circuits.
- CO3. Develop sequential circuits, such as counters and flip-flops.
- CO4. Design various combinational logic circuits.

UK2MDCCSC104-DATA SCIENCE USING PYTHON

- CO1. Develop knowledge on Python
- CO2. Identify basic Data structures in Python
- CO3. Use Dictionaries and functions in Python
- CO4. Manipulate Data Using Numpy and Python Pandas

SEMESTER 3

UK3DSCCSC200-DATA STRUCTURES

- CO1. Discuss about data structure classification and applications in searching and sorting
- CO2. Demonstrate the concept and usage of linked lists
- CO3. Summarise about stack, queue and its applications
- CO4. List various types of trees and operations



UK3DSCCSC201-SYSTEM SOFTWARE

- CO1. Differentiate between various types of system software and their specific roles.
- CO2. Explain basic assembler and loader functions,
- CO3. Identify basic functions of loaders and linkers
- CO4. Use macro processor functionalities, text editing tools, and interactive debugging systems

UK3DSCCSC202-MICROPROCESSOR AND ASSEMBLY LANGUAGE PROGRAMMING

- CO1. Summarise the basic concepts of microprocessors
- CO2. Apply various addressing modes and instructions of the 8086 microprocessors for program development.
- CO3. Develop assembly language programs for the 8086 microprocessors to solve computational problems efficiently.
- CO4. Outline the features of advanced microprocessors

UK3DSCCSC203-COMPUTER GRAPHICS

- CO1. Outline the basic principles of computer graphics, different input/output devices and graphic operations.
- CO2. Experiment with algorithms to generate computer graphic primitives, specifically straight line and polygon filling.
- CO3. Illustrate 2D transformations and clipping operations in computer graphics, different methods for transformations.
- CO4. Demonstrate 3D computer graphics techniques, the concept of projections and various surface detection algorithms.

UK3DSCCSC204-KNOWLEDGE REPRESENTATION AND REASONING

- CO1. Summarise the concepts of knowledge, representation, and reasoning
- CO2. Identify equivalences, tautologies, and contradictions.
- CO3. Sketch the fundamentals of knowledge engineering
- CO4. Show the design of expert systems

UK3DSCCSC205-VISUAL PROGRAMMING

- CO1. Discuss about the various features of visual studio tools.
- CO2. Illustrate the usage of different controls in web development.
- CO3. Build web pages using validation and data controls in ASP.NET
- CO4. Develop dynamic websites using visual studio IDE.

UK3DSCCSC206-LOW CODE APPLICATION DEVELOPMENT

- CO1. Summarise the fundamentals of No-Code, Workflows and perform Web Scraping using a No-Code App
- CO2. Build a website using the popular No-Code Apps Web flow and Bubble.io
- CO3. Build Mobile Apps using the popular No-Code Apps Glide and Thinkable



CO4. Build AI-powered apps using No-Code AI Tools

UK3DSCCSC207-CYBER CRIMES AND LAWS

- CO1. Summarise the basics of cybercrimes and cyber security
- CO2. Outline the methods, techniques of phishing, thefts and solutions.
- CO3. Identify the authorities, jurisdictions and penalties under IT Act.
- CO4. Identify legislative aspects of cyberspace, related to trademark and copyright laws.

UK3DSCCSC208-E-GOVERNANCE

- CO1. Summarise concepts of E-Governance
- CO2. Illustrate the various phases of E-Government
- CO3. Interpret E-Governance Principles
- CO4. Identify Architecture and challenges in E-Governance

UK3DSCCSC209-DATA MINING CONCEPTS AND TECHNIQUES

- CO1. Cite the fundamentals of data mining
- CO2. Summarise about pre-processing techniques
- CO3. Illustrate the data integration, transformation and reduction techniques
- CO4. Experiment with classification and prediction models.

UK3DSCCSC210-DATA VISUALIZATION

- CO1. Differentiate between physical and abstract types
- CO2. Use Visualization, data maps, time series and text visualization
- CO3. Apply design for visualization
- CO4. Compare different data and image models

UK3DSCCSC211-INTRODUCTION TO MACHINE LEARNING

- CO1. Summarise the definition and significance of machine learning
- CO2. Cite the principles underlying supervised and unsupervised learning methods.
- CO3. Apply data preprocessing procedures using Python libraries to cleanse and organise datasets efficiently,
- CO4. Illustrate the effectiveness of machine learning models.

UK3DSCCSC212-MEDICAL IMAGING AND ANALYSIS

- CO1. Outline medical images, integrating theory, tools, and ethical considerations effectively.
- CO2. Discuss principles of X-ray, MRI, and ultrasound imaging, enabling effective medical diagnosis.
- CO3. Outline image processing and segmentation methods
- CO4. Identify methods of Image representation, analysis and classification



UK3DSCCSC213-HEALTH DATA ANALYTICS

- CO1. Restate healthcare analytics to improve decision-making and address challenges in healthcare transformation effectively.
- CO2. Develop strategies for enhancing healthcare quality, performance, and value through data-driven decision-making processes.
- CO3. Establish data governance frameworks to ensure data quality and integrity for informed decision-making in healthcare.
- CO4. Implement advanced analytics techniques to predict healthcare outcomes and optimize resource allocation effectively.

UK3DSECSC200-INTRODUCTION TO CYBER SECURITY

- CO1. Summarise the fundamental principles and concepts of cybersecurity.
- CO2. Identify best practices for securing digital assets.
- CO3. Demonstrate awareness of common cyber threats and techniques used by attackers.
- CO4. Identify measures for implementing cybersecurity

UK3DSECSC201-DATA SCIENCE FUNDAMENTALS

- CO1. Discuss about the fundamentals of Data Science
- CO2. Illustrate the usage of Data Pre-processing techniques
- CO3. Use data science concepts in real world problems
- CO4. Build Data Analytics and management Skill

UK3DSECSC202-INTRODUCTION TO ARTIFICIAL INTELLIGENCE

- CO1. Infer basic ideas about Artificial Intelligence (AI) and Intelligent Agents
- CO2. Demonstrate the different searching techniques practiced in AI
- CO3. Summarize knowledge representation and reasoning in the context of AI
- CO4. Illustrate different ways of problem solving

UK3DSECSC203-WEB DEVELOPMENT USING HTML5 AND CSS3

- CO1. Illustrate the basic features of HTML5
- CO2. Use advanced HTML features for web designing
- CO3. Develop basic stylesheets in various CSS levels
- CO4. Create stylesheets for high level visual designs

UK3VACCSC200-CODING STANDARDS AND PRACTICES

- CO1. Summarize principles and practices of clean coding.
- CO2. Cite the role of functions in programming and their importance in clean coding.
- CO3. Demonstrate writing clear, readable and concise comments and documentation.
- CO4. Prepare unit test cases.

UK3VACCSC201-PROFESSIONAL ETHICS IN COMPUTER SCIENCE

- CO1. Cite the core values that shape the ethical behavior of a professional.
- CO2. Relate with the principles to be followed for a good and ethical life



- CO3. Explain the role and responsibility in technological development by keeping personal ethics and legal ethics.
- CO4. Relate moral and ethical problems through experiments.

SEMESTER 4

UK4DSCCSC200-DATABASE MANAGEMENT SYSTEMS

- CO1. Outline the concept of databases.
- CO2. Create a database using SQL and perform operations in SQL.
- CO3. Build ER diagrams using ER design concepts
- CO4. Demonstrate the design concepts and normalization in the database.

UK4DSCCSC201-DATA COMMUNICATION

- CO1. Summarize the basic concept of Data Communication
- CO2. Differentiate between Guided and Unguided media.
- CO3. Explain the principles of digital signal encoding techniques.
- CO4. Identify various multiplexing and spread spectrum techniques in communication systems.

UK4DSCCSC202-ARTIFICIAL INTELLIGENCE

- CO1. Infer basic ideas about Artificial Intelligence (AI) and Intelligent Agents
- CO2. Demonstrate the different searching techniques practised in AI
- CO3. Use concepts of knowledge representation and reasoning in the context of AI
- CO4. Illustrate AI Problems and different ways of problem solving

UK4DSCCSC203-COMPUTER ORGANIZATION

- CO1. Discuss the functional components and building blocks of a computer.
- CO2. Illustrate memory concepts and setting of BIOS configuration.
- CO3. Use the different instruction sets.
- CO4. Describe input-output organization followed in a computer.

UK4DSECSC200-ETHICAL HACKING

- CO1. Describe the ethics, legality, methodologies and techniques of hacking
- CO2. Explain the types of attacks and their common prevention mechanisms
- CO3. Apply various tools for hacking in real time machines
- CO4. Illustrate Systems Hacking and Applications Hacking.

UK4DSECSC201-PYTHON FOR DATA ANALYTICS

- CO1. Use Python basics
- CO2. Comprehend various Python Data Structures and Modules
- CO3. Use Pandas library, data frames, and data extraction methods.

- CO4. Experiment with Python libraries Matplotlib and Seaborn for data visualization of both categorical and continuous variables.

UK4DSECSC202-KNOWLEDGE REPRESENTATION AND INTELLIGENT AGENTS

- CO1. Interpret the efficiency of different algorithm design methods
CO2. Apply heuristic search techniques
CO3. Represent and manage knowledge effectively using various structures, enhancing problem-solving skills
CO4. Distinguish between the types of intelligent agents

UK4DSECSC202-WEB SCRIPTING USING JAVASCRIPT

- CO1. Illustrate the basic skills in JavaScript
CO2. Develop the client-side scripts using JavaScript
CO3. Illustrate the main ideas behind React JS
CO4. Create interactive user interfaces using React JS

UK4VACCSC200-ETHICAL HACKING

- CO1. Describe the ethics, legality, methodologies and techniques of hacking
CO2. Explain the types of attacks and their common prevention mechanisms
CO3. Apply various tools for hacking in real time machines
CO4. Illustrate Systems Hacking and Applications Hacking.

UK4VACCSC201-SOFTWARE QUALITY MANAGEMENT

- CO1. Summarize software quality management concepts, principles.
CO2. Relate knowledge, skills, and tools necessary to implement metrics-driven quality improvement initiatives.
CO3. Make use of knowledge, skills, and tools necessary to effectively plan, execute, and manage software testing activities.
CO4. Identify tools necessary to implement continuous improvement methodologies, process improvement frameworks.

UK4VACCSC202-ETHICAL AI AND RESPONSIBLE COMPUTING

- CO1. Summarize main concepts of AI with a focus on the ethical implications.
CO2. Relate AI governance issues and outcomes
CO3. Explain professional codes of conduct.
CO4. Identify the ethical issues, and standards used in AI.

UK4VACCSC203-PREFACE TO CYBER LAWS

- CO1. Summarize the concepts of cyber laws and cyberspace.
CO2. Outline Information Technology Act 2000, including its amendments.
CO3. Illustrate various types of cybercrimes, their legal implications.
CO4. Explain the concepts of digital signatures.



UK4SECSC201-CONTENT MANAGEMENT SYSTEM

- CO1. Cite the fundamental concepts of Content Management Systems (CMS) and their importance in web development.
- CO2. Demonstrate proficiency in installing, configuring, and customizing WordPress for different website requirements.
- CO3. Develop various types of content such as posts, pages, media, and menus using WordPress.
- CO4. Use themes and plugins to enhance the functionality and design of WordPress websites.

UK4CSCSEC202-COMPUTER HARDWARE MAINTENANCE

- CO1. Outline the fundamental principles of computer hardware components.
- CO2. Experiment with hardware installation, upgrading, and configuration.
- CO3. Develop skills to troubleshoot common hardware problems.
- CO4. Apply preventive maintenance strategies to prolong the lifespan and optimize performance of computer hardware.

SEMESTER 5

UK5DSCCSC300-PROGRAMMING IN JAVA

- CO1. Discuss about the core concepts of Java
- CO2. Illustrate advanced features of Java in programming context
- CO3. List Java methods in Packages, Exception Handling & Multithreading
- CO4. Use Applets in event handling

UK5DSCCSC301-DATA MINING

- CO1. Summarize about data mining concepts, applications and usage.
- CO2. Demonstrate data mining techniques and methods in datasets
- CO3. Illustrate the concept of classification algorithms and their applications
- CO4. Interpret different cluster analysis methods

UK5DSCCSC302-SOFTWARE ENGINEERING

- CO1. Identify the software development life cycle models applicable in various project contexts.
- CO2. Infer the role of software project management and software requirement specification (SRS) document.
- CO3. Illustrate the concepts of structured and object-oriented analysis & design.
- CO4. Demonstrate the principles of coding, testing and the need for software quality management and maintenance.



UK5DSCCSC303-COMPUTER NETWORKS

- CO1. Outline the basics of Computer Networks and the role of network reference models.
- CO2. Explain error detection, error control and flow control in the data link layer.
- CO3. Describe the different protocols used in network and transport layer
- CO4. Summarize the features and operations of various application layer protocols.

UK5DSCCSC304-DESIGN AND ANALYSIS OF ALGORITHMS

- CO1. Explain the foundational concepts of algorithm analysis.
- CO2. Outline various search techniques, divide and conquer methods and the concept of search trees
- CO3. Explain various algorithms in dynamic programming
- CO4. Describe important algorithmic design paradigms and methods of analysis.

UK5DSCCSC305-TRENDS IN COMPUTING

- CO1. Outline on Grid Computing
- CO2. Summarize basic concepts on Cloud Computing
- CO3. Identify challenges faced in Edge Computing
- CO4. Explain ideas behind Quantum Computing

UK5DSCCSC306-STATISTICAL ANALYSIS SYSTEM

- CO1. Apply SAS data set structures and methods for efficient data manipulation and analysis.
- CO2. Create, use and manage permanent SAS data sets and libraries efficiently.
- CO3. Gain proficiency in importing, reading, and storing data using SAS data step.
- CO4. Understand and apply SAS support statements, proc statement syntax and common system options to enhance data analysis

UK5DSCCSC307-INFORMATION RETRIEVAL

- CO1. Summarize Information Retrieval Principles.
- CO2. Use Advanced Retrieval Techniques
- CO3. Experiment with text classification and clustering using different techniques.
- CO4. Outline on web search

UK5DSCCSC308-CLOUD COMPUTING

- CO1. Outline the basics of cloud computing
- CO2. Differentiate between the various technologies of cloud computing.
- CO3. Recognize the applications of Cloud
- CO4. Compare various Cloud Services

UK5DSCCSC309-RECOMMENDATION SYSTEMS

- CO1. Summarize Recommendation system concepts
- CO2. Apply data mining methods



- CO3. Make use of skills in Content-based Recommender Systems
- CO4. Explain different techniques for collaborative filtering

UK5DSECSC300-CRYPTOGRAPHY AND NETWORK SECURITY

- CO1. Summarize the Basic Concepts of Security
- CO2. Explain the working of Cryptographic Algorithms
- CO3. Outline on public key infrastructure in cryptography
- CO4. Select among various Authentication Systems

UK5DSECSC301-CYBER FORENSICS

- CO1. Outline the key concepts in cyber forensics.
- CO2. Summarise network forensics techniques and investigation of cyber-attacks.
- CO3. Explain about various kinds of data analysis, reporting and Investigations.
- CO4. Identify various types of violations

UK5DSECSC302-DATA ANALYTICS WITH R

- CO1. Demonstrate the basic features used in R Programming
- CO2. Illustrate the concepts of data visualization and its usage in various scenarios.
- CO3. Examine different functions used in advanced R Programming
- CO4. Illustrate different ways of Data Analysis using R

UK5DSECSC303-DATA MINING CONCEPTS AND TECHNIQUES

- CO1. Cite the fundamentals of data mining
- CO2. Summarize about pre-processing techniques
- CO3. Illustrate the data integration, transformation and reduction techniques
- CO4. Experiment with classification and prediction models.

UK5DSECSC304-INTRODUCTION TO MACHINE LEARNING

- CO1. Summarize the definition and significance of machine learning
- CO2. Cite the principles underlying supervised and unsupervised learning methods.
- CO3. Use data preprocessing procedures using Python libraries to cleanse and organize datasets efficiently,
- CO4. Illustrate the effectiveness of machine learning models.

UK5DSECSC305-ARTIFICIAL NEURAL NETWORK

- CO1. Outline neural network fundamentals.
- CO2. Demonstrate neural network architectures.
- CO3. Experiment with various learning methods
- CO4. Sketch the features and applications of SOM

UK5DSECSC306-PHP AND MYSQL

- CO1. Discuss features, Basics and building blocks of PHP
- CO2. Outline on object object-oriented paradigms

- CO3. Experiment with web designing using PHP
- CO4. Develop skills to manage the front end and back end.

UK5DSECSC307-WEB APPLICATION DEVELOPMENT

- CO1. Summarize the role of Django in creating web applications.
- CO2. Demonstrate setting up and configuring Django
- CO3. Experiment with models that represent data in applications.
- CO4. Explain about views and templates in Django and their role in rendering dynamic web pages.

UK5SECCSC300-SOFTWARE TESTING

- CO1. Outline the fundamental concepts of software testing and its importance in software development.
- CO2. Identify different testing techniques and methodologies and apply them to real-world scenarios.
- CO3. Use Selenium environment.
- CO4. Develop test cases using Selenium

UK5SECCSC301-WEB APPLICATION DEVELOPMENT

- CO1. Summarize basics of web development and role of Django in creating web applications.
- CO2. Illustrate setting up and configuring Django projects and applications.
- CO3. Develop models in Django applications.
- CO4. Build dynamic webpages

UK5SECCSC302-ANDROID PROGRAMMING USING KOTLIN

- CO1. Explain about the Kotlin ecosystem
- CO2. Experiment with the basics of Kotlin with emphasis on control structures, data types and operators.
- CO3. Demonstrate comprehensive knowledge of Functions and Object Oriented Programming concepts in Kotlin.
- CO4. Develop Android applications

SEMESTER 6

UK6DSCCSC300-MACHINE LEARNING USING PYTHON

- CO1. Outline the definition and significance of machine learning
- CO2. Summarize the principles underlying supervised and unsupervised learning methods.
- CO3. Use Python libraries.
- CO4. Demonstrate the effectiveness of machine learning models.



UK6DSCCSC301-OBJECT ORIENTED ANALYSIS AND DESIGN

- CO1. List the importance of basic principles in object-oriented modelling for appropriate analysis and design of given scenarios.
- CO2. Make use of building blocks and different views for creating conceptual model architectural view of system in Unified Software Development Life cycle.
- CO3. Demonstrate static and dynamic aspects of the system through UML diagrams for specifying structure and interaction of objects during runtime.
- CO4. Identify basic building blocks for visualizing artifacts of an Object-Oriented System.

UK6DSCCSC302-CRYPTOGRAPHY AND NETWORK SECURITY

- CO1. Summarize the Basic Concepts of Security
- CO2. Illustrate the working of Cryptographic Algorithms
- CO3. Interpret about public key infrastructure in cryptography
- CO4. Choose over various Authentication Systems

UK6DSCCSC303-OPERATING SYSTEM

- CO1. Summarize the basic functions and services of operating system.
- CO2. Compare various process scheduling methods and to demonstrate deadlock handling.
- CO3. Demonstrate the memory management techniques and page replacement algorithms
- CO4. Sketch file allocation methods and disk scheduling.

UK6DSCCSC304-FUNCTIONAL PROGRAMMING

- CO1. Discuss the foundational concepts in Functional Programming
- CO2. Explain about Numbers and Lists in Functional Programming
- CO3. Infer the relevance of proofs and efficiency through various methods
- CO4. Summarize the concepts in Imperative Functional Programming

UK6DSCCSC305-INTERNET OF THINGS

- CO1. Restate the basic characteristics, elements and challenges faced in IoT (Ap)
- CO2. Compare different IOT Network Architecture and Design
- CO3. Illustrate the role of various hardware and Software components in IOT
- CO4. Outline the role of IOT in major domains through Domain specific IOT applications

UK6DSECSC300-IMAGE SECURITY

- CO1. Demonstrate the fundamental concepts of images and security.
- CO2. Illustrate the concepts of visual cryptography and its applications
- CO3. Experiment with digital watermarking
- CO4. Demonstrate the principles and techniques of steganography



UK6DSECSC301-MOBILE AND WIRELESS SECURITY

- CO1. List the security threats in Mobile and Wireless Networks.
- CO2. Explain the different security measures in Mobile and Wireless Networks.
- CO3. Identify the various advantages and disadvantages of different security measures.
- CO4. Explain the various types of security issues in wireless networks.

UK6DSECSC306-MOBILE APPLICATION DEVELOPMENT

- CO1. Outline the fundamentals of mobile applications and their significance in the current digital landscape.
- CO1. Demonstrate the mobile app development process from ideation to deployment, including design considerations, development stages, and testing.
- CO2. Experiment in Flutter framework, its architecture, widgets, and features.
- CO3. Develop a basic mobile application using Flutter.

UK6DSECSC304-RECOMMENDATION SYSTEMS

- CO1. Summarize Recommendation system concepts
- CO2. Apply data mining methods
- CO3. Make use of skills in Content-based Recommender Systems
- CO4. Explain different techniques for collaborative filtering

UK6DSECSC305-DEEP LEARNING

- CO1. Summarize the concepts of deep learning
- CO2. Apply deep neural networks in various real world problems
- CO3. Use various methods in convolutional neural networks
- CO4. Illustrate the working various learning methods

UK6SECCSC300-MOBILE APP DEVELOPMENT

- CO1. Summarize about mobile applications and their significance in the current digital landscape.
- CO2. Outline the mobile app development process from ideation to deployment, including design considerations, development stages, and testing.
- CO3. Use Flutter framework, its architecture, widgets, and features.
- CO4. Apply the acquired knowledge and skills to develop a basic mobile application using Flutter.

UKCSC304SEC-GAME DEVELOPMENT

- CO1. Summarize the principles of game design and development.
- CO2. Outline the fundamentals of designing interactive and engaging gameplay experiences.
- CO3. Relate with the stages of the game development process.
- CO4. Use Unity for game creation and development.



UK6SECCSC302-IMAGE PROCESSING AND ITS APPLICATIONS

- CO1. Apply Image basic concepts and Preprocessing Techniques
- CO2. Demonstrate morphological and colour image processing techniques
- CO3. Use Image Mining and Content-Based Image Retrieval methods.
- CO4. Use Image Processing Techniques in Biometric and Biomedical Contexts

UK6SECCSC303-ENTREPRENEURSHIP IN IT

- CO1. Summarize basic concepts of Entrepreneurship
- CO2. Categorize entrepreneurs and features of enterprises
- CO3. Explain the principles and tools that support building a startup
- CO4. Identify concepts that provide legal protection to startups and enterprises

SEMESTER 7

UK7DSCCSC400-RESEARCH METHODOLOGY

- CO1. Summarize about research methods
- CO2. Demonstrate competency in various methods of data collection, such as observation, interviews, questionnaires, schedules, and others, and apply them according to the research objectives.
- CO3. Demonstrate proficiency in editing raw data, coding variables, classifying data into meaningful categories, and tabulating data for analysis.
- CO4. Develop skills in the various steps involved in preparing scientific reports, including layout, structure, and language considerations.

UK7DSCCSC401-ACADEMIC WRITING AND PUBLISHING

- CO1. Identify ethical considerations in research including matters of falsification, fabrication, plagiarism and the principles of transparency in scholarly publishing,
- CO2. Explain open access initiatives, familiarise with software tools for reference management and anti-plagiarism.
- CO3. Prepare academic documents using latex editors using document class, sectioning, environment, basic type setting commands, tables and figure
- CO4. Produce documents having charts, index, bibliography & citation, presentation slides and posters

UK7DSCCSC402-NATURAL LANGUAGE PROCESSING

- CO1. Summarize the basic Concepts of NLP
- CO2. Extract information from text using concepts and methods from NLP including N-Grams, POS Tagging and Parsing
- CO3. Explain Syntax and Semantic analysis
- CO4. Implement different text classification and information retrieval methods



UK7DSCCSC406-PROMPT ENGINEERING

- CO1. Summarize prompt engineering principles
- CO2. Develop effective prompts
- CO3. Illustrate prompt engineering strategies:
- CO4. Make use of prompt engineering technologies

UK7DSCCSC407-THEORY OF COMPUTATION

- CO1. Build regular expressions, finite state automata, and regular grammar.
- CO2. Design grammar representations free of context and push-down automata for context-free languages.
- CO3. Interpret formal languages into four categories: unrestricted, context-sensitive, context-free and regular
- CO4. Summarize decidability and Undecidability

UK7DSCCSC408-WIRELESS DATA COMMUNICATION

- CO1. List the requirements and types of wireless networks.
- CO2. Explain the different types of channel access methods in wireless networks
- CO3. Illustrate the various WLAN standards.
- CO4. Infer about the various types of wireless network security protocols.

UK7DSCCSC409-ADVANCED DBMS

- CO1. Demonstrate the advanced concepts in Database Management Systems.
- CO2. Explore the concepts of Schema Refinement and Normal Forms
- CO3. Compare parallel and distributed databases in DBMS
- CO4. Illustrate the features of Object Database Systems

UK7DSCCSC411-IMAGE PROCESSING AND ITS APPLICATIONS

- CO1. Apply Image and Preprocessing Techniques
- CO2. Demonstrate morphological and colour image processing techniques
- CO3. Implement Image Mining and Content-Based Image Retrieval methods.
- CO4. Use Image Processing Techniques in Biometric and Biomedical Contexts

UK7DSCCSC413-SOFT COMPUTING

- CO1. Summarise about the basic concepts of soft computing
- CO2. Discuss about neural networks and its various applications
- CO3. Demonstrate the use of fuzzy logic in various contexts
- CO4. Illustrate the principles and working of different operators in Genetic Algorithms

UK7DSCCSC415-SOCIAL MEDIA ANALYTICS

- CO1. Acquire knowledge on the fundamentals of social media data
- CO2. Articulate data aggregation, key metrics, and usage of proper analytical tools for discerning insights.



CO3. Illustrate the methods to analyze keywords, sentiments and campaigns in social media.

CO4. Compare the use of dedicated and hybrid tools in social media analytics

UK7DSCCSC416-TEXT MINING

CO1. Summarize text mining, explore its applications, challenges, and tools effectively.

CO2. Apply text preprocessing techniques and various text representation models for effective text mining.

CO3. Analyse supervised and unsupervised algorithms for text classification and clustering, using evaluation metrics

CO4. Develop skills in Text summarization.

UK7DSCCSC420-ARTIFICIAL NEURAL NETWORK

CO1. Outline neural network fundamentals.

CO2. Demonstrate neural network architectures.

CO3. Experiment various learning methods

CO4. Sketch the features and applications of SOM

UK7DSECSC400-CLOUD SECURITY

CO1. Outline risks in Cloud Computing

CO2. Analyze issues in Cloud Security

CO3. Plan appropriate Cloud security services

CO4. Identify an effective Secure Cloud architecture

UK7DSECSC401-SOCIAL MEDIA ANALYTICS

CO1. Summarize knowledge on the fundamentals of social media data

CO2. Articulate data aggregation, key metrics, and usage of proper analytical tools for discerning insights.

CO3. Illustrate the methods to analyze keywords, sentiments and campaigns in social media.

CO4. Compare the use of dedicated and hybrid tools in social media analytics

UK7DSECSC403-FULL STACK DEVELOPMENT

CO1. Summarize basic concepts of full stack development

CO2. Develop Applications using Express and Angular

CO3. Build Applications with REACT

CO4. Construct a MERN Stack



Dr. BIJI P. THOMAS
PRINCIPAL
NAIPUNNYA SCHOOL OF MANAGEMENT
CHERTHALA-688 524