KLS Vishwanathrao Deshpande Institute of Technology, Haliyal

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Semester: III **Year: 2022-2023**

Course Title	**Advanced C and Graphics**		
Total Teaching Hours	30	Teaching Hours/Week	3
Internal AssessmentMarks	05		

Course Learning Objectives:

1. To Learn the concept of Dynamic memory allocation.
2. To Study File concepts and File handling.
3. To be able to learn graphics in C

Course Content (Syllabus)

MODULE-1 **Files, Dynamic memory allocation ,C Graphics** Files: file Concepts, File Pointer, File Modes, file Opening, File Reading, File Writing ,File Closing, Dynamic Memory Allocation, command line Arguments, C Graphics : Graphics header file, Graphics Driver Initialization, cleardevice(), getpixel(), putpixel(), floodfill(),setcolor(),floodfill(),Drawing circle, ellipse ,line ,rectangles.	10 Hrs
MODULE-2 **Hands on activity** Code snippets on various programming features	10 Hrs
MODULE-3 **Solving Real world Problems(projects)** Customer Billing System, Bank Management System, Quiz Game, Typing Tutor,Library Management System, graphics Editor, Freehand drawing,	10 Hrs

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Syllabus

Semester: V **Year: 2022-2023**

Course Title	Graph Theory and Combinatorics		
Total Teaching Hours	30	Teaching Hours/Week	3
Internal Assessment Marks	05		

Course Learning Objectives: This course will enable students to

1. To learn the fundamentals of graph theory and tree.
2. To learn various optimization and matching theory techniques.
3. To learn the principles of counting, inclusion and exclusion.

Course Content (Syllabus)

MODULE-1 **Module – 1 : Introduction to Graph Theory** Definitions and Examples, Subgraphs, Complements, and Graph Isomorphism, Vertex Degree, Euler Trails and Circuits, Planar Graphs, Hamilton Paths and Cycles, Graph Colouring, and Chromatic Polynomials.	10 Hrs
MODULE-2 **Module-2 :**Trees, Otimization and Matching Trees: Definitions, Properties, and Examples, Routed Trees, Trees and Sorting, Weighted Trees and Prefix Codes. Optimization and Matching: Dijkstra"s Shortest Path Algorithm, Minimal Spanning Trees – The algorithms of Kruskal and Prim, Transport Networks – Max-flow, Min-cut Theorem, Matching Theory	10Hrs
Module-3 : Principles of counting, exclusion and exclusion Fundamental Principles of Counting: The Rules of Sum and Product, Permutations, Combinations – The Binomial Theorem, Combinations with Repetition, The Catalon Numbers . The Principle of Inclusion and Exclusion: The Principle of Inclusion and Exclusion, Generalizations of the Principle, Derangements – Nothing is in its Right Place, Rook Polynomials	10Hrs

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Semester: VII **Year: 2022-2023**

Course Title	**Image Processing using SCILAB**		
Total Teaching Hours	30	Teaching Hours/Week	3
Internal AssessmentMarks	05		

Course Learning Objectives:

- To understand image representation.
- To Apply knowledge of mathematics for image understanding and analysis.
- To implement image processing algorithms in SCILAB.

Course Content (Syllabus)

MODULE-1 **INTRODUCTION** A Digital Image and Its Processing, Information of Scilab Software, How to Obtain and Install Scilab, How to Install the Image Processing Toolbox in Scilab, Areas of Image Processing	10 Hrs
MODULE-2 **Image Enhancement in the Spatial Domain** Image Enhancement by Point Processing, Histogram, Spatial Domain Filters, Image Enhancement Using Arithmetic/Logical Operations. **Image Enhancement in the Frequency Domain** Fourier Transform, Low-Pass Frequency Domain Filter, High-Pass Frequency Domain Filter, Unsharp Masking.	10 Hrs
MODULE-3 **Image Restoration** Image Degradation and Restoration Process, Noise Models, Periodic Noise and Estimation of Noise Parameters, Image Restoration: Spatial Filtering, Wiener Filtering. **Morphological Image Processing** Fundamental Morphology Operations, Compound Morphology Operations, Hit or Miss Transform.	10 Hrs

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Syllabus

Semester: IV **Year: 2022-23**

Course Title	SOFTWARE ENGINEERING		
Total Teaching Hours	30	Teaching hours/week	03
Assessment Marks	10		

Course Learning Objectives:

This course will enable students to,

CO1: Design a software system, component, or process to meet desired needs within realistic constraints

CO2: Assess professional and ethical responsibility

CO3: Function on multi-disciplinary teams

CO4: Use the techniques, skills, and modern engineering tools necessary for engineering practice.

CO5: Analyze, design, implement, verify, validate, implement, apply, and maintain software systems or parts of software systems

Course Content

Module 1	10 Hours
Introduction: Software Crisis, Need for Software Engineering. Professional Software Development, Software Engineering Ethics. Software Processes: Models: Waterfall Model, Incremental Model and Spiral Model. Process activities. **Requirements Engineering**: Requirements Engineering Processes Requirements Elicitation and Analysis. Functional and non-functional requirements . The software Requirements Document. Requirements Specification. Requirements validation . Requirements Management .	
Module 2	**10 Hours**
Software Requirements: Functional and Non-functional requirements; User requirements; System requirements; Interface specification; The software requirements document. **Requirements Engineering Processes**: Feasibility studies; Requirements elicitation and analysis; Requirements validation; Requirements management. Design and Implementation: **System Models**: Context models; Behavioral models; Data models; Object models; Structured methods. **Project Management**: Management activities; Project planning; Project scheduling; Risk management	
Module-3	**10 Hours**
Rapid Software Development: Agile methods; Extreme programming; Rapid application development. **Software Evolution**: Program evolution dynamics; Software maintenance; Evolution processes; Legacy system evolution. **Verification and Validation**: Planning; Software inspections; Automated static analysis; Verification and formal methods. **Software testing**: System testing; Component testing; Test case design; Test automation.	

Course Coordinator

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Year: 2022-23

Semester: VI

Course Title	MONGO DB		
Total Teaching Hours	30	Teaching hours/week	03
Assessment Marks	10		

Course Learning Objectives:

This course will enable students to

1. Understand NoSQL databases and their advantages
2. Design Data Model relationships and tree structure
3. Insert, query, update, and delete documents
4. Understand scalability using sharding and replication.

Course Content

Module – 1 **Introduction:** Need of a database, Different types of database, Relational vs. Non-relational database, Installation of Mongodb, Introduction to NoSQL Databases, NoSQL features, Different types of NoSQL Databases, Introduction to MongoDB, MongoDB architecture, Data modelling in MongoDB, Advantages of MongoDB over RDBMS.	10 Hours
Module-2 **MongoDB CRUD Operations**: Insert Documents, Query Documents, Update Documents, Delete Documents, SQL to MongoDB Mapping. **Aggregation Operations**: Aggregation Pipeline, Aggregation Pipeline Limits.	10 Hours
Module-3 **Replication:** Replica Set Deployment Architectures, Replica Set High Availability, Replica Set Read and Write Semantics. **Sharding:** Sharded Cluster Components, Shard Keys, Sharded Cluster Balancer. **Storage:** Storage Engines, Journaling	10 Hours

Course Coordinator

Kavita J. Kulkarni
(K/6)

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Syllabus

Semester: VIII **Year: 2022-23**

Course Title	System Modeling and Simulation		
Total Teaching Hours	30		
Assessment Marks	10	Teaching hours/week	03

Course Learning Objectives:

This course will enable students to

1. Explain the basic system concept and definitions of system.
2. Discuss techniques to model and simulate various systems.
3. Analyze a system and to make use of the information to improve the performance.

Course Content

Module – 1 **Introduction:** When Simulation is appropriate tool and when it is not appropriate, Advantages and disadvantages of Simulation, Areas of Application, Systems and system environment, Components of a system, Discrete and Continuous Systems, Model of a system, Types of models, Discrete Event System simulation, Simulation Examples: Simulation of Queuing Systems.	10 Hours
Module-2 **Statistical Models in Simulation**: Review of terminology and concepts, Useful statistical models, Discrete distributions, Continuous distributions, Poisson process, Empirical distributions. **Random-Number Generation:** Properties of random numbers; Generation of pseudo-random numbers, Techniques for generating random numbers, Tests for Random Numbers.	10 Hours
Module-3 **Random-Variate Generation**: Inverse Transform Technique, Acceptance-RejectionTtechnique. **Input Modeling:** Data Collection; Identifying the distribution with data, Parameter estimation, Goodness of Fit Tests, Fitting a non-stationary Poisson process, Selecting input models without data, Multivariate and Time-Series input models. **Estimation of Absolute Performance:** Types of simulations with respect to output analysis, stochastic nature of output data, Measures of performance and their estimation, Output analysis for terminating simulations	10 Hours

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