MATA TRIPURA SUNDARI OPEN UNIVERSITY

Agartala, Tripura

CSB-1111

SCHOOL OF COMPUTER AND INFORMATION TECHNOLOGY

MANAGEMENT INFORMATION SYSTEM

Registrar
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Gomati-Tripura

BACHELOR OF COMPUTER SCIENCE

BACHELOR OF COMPUTER APPLICATIONS (BCA)

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IGNOU, New Delhi

Prof. V.V. Subrahmanyam
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IGNOU, New Delhi

Prof. S. Nagakishore Bhavanam
Professor of Computer Science
Mangalayatan University, Jabalpur

Prof. Jawed Wasim
Professor of Computer Science
Mangalayatan University, Aligarh

COURSE WRITERS

Dr. Md. Amir Khusru Akhtar
Associate Professor of Computer Science
MTSOU, Tripura
CSB-1111 Management Information System

Dr. Ankur Kumar
Assistant Professor
MTSOU, Tripura
CSB-1112 Problem solving through 'C'
CSB-1101 Fundamentals of Computer System and Office Automation

Dr. Manish Saxena
Assistant Professor of Computer Science
MTSOU, Tripura
CSB-1113 Mathematics-I

Dr. Duvvuri B. K. Kamesh
Assistant Professor of Computer Science
MTSOU, Tripura
CSB-1114 Financial Accounting

Mr. Pankaj Kumar
Assistant Professor of Computer Science
Mangalayatan University, Aligarh
CSB-1151 Problem solving through 'C' Lab

Ms. Vanshika Singh
Assistant Professor of English
MTSOU, Tripura
ENB-1101 English Communication

Dr. Richa Verma
Assistant Professor of Hindi
MTSOU, Tripura
HNB-1101 रचनात्मक और समाचार लेखन

COURSE EDITORS

Prof. S. Nagakishore Bhavanam
Professor of Computer Science
Mangalayatan University, Jabalpur

Prof. Jawed Wasim
Professor of Computer Science
Mangalayatan University, Aligarh

Dr. Manoj Varshney
Associate Professor of Computer Science
Mangalayatan University, Ailgarh

Dr. M. P. Mishra
Associate Professor of Computer Science
IGNOU, New Delhi

Dr. Akshay Kumar
Associate Professor of Computer Science
IGNOU, New Delhi

Dr. Rahul Kumar
Associate Professor of Hindi
MTSOU, Tripura

Dr. Shaifali R. Puri
Associate Professor of English
Himalayan University, Etanagar

FORMAT EDITORS

Dr. Nitendra Singh
Associate Professor of English
MTSOU, Tripura

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MTSOU, Tripura

Dr. Faizan
Assistant Professor of English
MTSOU, Tripura

Ms. Vanshika Singh
Assistant Professor of English
MTSOU, Tripura

MATERIAL PRODUCTION

1. Mr. Himanshu Saxena
2. Ms. Rainu Verma
3. Mr. Jeetendra Kumar
4. Mr. Khiresh Sharma
5. Mr. Ankur Kumar Sharma
6. Mr. Pankaj Kumar

Block I: Introduction to Management Information Systems

Unit 1: Overview of Management Information Systems: Definition and scope of MIS, Importance of MIS in organizations, Historical development and evolution of MIS

Unit 2: Information Technology Infrastructure: Components of information technology infrastructure, Hardware, software, networks, and telecommunications, Cloud computing and emerging trends in IT infrastructure

Unit 3: Database Management Systems (DBMS): Introduction to database concepts, Relational database management systems (RDBMS), Database design, normalization, and query languages

Unit 4: Systems Development Life Cycle (SDLC): Overview of SDLC phases: planning, analysis, design, implementation, and maintenance, Approaches to system development: waterfall, agile, and iterative

Block II: System Analysis and Design

Unit 5: Requirements Analysis and Modeling: Elicitation and documentation of user requirements, Use case diagrams, entity-relationship diagrams (ERD), and data flow diagrams (DFD)

Unit 6: System Design and Architecture: Design principles and methodologies, Architectural models: client-server, peer-to-peer, and cloud-based architectures

Unit 7: Information Systems Security and Risk Management: Threats to information security, Risk assessment and mitigation strategies, Security policies, procedures, and controls

Unit 8: IT Governance and Compliance: Principles of IT governance, Regulatory compliance (e.g., GDPR, HIPAA), IT audit and assurance

Block III: Managing Information Systems

Unit 9: Project Management in Information Systems: Project planning, scheduling, and resource allocation, Project management methodologies (e.g., PMBOK, PRINCE2), Risk management and project success factors

Unit 10: Strategic Role of Information Systems: Aligning IT with business strategy, Competitive advantage through IT-enabled innovation, Digital transformation and disruptive technologies

Unit 11: Business Intelligence and Analytics: Data-driven decision-making, Data warehousing and data mining techniques, Business analytics tools and techniques

Unit 12: Enterprise Systems and ERP: Overview of enterprise systems, Enterprise Resource Planning (ERP) systems, Implementation challenges and best practices

Block IV: Strategic Management of Information Systems

Unit 13: Emerging Trends in MIS: Internet of Things (IoT) and connected devices, Artificial Intelligence (AI) and machine learning in MIS, Blockchain technology and decentralized applications

Unit 14: E-Business and E-Commerce: Fundamentals of e-business and e-commerce, E-commerce platforms and business models, Legal and ethical issues in e-commerce

Unit 15: Knowledge Management Systems: Introduction to knowledge management, Knowledge management tools and techniques, Implementing and evaluating knowledge management systems

Unit 16: Case Studies and Future Directions in MIS: Case studies of MIS in various industries, Future directions and trends in MIS, Integrative project on MIS strategy

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SYSTEM ANALYSIS & DESIGN

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Prof. Jawed Wasim
Professor of Computer Science
Mangalayatan University, Aligarh

COURSE WRITERS

Dr. Md. Amir Khusru Akhtar
Associate Professor of Computer Science
MTSOU, Tripura
CSB-1211 System Analysis & Design

Dr. Ankur Kumar
Assistant Professor
MTSOU, Tripura
CSB-1212 C++ & Data Structure

Dr. Manish Saxena
Assistant Professor of Computer Science
MTSOU, Tripura
CSB-1213 Ordinary Differential Equations

Dr. Duvvuri B. K. Kamesh
Assistant Professor of Computer Science
MTSOU, Tripura
CSB-1214 Fundamentals of Electronics

Mr. Pankaj Kumar
Assistant Professor of Computer Science
Mangalayatan University, Aligarh
CSB-1251 C++ & Data Structure Lab

Ms. Vanshika Singh
Assistant Professor of English
MTSOU, Tripura
ENB-1201 Creative Writing

Dr. Richa Verma
Assistant Professor of Hindi
MTSOU, Tripura
HNB-1201 फिल्म और मीडिया लेखन

Dr. Rajnesh Panwar
Assistant Professor of Mathmatics
IIMT University, Meerut
SEC-1201 Reasoning

COURSE EDITORS

Prof. S. Nagakishore Bhavanam
Professor of Computer Science
Mangalayatan University, Jabalpur

Prof. Jawed Wasim
Professor of Computer Science
Mangalayatan University, Aligarh

Dr. Manoj Varshney
Associate Professor of Computer Science
Mangalayatan University, Ailgarh

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MTSOU, Tripura

Dr. Shaifali R. Puri
Associate Professor of English
Himalayan University, Etanagar

Dr. Manju Bala
Associate Professor of Mathmatics
Shri Varshney college, Aligarh

FORMAT EDITORS

Dr. Nitendra Singh
Associate Professor of English
MTSOU, Tripura

Ms. Angela Fatima Mirza
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MATERIAL PRODUCTION

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Block-I: System Concepts and Information Systems Environment

Unit-1: The System Concept: Definition, Characteristics of Systems, Elements of a System, Open and Closed System,
Unit-2: Formal and Informal Information Systems, Computer based Information Systems,
Unit-3: Management Information System, Decision Support System, General Business Knowledge, and Interpersonal Communicational System.

Block-II: The System Development Life Cycle

Unit-4: Recognition of needs, Impetus for System Change, Feasibility Study, Analysis, Design, Implementation, Post implementation & Maintenance.
Unit- 5: The Role of the Systems Analyst: Historical Perspective, The War Effort, What Does it takes to do System Analysis, Academic & Personal Qualifications,
Unit-6: The Multi-faceted role of the Analyst, The Analyst/User Interface, Behaviorassues.

Block-III: Systems Planning & Initial Investigation

Unit-7: Strategies for Determining Information Requirement.
Unit-8: Problem Definition & Project initiation, Background Analysis, Fact Analysis, Review of Written Documents,
Unit-9: Onsite Observations, Interviews & Questionnaires, Fact Analysis, Performance Analysis, Efficiency Analysis, Service Analysis.

Block-IV: Information Gathering

Unit-10: What Kind of Information do we need? Information about the firms, Information gathering tools,
Unit-11: The art of Interviewing, Arranging the Interview, Guides to a Successful Interview, Types of Interviews and Questionnaires, The Structured and Unstructured Alternatives.
Unit-12: The Tools of Structured Analysis: The Data flow Diagram (DFD), Data Dictionary, Decision Trees and Structured English.

Block-V: Feasibility Study

Unit-13: System performance, Economic Feasibility, Technical Feasibility, Behavioral Feasibility, Steps in Feasibility Analysis.
Unit-14: Input / Output and Forms Design: Input Design, CRT Screen Design, Output Design, Requirements of form Design.
Unit-15: H/W/S/W Selection and Maintenance: The Computer Industry, S/W Industry, a Procedure for H/W/S/W Selection, Major Phases in Selection, Criteria for S/W Selection, The Used Computer, The Computer Contract.
Unit 16: System Maintenance: System Maintenance and Evolution, Maintenance strategies, Software evolution and version control, Change management, Emerging Trends, Introduction to agile methodologies

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Prof. S. Nagakishore Bhavanam
Professor of Computer Science
Mangalayatan University, Jabalpur

Prof. Jawed Wasim
Professor of Computer Science
Mangalayatan University, Aligarh

COURSE WRITERS

Dr. Md. Amir Khusru Akhtar
Associate Professor of Computer Science
MTSOU, Tripura
CSB-2111 Computer Organization

Dr. Ankur Kumar
Assistant Professor
MTSOU, Tripura
CSB-2112 Operating System

Mr. Pankaj Kumar
Assistant Professor of Computer Science
Mangalayatan University, Aligarh
CSB-2151 Operating System Lab

Ms. Vanshika Singh
Assistant Professor of English
MTSOU, Tripura
ENB-2101 Personality Development

Dr. Richa Verma
Assistant Professor of Hindi
MTSOU, Tripura
HNB-2101 पटकथा लेखन

Dr. Toku Bani
Assistant Professor of Environmental Studies
MTSOU, Tripura
VAC-2101 Environmental Education

Dr. Rajnesh Panwar
Assistant Professor of Mathmatics
IIMT University, Meerut
CSB-2113 Integral Calculus
CSB-2114 Computer Based Numerical Methods

COURSE EDITORS

Prof. S. Nagakishore Bhavanam
Professor of Computer Science
Mangalayatan University, Jabalpur

Prof. Jawed Wasim
Professor of Computer Science
Mangalayatan University, Aligarh

Dr. Manoj Varshney
Associate Professor of Computer Science
Mangalayatan University, Aligarh

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Dr. Rahul Kumar
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MTSOU, Tripura

Dr. Shaifali R. Puri
Associate Professor of English
Himalayan University, Etanagar

Dr. Manju Bala
Associate Professor of Mathmatics
Shri Varshney college, Aligarh

Dr. Seema Anand
Associate Professor of Botany
Shri Varshney College, Aligarh

FORMAT EDITORS

Dr. Nitendra Singh
Associate Professor of English
MTSOU, Tripura

Ms. Angela Fatima Mirza
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Block – I: Foundations of Computer Organization

Unit 1: Introduction to Computer Organization and Architecture, Basic concepts and components of computer systems, Historical perspective and evolution of computer architecture, Digital Logic and Circuits, Boolean algebra and logic gates

Unit 2: Digital Logic and Circuits (Continued)

Combinational and sequential circuits, Designing and analyzing digital circuits, Arithmetic circuits and ALU design, Simplification of Boolean functions, NAND or NOR implementation, Don't care condition, Tabulation method, Adder, subtractor, Code Conversion, Universal Gate

Unit 3: Sequential Logic:

Flip-flops, Triggering of Flip-flops, Analysis of clocked sequential, circuits, State reduction and Assignment, Flip-flop excitation

Unit 4: CPU Structure and Function

Instruction set architecture (ISA), CPU components: ALU, control unit, registers, Design of counters, Design with state equations, Register Transfer Language, Register transfer, Bus and Memory transfer

Block – II: Processor Architecture and Design

Unit 5: CPU Structure and Function (Continued), Microarchitecture and instruction execution, Performance metrics and benchmarks

Unit 6: Memory Systems, Memory hierarchy: cache, main memory, secondary storage, Memory technologies and organization

Unit 7: Memory Systems Cache memory: principles and optimization techniques, Virtual memory concepts and implementation.

Unit 8: Basic Computer Organization and Design, Instruction codes, Computer registers, Computer instructions, Timing and Control, Instruction cycle, Memory-Reference Instructions, Input-output and interrupt, Design of Basic computer, Design of Accumulator Unit

Unit 9: Input/Output Systems, I/O interface and devices, Polling, interrupts, and DMA, Programming Arithmetic and logic operations, Subroutines, I-O Programming

Block – III: Memory Systems and Interfacing

Unit 10: Input/Output Systems, Bus architectures and protocols, Storage devices and technologies

Unit 11: Pipelining, Basic concepts and principles of pipelining, Pipelined CPU design and optimization, Pipelining, Hazards and their resolution techniques, Advanced pipelining techniques

Unit 12: Heterogeneous Computing and Accelerators, GPU architectures and programming models, FPGA-based accelerators, Domain-specific accelerators (e.g., AI accelerators)

Unit 13: Parallel Processing, Concepts of parallel processing, Types of parallelism: SIMD, MIMD

Block – IV: Parallel and Distributed Computing

Unit 14: Parallel Processing, Multiprocessor systems and architectures, Cache coherence protocols

Unit 15: Advanced Topics in Computer Architecture, Multicore and manycore architectures, Energy-efficient computing techniques

Unit 16: Emerging Trends in Computer Architecture, Quantum computing, Neuromorphic computing, Energy-Efficient Architectures, Techniques for energy-efficient computing, Low-power processor and system design, Energy-aware programming models and optimizations

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Mangalayatan University, Jabalpur

Prof. Jawed Wasim
Professor of Computer Science
Mangalayatan University, Aligarh

COURSE WRITERS

Dr. Md. Amir Khusru Akhtar
Associate Professor of Computer Science
MTSOU, Tripura
CSB-2211 Analysis and Design of Algorithms

Dr. Ankur Kumar
Assistant Professor
MTSOU, Tripura
CSB-2212 Object Oriented Programming with Java

Dr. Manish Saxena
Assistant Professor of Computer Science
MTSOU, Tripura
CSB-2214 Database Management System

Mr. Pankaj Kumar
Assistant Professor of Computer Science
Mangalayatan University, Aligarh
CSB-2251 Object Oriented Programming with Java Lab

Ms. Vanshika Singh
Assistant Professor of English
MTSOU, Tripura
ENB-2201 Basic Knowledge of English Grammar

Dr. Richa Verma
Assistant Professor of Hindi
MTSOU, Tripura
HNB-2201 कार्यालयी लेखन

Dr. Tariq Anwar
Associate Professor of Political Science
MTSOU, Tripura
VAC-2201 Understanding India

Dr. Rajnesh Panwar
Assistant Professor of Mathmatics
IIMT University, Meerut
CSB-2213 Matrix Theory

COURSE EDITORS

Prof. S. Nagakishore Bhavanam
Professor of Computer Science
Mangalayatan University, Jabalpur

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Block I: Introduction to Algorithms and Analysis

Unit 1: Introduction to Algorithms: Definition of algorithms, algorithmic problem-solving, and algorithm design paradigms, Overview of algorithm analysis techniques: time complexity, space complexity, and big-O notation.

Unit 2: Algorithm Analysis: Asymptotic analysis: big-O, big-Theta, and big-Omega notation, Worst-case, average-case, and best-case analysis of algorithms.

Unit 3: Divide and Conquer: Divide and conquer paradigm: principles and applications, Examples of divide and conquer algorithms: merge sort, quicksort, binary search.

Unit 4: Advanced Data Structures:: Priority queues and heaps, Disjoint-set data structures, Hash tables and hashing techniques

Block II: Advanced Algorithm Design Paradigms

Unit 5: Dynamic Programming: Principles of dynamic programming and memorization, Examples of dynamic programming algorithms: Fibonacci sequence, knapsack problem.

Unit 6: Greedy Algorithms: Greedy algorithm paradigm: characteristics and applications, Examples of greedy algorithms: minimum spanning tree, shortest path algorithms.

Unit 7: Backtracking: Backtracking paradigm: principles and techniques, Examples of backtracking algorithms: N-Queens problem, Sudoku solver.

Unit 8: Branch and Bound: : General method, applications - travelling sales person problem, knapsack problem- LC branch and bound solution, FIFO branch and bound solution

Block III: Specialized Topics in Algorithm Design

Unit 9: Graph Algorithms: Graph representation and traversal techniques: DFS, BFS,

Unit 10: Path Algorithms: Shortest path algorithms (Dijkstra's, Bellman-Ford), minimum spanning tree algorithms (Prim's, Kruskal's).

Unit 11: Network Flow Algorithms Maximum flow and minimum cut problems, Network flow algorithms: Ford-Fulkerson algorithm, Edmonds-Karp algorithm.

Unit 12: String Matching Algorithms Brute-force and efficient string-matching algorithms. Examples: Knuth-Morris-Pratt (KMP) algorithm, Boyer-Moore algorithm.

Unit 13: Approximation Algorithms: Introduction to approximation algorithms and approximation ratio. Examples: vertex cover, traveling salesman problem.

Block IV: Randomization Algorithm and Advanced Algorithms

Unit 14: Randomized Algorithms: Randomized algorithm paradigm: principles and applications Examples: randomized quicksort, Monte Carlo algorithms.

Unit 15: Parallel and Distributed Algorithms: Parallel algorithm design techniques: parallel prefix, parallel sorting, Distributed algorithm paradigms: message-passing, shared memory.

Unit 16: Advanced Topics: NP-HARD AND NP-COMPLETE PROBLEMS: Basic concepts, non-deterministic algorithms, NP-hard and NP-complete classes, Cook‘s theorem.

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