Takshashila University

(State Private University)

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Ongur, Tindivanam, Villupuram District, Tamilnadu - 604305

Department of Computer Science and Engineering

I. Data Structures

Abstract Data Types (ADTs) – List ADT-Stack ADT – Operations – Applications-Tree ADT – Tree Traversals – Binary Tree ADT – Expression trees – Binary Search Tree ADT – AVL Trees- Graph Definition – Representation of Graphs – Types of Graph – Breadth-first traversal – Depth-first traversal –– Bi-connectivity – Euler circuits – Topological Sort – Dijkstra's algorithm – Minimum Spanning Tree – Prim's algorithm – Kruskal's Algorithm- Searching- Sorting-Hashing

II. Design and Analysis of Algorithms

Notion of an Algorithm – Fundamentals of Algorithmic Problem Solving – Fundamentals of the Analysis of Algorithmic Efficiency –Asymptotic Notations and their properties. – Mathematical analysis for Recursive and Non-Recursive Algorithms-Brute Force and Divide- And-Conquer-String Matching – Closest-Pair and Convex-Hull Problems -Exhaustive Search – Travelling Salesman Problem – Knapsack Problem – Assignment problem. Divide and Conquer Methodology – Binary Search – Merge sort – Quick sort – Heap Sort

III. Operating Systems

Operating System Structures - Simple Batch, Multiprogrammed, Parallel, Distributed Systems, Real-Time Systems, System components, Process and CPU Scheduling - Process concepts and scheduling, Memory Management and Virtual Memory - Logical versus Physical Address Space, Swapping, Contiguous Allocation, Paging, Segmentation, Segmentation with Paging, Demand Paging, Page Replacement, Page Replacement Algorithms. File System Interface and Operations -Access methods, Directory Structure, Protection, File System Structure, Allocation methods, Free-space Management.

IV. Software Engineering Concepts

Introduction to Software Engineering: Process models: Software Requirements: Functional and non-functional requirements, user requirements, system requirements, Requirements engineering process: Feasibility studies, requirements elicitation and analysis, requirements validation, requirements management. conceptual model of UML, basic structural modeling, class diagrams, sequence diagrams, collaboration diagrams, use case diagrams, component diagrams. Testing Strategies: Metrics for Process and Products: Software measurement, metrics for software Quality-Risk management

V. Database Design

Entity-Relationship model – E-R Diagrams – Enhanced-ER Model – ER-to-Relational Mapping – Functional Dependencies –Normal forms-ACID Properties-Concurrency Control-Deadlock Handling-RAID – File Organization-Distributed Databases-Database Security: Security issues – Access control based on privileges – Role Based access control

Department of Electronics and Communication Engineering

I. Electronic Devices
Energy bands in silicon, intrinsic and extrinsic silicon. Carrier transport in silicon: diffusion current, drift current, mobility, and resistivity. Generation and recombination of carriers. p-n junction diode, Zener diode, tunnel diode, BJT, JFET, MOS capacitor, MOSFET, LED, p-i-n and avalanche photo diode, Basics of LASERs. Applications of diodes: HWR, FWR, clipper, clamper

II. Analog and Digital Circuits
Analog Circuits: BJT and CMOS circuits and amplifiers, Inverting and non-inverting operational amplifiers, Differential amplifiers, practical opamp parameters, open-loop and closed-loop frequency response, gain-bandwidth product, slew rate, CMRR. Adder, integrators, differentiators, voltage comparators, Schmitt trigger, peak detector, class A, B, C and AB power amplifiers

Digital Circuits: Logic gates, Boolean Algebra, Synthesis Using AND, OR, NOT, NAND and NOR Gates. Design Examples – Karnaugh Map – Strategy for Minimization, Minimization of sum of products, product of Sums forms, Combinational Circuits: Multiplexers- Decoders – Encoders, Code Converters, Sequential circuits: Flip flop, Registers, Counters, Semiconductor memories. Microprocessor (8085): architecture, programming, memory and I/O interfacing

III. Digital Signal Processing
Definitions and properties of Laplace transform, continuous-time and discrete-time Fourier series, continuous-time and discrete-time Fourier Transform, DFT and FFT, z-transform. Sampling theorem. Linear Time-Invariant (LTI) Systems: definitions and properties; causality, stability, impulse response, convolution, poles and zeros, parallel and cascade structure, frequency response, group delay, phase delay. Signal transmission through LTI systems

IIR filter design: Characteristics of commonly used analog filters – Butterworth and Chebysheve filters, analog to analog frequency transformations. Design of IIR filters from analog filters (Butterworth and Chebyshev) - impulse invariance method, Bilinear transformation method.

FIR filter design: Introduction to FIR filters, design of FIR filters using - Rectangular, Hamming, Barlet and Kaiser windows

IV. Electromagnetics
Elements of vector calculus: divergence and curl; Gauss' and Stokes' theorems, Maxwell's equations: differential and integral forms. Wave equation, Poynting vector. Plane waves: propagation through various media; reflection and refraction; phase and group velocity; skin depth. Transmission lines: characteristic impedance; impedance transformation; Smith chart; impedance matching; S parameters, pulse excitation. Waveguides: modes in rectangular waveguides; boundary conditions; cut-off frequencies; dispersion relations. Basics of propagation in dielectric waveguide and optical fibers. Basics of Antennas: Dipole antennas; radiation pattern; antenna gain

V. Communication Engineering
Analog communications: Analog modulation schemes – AM, FM, PM, spectrum analysis, superhetero dyne receivers, Random process and Noise

Digital communications: sampling – quantization – encoding – aliasing – Nyquist rate - Modulation schemes PAM, PCM, PSK, FSK, QAM and higher order of modulation techniques and their error performance – pulse shaping, matched filter.

Department of Management

I. Managerial Functions

Management – Concept, Process, Theories and Approaches, Management Rolesand Skills Functions – Planning, Organizing, Staffing, Coordinating and Controlling.Communication – Types, Process and Barriers. Decision Making – Concept, Process, Techniques and Tools Organisation Structure and Design – Types, Authority, Responsibility, Centralisation, Decentralization and Span of Control, Managerial Economics – Concept & Importance Demand analysis – Utility Analysis, Indifference Curve, Elasticity & ForecastingMarket Structures – Market Classification & Price Determination, National Income – Concept, Types and MeasurementInflation – Concept, Types and Measurement Business Ethics & CSR Ethical Issues & Dilemma Corporate Governance Value Based Organisation

II. Organizational Behaviour

Organizational Behaviour – Significance & Theories, Individual Behaviour – Personality, Perception, Values, Attitude, Learning and Motivation, Group Behaviour – Team Building, Leadership, Group Dynamics Interpersonal Behaviour & Transactional Analysis, Organizational Culture & Climate, Work Force Diversity & Cross Culture Organizational Behaviour, Emotions and Stress Management, Organizational Justice and Whistle Blowing, Human Resource Management – Concept, Perspectives, Influences and Recent Trends, Human Resource Planning, Recruitment and Selection, Induction, Training and Development, Job Analysis, Job Evaluation and Compensation Management

Human Resource Management

Strategic Role of Human Resource ManagementCompetency Mapping & Balanced Scoreboard Career Planning and Development, Performance Management and Appraisal, Organization Development, Change & OD InterventionsTalent Management & Skill Development, Employee Engagement & Work Life Balance, Industrial Relations: Disputes & Grievance Management, Labour Welfare and Social Security, Trade Union & Collective Bargaining, International Human Resource Management – HR Challenge of InternationalBusiness, Green HRM

III. Accounting

Accounting Principles and Standards, Preparation of Financial Statements, Financial Statement Analysis – Ratio Analysis, Funds Flow and Cash FlowAnalysis, DuPont Analysis, Preparation of Cost Sheet, Marginal Costing, Cost Volume Profit AnalysisStandard Costing & Variance Analysis, Financial Management, Concept & Functions, Capital Structure – Theories, Cost of Capital, Sources and Finance Budgeting and Budgetary Control, Types and Process, Zero base Budgeting, Leverages – Operating, Financial and Combined Leverages, EBIT–EPS Analysis, Financial Breakeven Point & Indifference Level.

Financial Management

Value & Returns – Time Preference for Money, Valuation of Bonds and Shares, Risk and Returns, Capital Budgeting – Nature of Investment, Evaluation, Comparison of Methods;Risk and Uncertainly Analysis, Dividend – Theories and Determination, Mergers and Acquisition – Corporate Restructuring, Value Creation, MergerNegotiations, Leveraged Buyouts, Takeover, Portfolio Management – CAPM, APT, Derivatives – Options, Option Payoffs, Option Pricing, Forward Contracts &Future Contracts, Working Capital Management – Determinants, Cash,

Inventory, Receivables and Payables Management, Factoring, International Financial Management, Foreign exchange market

IV. Marketing Management
Consumer and Industrial Buying Behaviour: Theories and Models of Consumer Behaviour Brand Management – Role of Brands, Brand Equity, Equity Models, Developinga Branding Strategy; Brand Name Decisions, Brand Extensions and Loyalty, Logistics and Supply Chain Management, Drivers, Value creation, Supply ChainDesign, Designing and Managing Sales Force, Personal Selling, Service Marketing – Managing Service Quality and Brands, Marketing Strategies of Service Firms, Customer Relationship Marketing – Relationship Building, Strategies, Values andProcess ,Retail Marketing – Recent Trends in India, Types of Retail Outlets, Emerging Trends in Marketing – Concept of e-Marketing, Direct Marketing,Digital Marketing and Green Marketing, International Marketing – Entry Mode Decisions, Planning Marketing Mix forInternational Markets

V. Entrepreneurship
Entrepreneurship Development – Concept, Types, Theories and Process, Developing Entrepreneurial Competencies, Intrapreneurship – Concept and Process, Women Entrepreneurship and Rural Entrepreneurship, Innovations in Business – Types of Innovations, Creating and IdentifyingOpportunities, Screening of Business Ideas, Business Plan and Feasibility Analysis – Concept and Process of Technical, Market and Financial Analysis, Micro and Small Scale Industries in India; Role of Government in Promoting SSI Sickness in Small Industries – Reasons and Rehabilitation, Institutional Finance to Small Industries – Financial Institutions, CommercialBanks, Cooperative Banks, Micro Finance.