

GOVERNMENT DEGREE COLLEGE
LARKANA



SYLLABUS

BS (CS)-II

4th SEMESTER

Information System

- ❖ Systems theory & Concepts
 - Environment and boundaries
 - Natural and human – made system
 - Process and transformation process
 - System Model
 - System Architecture
- ❖ Types of Systems
 - Physical or Abstract systems
 - CBI systems
 - Real Time System
- ❖ Systems Components & Relationships
 - Systems Environment
 - Open versus Closed Systems
- ❖ Information systems vs. Organizational systems
 - Formal / Informal Information systems
 - 'Man – made' Information systems
 - Organizational Characteristics
 - Organizational Structure
- ❖ Quality level of systems in planning and control
 - Strategic
 - Tactical
 - Operational
- ❖ Information Systems Strategies
 - Strategic Analysis & Choice of Strategy
 - Strategy Implementation
 - Information Technology & Corporate Strategic Planning
 - Strategic MIS Planning
- ❖ Role of Information and Information Technology
 - Information Resource Management
 - Components of Computer Based Information System
 - Hardware Fundamentals
 - Software Fundamentals
 - Database Management
 - Telecommunication
- ❖ Decision Support Systems
 - DSS Goals & Applications
 - Components of a DSS
 - Putting A DSS To Work
- ❖ Role of people using , developing and managing systems
 - Role of Managers & Users In System Development
 - System Development Life Cycle
 - System development team
 - Levels of Management
 - Managerial Roles
- ❖ Information system planning and change management
 - Role of Information System In Planning
 - Managerial Styles
- ❖ Human – computer interface
 - OA
- ❖ Information system development process
 - Office & Office System
 - Research & Development Information System

DEPARTMENT OF COMPUTER SCIENCE

- ❖ Evaluation of system performance
 - Potential Problems with existing systems
 - Successful systems development : essential elements
 - End – User Development
 - Feasibility Assessment
- ❖ Social & ethical issues related to IS design & use

Recommended Books:

Introduction to information system

By:

James A O' BRIEN

GEORGE M. MARAKAS

	Mid (Th)	Final (Th)	Attendance	Assig:	Total
Internal	10	20	10	10	50
External					50
Total					100

OPERATING SYSTEMS

OPERATING SYSTEM CONCEPTS.

Operating System, History and Evolution, Distributed System, Open System, An Introduction to UNIX and MS-DOS Overview of Operating System; The 'Process' Concept; Process Creation and States, Kernel Mode.

Hardware features

Introduction; General Machine Structure; Interrupt System; DMA; Memory Addressability; Memory Relocation

User Interface

Classes of User; Types of Interface
System Calls; Command Language; Job Control Languages;

PROCESS MANAGEMENT

Basic Concepts

Process Life Cycle

Overview, Process Creation, Process State Diagrams, asynchronous, Concurrent process, mutual exclusion, semaphores, producer & consumer problem. Scheduling Objectives of Scheduling; Criteria for Scheduling; High Level Scheduling; Medium Level Scheduling; Low Level Scheduling

DEAD LOCK

Introduction, Resource Concepts, Condition, Major Area of Research

MEMORY MANAGEMENT

Introduction

Process Loading And Swapping

Memory Allocation Methods

Single Process System; Fixed Partition Memory; Variable Memory

Variable Partition Allocation With Compaction; Simple Paging

Simple Segmentation

VIRTUAL STORAGE MANAGEMENT

Introduction, Strategies, Page Replacement, Page Fault, Demand Paging, Page Size

AUXILIARY STORAGE MANAGEMENT

Introduction, Operation of Moving Head, Scheduling Policies, Seek Optimization, Rotational Optimization, Disk Caching

FILE MANAGEMENT

File system, Hierarchy, Blocking & Buffering, File Organization, Allocation & Free Space File Descriptor, Access Control Matrix Backup Recovery System Services; On-Line Facilities, Programming Services

File Management Techniques; Allocation Of File Space, Blocking, Disk Caching Caching, RAM disk
File Re-organization

Books Recommended

Text Book

Dietel H.M. Operating Systems, (2nd Ed.)

Reference Book

Silberschatz A Galvin Operating System Concepts (6th Ed.)

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DATABASE SYSTEMS

1. The Database Environment

- Introduction
- Database Approach
- Characteristics of the Database Approach
- Advantages of using a DBMS
- Implications of the Database Approach

2. Database System Concepts and Architecture

- Data Models, Schemas, and Instances
- Hierarchical database model
- Network database model
- Relational database model
- Object-oriented database model
- DBMS Architecture and Data Independence
- Database Languages and Interfaces
- The Database System Environment
- Classification of Database Management Systems

3. Data Modeling using the Entity- Relationship Model

- Using High level conceptual data models for database design
- Entity types , Entity sets, Attributes, and keys
- Relationships, Relationship Types, Roles, and Structural constraints
- ER Diagrams, Naming conventions and Design issues.

4. Enhanced Entity- Relationship Model

- Subclasses, Super classes, and Inheritance.
- Specialization and Generalization
- Constraints and characteristics of specialization and Generalization

5. Database Design, Theory and Methodology

5.1. Functional Dependencies and Normalization for Relational Databases.

- a) Informal Design Guidelines for Relation Schemas
- b) Functional Dependencies
- c) Normal Forms Based on Primary Keys
- d) General Definitions of Second and Third Normal Forms
- e) Boyee-Codd Normal Form

5.2. Relational Database Design Algorithms and Further Dependencies

Multi valued Dependencies and Fourth Normal Form

Join Dependencies and Fifth Normal Form

Inclusion Dependencies

Other Dependencies and Normal Forms

6. SQL- The Relational Database Standard

- Introduction
- History of the SQL standard
- The SQL environment
- Data definition , constraints
- Basic Queries in SQL
- More complex SQL Queries
- Insert, Delete, and Update statements in SQL
- Views (Virtual Tables) in SQL
- Specifying General Constraints as Assertions
- Additional Features of SQL

DEPARTMENT OF COMPUTER SCIENCE

7. The Relational Data model , constraints, and Relational Algebra

- Relational Model Concepts
- Basic Relational Algebra Operations
- Additional Relational Operations
- Examples of Queries in the Relational Algebra

8. Relational Calculus

- Relational Calculus : An overview
- Relational Calculus Expressions
- Calculus vs Algebra

9. Query Processing and optimization

- Translating SQL Queries into Relational Algebra.
- Basic Algorithms for Executing Query Operations.
- Using Heuristics in Query Optimization.
- Using Selectivity and Cost Estimates in Query Optimization.
- Overview of Query Optimization in ORACLE.
- Semantic Query Optimization.

10. Concurrency Control Techniques.

- Locking Techniques for Concurrency Control.
- Concurrency Control Based on Timestamp Ordering.
- Multiversion Concurrency Control Techniques.
- Validation (Optimistic) Concurrency Control Techniques.
- Granularity of Data Items and Multiple Granularity Locking.
- Using Locks for Concurrency Control in Indexes.
- Some Other Concurrency Control Issues.

11. Client/Server and Middleware.

- Introduction
- Client/Server Architecture
- Using Middleware
- Client/Server issues

Recommended Books:

- Modern Databases Systems (**TEXT BOOK**)
By: MacFaden
- Database Systems (**REFERENCE BOOK**)
By: C-J Dates

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STATISTICS AND PROBABILITY

1. Introduction to Statistics

- 1.1 Nature and Purpose of Statistics
- 1.2 Definition of Statistics
- 1.3 Aspects of Statistics
 - 1.3.1 Description
 - 1.3.2 Analytical and Inferential.
- 1.4 Characteristics of Statistics
- 1.5 Limitation of Statistics.

2. Basic Statistical Concepts.

- 2.1 Types of Data.
 - 2.1.1 Description.
 - 2.1.2 Continuous.
- 2.2 Classification of Data.
 - 2.2.1 Primary and Secondary.
- 2.3 Difference b/w data and variable
- 2.4 Parameter, Statistic
- 2.5 Population, Sample
- 2.6 Frequency Distribution.
 - Range, Class boundaries, Limits, Class interval, Telly Mark freq. Distribution table, freq, relative freq. Cum. Freq.
- 2.6.1 Grouped and Ungrouped Data.

3. Graphical Representation

- 1. Bar Diagram
- 2. Histogram.
- 3. Freq Polygon.
- 4. Relative Frequency Cum.
- 5. Ogive.
- 6. Data Stem
- 7. Lead Plot
- 8. Box-Cox plots.

4. Measures of Central Tendency.

- 4.1 Arithmetic Mean
- 4.2 Geometric Mean
- 4.3 Harmonic Mean
- 4.4 Areas of Application for A.M, G.M & H.M.
- 4.5 Relationship b/w A.M, G.M, H.M.
- 4.6 Median.
- 4.7 Quartiles, Deciles, Percentiles
- 4.8 Mode
- 4.9 Areas of Application for mean, median, mode.
- 4.10 Empirical & Rotation & Relative Comparison.

5. Measure of Dispersion

- 5.1 Range.
- 5.2 Quartile Deviation
- 5.3 Mean Absolute Deviation.
- 5.4 Standard Deviation.
- 5.5 Variance.
- 5.6 Coefficient of Variation.
- 5.7 Skewness.
- 5.8 Kurtosis.

6. Moments

- 6.1 First, Second, third & fourth Moment.
- 6.2 Sheppered correlation.
- 6.3 Moment ratio.

7. Counting Techniques.

- 7.1 Principles of counting techniques.
- 7.2 Permutation.
 - 7.2.1 Distinct Permutation.
- 7.3 Combination

8. Probability

- 8.1 Classical Definition (Priori)
- 8.2 Relative frequency Definition (posteriori)
- 8.3 Relative frequency Definition (Posteriori)
- 8.4 Concepts used in Probability: Sample Space, Trial, Event
 - 8.4.1 Simple Event
 - 8.4.2 Compound Events
 - 8.4.3 Mutually Exclusive Events
 - 8.4.4 Non-Mutually Exclusive Events
- 8.5 Axioms of Probability

9. Laws of Probability

- 9.1 Addition laws
 - 9.1.1 Mutually Exclusive Events
 - 9.1.2 Non-Mutually Exclusive Events
- 9.2 Multiplication laws
 - 9.2.1 Independent Events
 - 9.2.2 Dependent Events
- 9.3 Conditional Probability
- 9.4 Bay's Theorm

10. Probability Distribution

- 10.1 Fundamental concepts of Probability Distribution
- 10.2 Properties of Probability Distribution
 - 10.2.1 Mean
 - 10.2.2 Standard Deviation
 - 10.2.3 Variance
 - 10.2.4 Coefficient of Skewness
 - 10.2.5 Coefficient of Kurtosis
 - 10.2.6 Moment Generating Function
 - 10.2.7 Characteristic Function

Books Recommended:-

1. Introduction to Statistics By Sher Muhammad Chaudhry.
2. Statistics By Ronald E. Welpel.

MARKS DISTRIBUTION

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DIFFERENTIAL EQUATIONS

1. ORDINARY DIFFERENTIAL EQUATIONS OF FIRST ORDER

- a) Geometrical consideration Isoclines.
- b) Separable equations, equations reducible to separable form.
- c) Exact differential equation, integration factors.
- d) Linear first order differential equations, Bernoulli's equation.
- e) Variation of parameters.

2. Ordinary linear differential equations

- a) Homogeneous linear equations of the second order, homogeneous second order equation with constant coefficients, general solution, real roots, complex roots, double root of the characteristics equation..
- b) Differential operators.
- c) Cauchy equation
- d) Homogeneous linear equations of arbitrary order; homogeneous linear equations of arbitrary order with constant coefficients.
- e) Non-homogeneous linear equation.

3. Modeling of electrical circuits

- a) System of differential equations
- b) Series solution of differential equations

4. Partial differential equations

- a) Method of separation of variables.
- b) Wave, heat and laplace equations and their solutions by Fourier series method.

Recommended books

- (1) **Schaum's outline series**
Theory & problems of differential equations
2/ed
By
Richard Bronson
- (2) **Mathematical methods**
For B.A/B.Sc & Engineering students
By
Dr. S.M Yusuf

MARKS DISTRIBUTION

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1. Introduction to Communication System

- 1.1 Periodic time, frequency, wave length, phase, Amplitude
- 1.2 Analog signals
- 1.3 Digital signals
- 1.4 Basic requirement for one way line and Radio communication system.
- 1.5 Noise, Media

2. Data Encoding Concepts:

- 2.1 Encoding digital data in analog signal
- 2.2 Amplitude-Shift Keying (ASK)
- 2.3 Frequency-Shift Keying (FSK)
- 2.4 Phase-Shift Keying (PSK)
- 2.5 Quadrature-Phase-Shift (QPSK)
- 2.6 Quadrature-Amplitude-Modulation (QAM)
- 2.7 Bipolar-Shift Keying (BPSK)

3. Data Transmission:

- 3.1 Data terminal equipment (DTE)
- 3.2 Data communication equipment (DCE)
- 3.3 Modem
- 3.4 Transmission media
 - 3.4.1.1 Guided media
 - 3.4.1.1.1 Twisted Pair (TP)
 - 3.4.1.1.2 Coaxial cable
 - 3.4.1.1.3 Fiber optic cable
 - 3.4.2 Unguided media
 - 3.4.2.1 Microwave (Terrestrial, Satellite)
 - 3.4.2.2 Laser
 - 3.4.2.3 Infrared transmission
- 3.5 Transmission types
 - 3.5.1 Simplex
 - 3.5.2 Half duplex
 - 3.5.3 Full duplex transmission
 - 3.5.4 Asynchronous transmission
 - 3.5.5 Synchronous transmission
- 3.6 Transmission techniques
 - 3.6.1 Baseband
 - 3.6.2 Broadband transmission

4. Understanding Computer Network:

- What is Network
- Network Accessories
- Client Server Model
- Peer to Peer Network
- LAN, MAN, WAN, GAN

5. The OSI Reference Model

- Application
- Presentation
- Session
- Transport
- Network
- Data Link
- Physical Layer

6. Data Link Protocols [HDLC,PPP]

- Synchronous Protocol
- Asynchronous Protocol

7. TCP/IP

- TCP/IP & the Internet
- TCP/IP Protocol Suit
- Protocols in the Network Layer
- Protocols in the Transport Layer
- Protocols in the Application Layer

8. Network Topologies

Bus , Star, Ring, Hybrid, Mesh

9. Media Access Control Method

- Token Passing
- Carrier Sense Multiple Access with Collision Detection (CSMA /CD)
- Carrier Sense Multiple Access with Collision Avoidance (CSMA /CA)
- Polling

10. Network Architecture

- Ethernet
- Token Ring
- Token Bus

11. Networking & Internetworking Devices

- Repeaters
- Bridges
- Routers
- Brouters
- Gateways

12. Multiplexing

- Frequency Division Multiplexing (FDM)
- Time Division Multiplexing (TDM)
- Statistical TDM
- Multiplexing application

12. Network Security Issues

13. Protocol Design issues

Books Recommended:-

Text Book

1. Data and computer Communication By : William Stallings

Reference Book:

1. Data Communication by Rettke

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