

GOVERNMENT DEGREE COLLEGE
LARKANA



SYLLABUS

BS (CS)-III

6th SEMESTER

DEPARTMENT OF COMPUTER SCIENCE

GOVT. DEGREE COLLEGE, LARKANA

DEPARTMENT OF COMPUTER SCIENCE

BS in COMPUTER SCIENCE

SEMESTER-VI

COMPUTER ARCHITECTURE

INTRODUCTION

- Organization and Architecture
- Structure and Function
- Digital Computer
- Logic Gates Se Boolean Algebra
- Combination Circuits
- Slip flops
- Sequential Circuit

DIGITAL COMPUTER SYSTEM

- Integrated Components Sc. Function
- Multi Phase
- Register
- Memory Unit
- Computer Evolution Sc. Performance
- Brief History of Performance
- Pentium and Power Evaluation

DATA REPRESENTATION

- Data Types
- Complements
- Fixed point Representation
- Floating Point Representation

REGISTER TRANSFER MICRO OPERATOR

- Register Transfer
- Bus and Memory Transfer
- Arithmetic Micro-operation
- Logic Micro-operation
- Shift Micro

BASIC COMPUTER ORGANIZATION AND DESIGN

- Basic Computer Organization and Design
- INS Code
- Computer Register Ec. Instructor
- Instruction Cycle
- Memory Reference Instruction
- Input-Output and Interrupt
- Design of Basic Computer
- Design of Accumulator

MEMORY ORGANIZATION

- Computer Memory System Overview
- Main Memory
- Cache Memory
- Memory Hierarchy
- Delvame Dram Organization
- Virtual Memory
- Memory Management Hardware

INTERNAL MEMORY

- Magnetic Disk
- Optical Memory
- Magnetic Tape

INPUT / OUTPUT ORGANIZATION

- External device
- I/O Module
- Programmed I/O
- Interrupt Driven I/O
- DMA Memory Access
- I/O Channels

THE CENTRAL PROCESSING UNIT

- Arithmetic and Logical Unit [A.L.U]
- Integer Representation
- Register Organization
- Stack Organization
- Instruction Formats
- Data Transfer SC. Manipulation

COMPUTER ARITHMETIC

- Addition and subtraction
- Multiplication Sc. Division Algorithms
- Floating point Arithmetic Organization
- Decimal Arithmetic Unit/ Operation

FUNDAMENTALS OF COMPUTER COMMUNICATIONS AND ERROR CONTROL

Text Book

1. **COMPUTER SYSTEM ARCHITECTURE BY. M. MORRIS MANO**

REFERENCE BOOK:

1. **MICROPROCESSORS AND INTERFACING BY DOLGLAS V. HALL**

MARKS DISTRIBUTION

	Mid(Th)	Final(Th)	Attendance	Assig:	Total
Internal	10	20	10		
External	by S.A.L.U Khairpur			10	50
Total					50
					100

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BS IN COMPUTER SCIENCE

SEMESTER # VI

COURSE OUTLINE COMPILER CONSTRUCTION

1. The Compiler Theory Landscape

- Introduction
- Language & Compiler
- Role of Compiler
- Analysis of Program
- Phases of Compiler (organization of Compiler)
- Cousins of Compiler
- Compiler Construction Tools

2. Lexical Analysis

- Lexical Analysis
- Role of the Lexical Analysis
- The String Table
- Symbol Table
- Input Buffering
- Specification & Recognition of Token

3. Grammars & Automata

- Introduction
- Grammars & examples
- Non-Terminals and Productions
- Chomsky Hierarchy
- Grammars & their Machines
- Turing Machine
- Linear bonded Automata
- Push-down Automata
- Removing empty productions
- Comparison (Context-free/ Context sensitive)
- Finite State Automata
- Limits of FSA

4. Regular Language & Expression

- Regular Expressions
- The Algebra of R.E
- Formal Properties of R. E
- Transformation Grammars & R. E
- FSA/ NDFSA
- Transforming Grammar to Automata
- Transforming Automata
- Left Linear Grammar
- Implementing FSA on Compiler

5. Syntax Analysis & Context Free Languages

- Role of the Parser
- Push-down Automata
- Writing a Grammar
- Construction of PDA from a CFG
- Top-down / Bottom up Parsing
- Operation Procedure / LR Parsing
- First and Follow sets
- Selection sets
- Left recursion

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- Common Left factors
6. **Syntax Directed Code Generation**
 - Syntax-Directed Translation
 - Syntax-Directed Definition
 - Bottom-up-evaluation of S-attribute definition
 - L-attribute definition
 - Top-down / Bottom-up attributes
 - Space for attribute values at compile time
 - Assigning space at compiler construction time

 7. **Syntax Directed Code Generation**
 - Introduction
 - Computer hardware Architecture
 - Stand machine expression evaluation
 - The Itty bitty state machine
 - A tiny basic Interpreter

 8. **Intermediate Code Generation**
 - Intermediate Language
 - Declaration
 - Assignments Statements
 - Boolean Expression
 - Case Statement

 9. **Code Generation and Code Optimization**
 - Target Machine
 - Design of Code Generator
 - Simple Code Generation
 - Principle source of optimization
 - Optimization of basic block
 - Detection & Recovery from errors

 10. **Some Compilers**
 - Compiler for C-Language
 - Compiler for Pascal language
 - Compiler for Fortran Language

RECOMMENDED BOOKS

Text Book:
 Compiler Tools, Techniques & Theory
 By: Alfred.V.Aho

Reference Book:
 The art of Compiler Design
 By: Thomas Pittman

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External					50
Total					100
INTERNAL			PRACTICAL		
25			EXTERNAL		
TOTAL			25		
			50		

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SEMESTER # VI

COURE OUTLINE NUMERICAL COMPUTING

1. Collocation polynomials and error of approximation.

2. Equally spaced arguments

- i. **Finite difference**
- ii. Difference label
- iii. Single error problem
- iv. Difference formulae and its proof
- v. Solution of differential equation.

3. Newton's forward difference formula

Newton's backward difference formula

4. Un-equally spaced arguments.

Langrage's Formula

Newton's divided difference formula

5. Interpolation & prediction

6. Numerical differentiation (Simple Application)

7. Numerical Integration

Trapezoidal Rules

Simpson's (1/3 rd Rule)

8. Technique in Matrix Algebra

I. Jacobis Method

II. Gauss Seidel Method

9. Solution of Non-linear equation

I. Bisection method

II. Newton Raphson Method

10. Eigen values & Eigan vector

Recommended Books

Text Book

- 1. Schaums outline series (Numerical Analysis)

Reference Book

- 1. Linear Algebra By Kolman.

MARKS DISTRIBUTION

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SEMESTER-VI

HUMAN RESOURCE MANAGEMENT

- An Overview of Human Resource Management and Resource Manger
- The Environment of human Resource Management, External and Internal Environment
- Equal Employment Opportunity and Affirmative Action
- Job Analysis: A Basic Human Resource Tool
- Human Resource Planning, Recruitment and Selection
- Organization Change and Human Resource Development
- Corporate Culture and Organization Development
- Career Planning Development Performance Appraisal

MARKS DISTRIBUTION

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1. Advance algorithm and design techniques

Running time calculations
Logarithm in the running time
Lists, stacks and queues
Introduction to trees

2. Graph algorithm analysis

Definitions
Topological sort
Shortest path algorithm
Network flow problems
1) Minimum spanning Trees or Minimum Cost Flow Problem
2) Maximum Flow Problem

3. Introduction to searching techniques

Algorithm for depth first search
Algorithm for breadth first search
Depth limited search
Iterative deepening search
Heuristic Search
Algorithm for best first search

4. Algebraic algorithm

Introduction to NP-Completeness
Easy Vs Hard
The class NP
NP complete problems
Probabilistic and parallel algorithm problems

5. Sorting algorithm

Insertion sort
Heapsort
Mergesort
Quick sort
Sorting large records

Books:

1. "Analysis of Algorithms"; Robert Sedgewick & Phillippe
2. "Data Structure and Algorithm Analysis"; Mark Allen Weiss
3. "Data Structure and Algorithm Analysis with C++"; Marka Allen Weiss

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SEMESTER-VI

Human Computer Interaction

Course Structure: Lectures: 2, Labs:1

Prerequisites: Data Structures and Algorithms

Objectives: This course introduces the human issues of usability and its importance. It considers the implications of human understanding on the usability of computer systems and the importance of understanding the context of use. It describes guidelines for use of different media and interface styles. Topics include Usability Design principals, standards and models, evaluation techniques. Groupware, pervasive and ubiquitous applications.

Course Outlines: The Human, Computer and Interaction, Usability paradigm and principles, Introduction to design basics, HCI in software process, Design rules, prototyping, evaluation techniques, task analysis, Universal design and User support and Computer Supported Cooperative Work. Introduction to specialized topics such as Groupware, pervasive and ubiquitous applications.

Books/ Resources:

1. Human-Computer Interaction, 3/E **Alan Dix**, *Computing Dept, Lancaster University Janet E. Finlay, Leeds Metropolitan University, Gregory D. Abowd, Georgia Institute of Technology, Russell Beale, University of Birmingham* ISBN-10: 0130461091 ISBN-13: 9780130461094 Publisher: Prentice Hall
2. Designing the User Interface: Strategies for Effective Human-Computer Interaction, 4/E **Ben Shneiderman**, *University of Maryland Catherine Plaisant, University of Maryland* ISBN-10: 0321197860 ISBN-13: 9780321197863 Publisher: Addison-Wesley

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