

Course Syllabus
File Management
Southern University and A&M College
Baton Rouge, LA 70813
Fall 2009

Course Number and Title: 202 File Management *Prerequisites:* CMPS 201

Catalog Description:

This course considers secondary storage devices, file structures, file design issues, file processing and programming. Accuracy, integrity, security, and data compression techniques relating to files will be treated.

Form: Lecture. Emphasis on File organization, access, and management; i.e., storing and retrieving vast amount of data effectively and efficiently.

Learning Objectives:

1. Students will understand secondary storage devices and file structures.
2. Students will be exposed to file design issues and the means to deal with problems presented.
3. Students will enhance programming skills with applications in file processing using COBOL, C++, and Java.
4. Students will be introduced to the concepts of accuracy, integrity, and security of data when using files.
5. Students will grasp the concept of data compression via file processing.

Learning Outcomes: Upon completion of the course through the use of examinations, quizzes, research papers, and assignments, the student will understand the

1. concept and types of files
2. organization and access of files
3. concept of secondary storage devices
4. complexity of cosequential processing techniques
5. compression techniques and
6. tree structured file organization

Book(s): None required, the instructor will supply notes during the semester. Supplementary texts and websites are used throughout the course.

Course Resources: The instructor will lecture with the assistance of the following tools: SU Blackboard, audiovisuals, and the computer, as well as using the following websites, plus others:

1. File Structures by M.J. Folk, B. Zoellick and G. Riccardi. Addison Wesley Longman, Inc., 1998; ISBN 0-201-87401-6

2. Dale, Nell and Henry M. Walker. Abstract Data Types: Specifications, Implementations and Applications. D.C. Heath and Company. 1996.
3. Grosshans, Daniel. File Systems: Design & Implementation Prentice Hall 1986.
4. Harbron, Thomas R. File Systems: Structures and Algorithms Prentice Hall 1988
5. Nance, Douglas and Thomas L. Naps. Introduction to Computer Science: Programming, Problem Solving and Data Structures. 3rd ed. West Publishing Company. 1995.
6. Savitch, Walter. Problem Solving with C++ 5th ed. Pearson Education, Inc. 2005.
7. Tharp, Alan L. File Organization and Processing. John Wiley and Sons, Inc. 1988.
8. Young, Margaret L. and John R. Levine. UNIX for Dummies: Quick Reference. 4th edition. IDG Books Worldwide, Inc. Foster City, CA©1998.
9. Dock, V. Thomas. Structured COBOL: American National Standard. West Publishing Company.1979.
10. Nickerson, Robert C. Fundamentals of Structured COBOL. San Francisco State University. 1984. Little, Brown and Company. Chapter 1.
11. Olson, Jack L. and Wilson T. Price. Elements of Structured COBOL Programming. Holt, Rienhart and Winston. 2nd Edition.
12. Paquette, Gerard A. Advanced Structured COBOL. Wm. C. Brown Publishers.1991.

SUN NFS: www.faqs.org/rfcs/frc1094.html
XFS: Serverless NF Service <http://now.cs.berkeley.edu/xfs/xfx.html>
Network File Systems: www.uwsg.iu.edu/usail/network/nfs
Coda: www.coda.cs.cmu.edu
Distributed File Systems:
www.microsoft.com/Windows2000/techinfo/howitworks/fileandprint/dfsnew.app
Cluster File System: www.clusterfs.com
High Performance File Systems: www.pcguides.com/ref/hdd/file/file-HPFSC.html
NTFS: www.ntfs.com
Solid File System: www.solfs.com
“Data Management” www.acmqueue.com/modules.php?name=News&file=article&sid=250
<http://www.howstuffworks.com>
http://www.almaden.ibm.com/StorageSystems/file_systems/index.shtml
<http://www-124.ibm.com/developerworks/opensource/jfs/>
<http://www.storage.ibm.com/index.htm>
<http://www.osdata.com/holistic/connect/filesys.htm>
<http://www.extremetech.com/article2/0,1558,11150,00.asp?kc=ETNKT0209KTX1K0100361>
<http://www.networkworld.com>

Course Requirements:

A. Academic Requirements

Students are required to participate in the class discussions, do homework, participate and pass exams and quizzes.

B. Administrative Requirements

1. Attendance is very important, so be here. After three absences your name will be submitted to the Dean of the College of Sciences. After six absences, your name will be submitted to the Vice Chancellor of Academic Affairs and will be handled administratively.
2. Adhere to posted conference hours.
3. The University grading scale is used to determine your final grade.
4. Academic dishonesty of any form will be dealt with severely.
 - a. Copying someone else's assignments.
 - b. Allowing another person to copy your work.
 - c. Telling another student the answers during an exam or quiz.
 - d. Using the computer for illegal and unethical behavior.
 - e. Stealing someone else's work.
5. NO LATE homework or assignments are accepted.
6. NO MAKE-UP for missed exams or quizzes.
7. ALL work must have your name and other important information on it or it will not be graded.
8. ALL other Student Conduct will be guided by the University Student Handbook.

C. Evaluation

Homework/Assignments	20 %
Exams/Quizzes	50 %
Programming Assignments	15%
Research Paper or Project	15 %

D. Grading

90 – 100=A; 89 – 90=B; 79 – 70=C; 69 – 60=D; Below 60 %=F

Course Schedule

<u>Main Topics</u>	<u>Weeks</u>
Introduction	1
Overview and Review of Data Structures	2 – 3
EXAM NO 1	
Windows and UNIX File Systems	
Fundamental File Processing	
Traditional File Systems	4 – 9
EXAM NO 2	
Tree Structures	10 – 12
EXAM NO 3	
File Sorting	13 – 14
EXAM NO 4	

EXAM NO 5

FINAL EXAM

Course Outline:

I. Introduction

- A. Course Overview and Guidelines
 - 1. Classroom Policies
 - 2. Grading Procedures
- B. Assignment and Project Guidelines
 - 1. Submission of Programs
 - 2. Submission of Research Papers

II. Overview

- A. Review of Data Structures
 - 1. Stacks
 - 2. Queues
 - 3. Lists
 - a. Linear
 - b. Non-Linear
 - 4. Arrays
 - a. 1-Dimensional
 - b. 2-Dimensional
- B. Definition of File Structures/Management
- C. Review of Unix File Systems
 - 1. The Structure of Unix
 - 2. The UNIX Kernel
 - 3. The File System
 - 4. File System Features and Benefits
 - 5. File Commands
 - 6. File Handling Procedures
- D. Review of Window File Systems
 - 1. Versions/Structure of Windows
 - 2. History
 - 3. Security
 - 4. File Commands
 - 5. File Handling Procedures
- E. **EXAM NUMBER 1**

III. Fundamental File Processing

- A. File Systems
- B. Basic Concepts and Terminology
 - 1. Processing Methods
 - 2. Organization and Access Methods
 - 3. File Objectives
 - 4. Key Issues in File Design
 - 5. Key File Design Ratios

- 6. File Structures
- C. Physical Devices
 - 1. Magnetic Tapes
 - a. Characteristics
 - b. Functions
 - c. Structure
 - 2. Magnetic Disks
 - a. Characteristics
 - b. Functions
 - c. Structure
 - 3. Compact Disk/Digital Video Disk (CDs and DVDs)
 - a. History
 - b. Characteristics
 - c. Functions
 - d. Structure
 - 4. Flash Drives/MP3s
 - a. Characteristics
 - b. Functions
 - c. Structure
 - 5. Blu-Ray
 - a. Characteristics
 - b. Functions
 - c. Structure
- D. EXAM NUMBER 2**

IV. Traditional File Systems

- A. Introduction to COBOL
 - 1. Basic Concepts
 - 2. Divisions of COBOL
 - 3. Sample Program
- B. Sequential Files
 - 1. Definition
 - 2. Operations
 - 3. Programming Assignment
- C. Relative Files
 - 1. Definition
 - 2. Operations
 - 3. Programming Assignment
- D. Direct Files
 - 1. Definition
 - 2. Operations
 - 3. Programming Assignment
- E. Indexed Files
 - 1. Definition
 - 2. Access Methods
 - 3. Programming Assignment

V. Compression Methods and Algorithms

- A. Data Compression
 - 1. Definition
 - 2. Compression Algorithms
 - 3. Compression Methods
- B. Image Compression
 - 1. Definition
 - 2. Compression Algorithms
 - 3. Compression Methods
- C. Lossless and Lossy Compression
 - 1. Definition
 - 2. Methods
 - 3. Huffman Coding
- D. Hashing Algorithms
 - 1. Hashing Definition
 - 2. Collisions
 - 3. Algorithms/Methods
 - 4. Collision Resolutions
 - 5. Rehashing
 - 6. Extendible Hashing
- E. **Exam Number 3**

VI. Tree Structures

- A. Binary Search Tree
 - 1. AVL
 - 2. Paged Binary Trees
- B. B-Trees
 - 1. Creating
 - 2. Searching
 - 3. Insertion
 - 4. Deletion
- C. B+-Trees
 - 1. Creating
 - 2. Searching
 - 3. Insertion
 - 4. Deletion
- D. **Exam Number 4**

VII. File Sorting

- A. Classification
- B. Sorting Algorithms and Complexities
 - 1. Insertion
 - 2. Quicksort
 - 3. Heapsort
 - 4. Merge Sort
 - 5. K-Way Merge
 - 6. Replacement

- C. Programming Assignment**
- D. Exam Number 5**

VIII. Current File Systems

Research Papers

- A. Network File Systems
 - 1. Definition
 - 2. Characteristics
 - 3. Types of Network File Systems
- B. Distributed File Systems
 - 1. Definition
 - 2. Characteristics
- C. Cluster File Systems
 - 1. Definition
 - 2. Characteristics
- D. High Performance File Systems
 - 1. Definition
 - 2. Characteristics
- E. Grid File Systems
 - a. Components
 - b. Features
 - c. Framework

IX. EXAM NUMBER 6 Final Exam as scheduled by the University

Possible Project Topics for Extra Credit: (Information Retrieval)

- A. Testing Various File Structures for Retrieval**
- B. Testing Various Data Compression Methods for Storage**
- C. Data and File Structures for Retrieval**