

SYLLABUS

<u>CODE:</u>	COMP 225	<u>TITLE:</u>	OPERATING SYSTEMS TECHNOLOGY
<u>DIVISION:</u>	Business and Computer Science	<u>DEPARTMENT:</u>	Computer Science
<u>COURSE DESCRIPTION:</u> Students will acquire an understanding of the role that an operating system has in the computing environment. The student will have hands-on experience and assignments on major operating systems. Topics will include process management, device management, file structures, utilities, performance evaluation and networking.			
<u>PREREQUISITES:</u> COMP 135			
<u>COREQUISITES:</u>			
<u>CREDITS:</u>	3	<u>LECTURE CREDITS:</u>	3
<u>LAB CREDITS:</u>		<u>LAB HOURS:</u>	

Required Material:

Text: **Operating Systems
Third Edition**
Deitel, Deitel, Choffnes
Prentice Hall
ISBN 0-13-182827-4

Storage: A portable secondary storage media (i.e., floppy, memory stick, zip disk)

ADDITIONAL TIME REQUIREMENTS: The student should expect to spend at least 2 hours of time outside class for each hour in class. The Computer Science Main Lab is open Mon.-Sat. Hours are posted on the outside door and on the Computer Science Website.

INTENDED COURSE LEARNING OUTCOMES: The student will be introduced to current operating systems design paradigms focused on distributed computing issues. Students will design a simulated programming language that will translate code that will include memory management (variable assignment), logical looping, arithmetic instructions, input and output commands as well as a user interface. In addition, students will use the Unix/Linux OS to complete required labs that reinforce the lecture material. (Core Competencies: Critical Thinking, Technological Literacy)

LECTURE OUTLINE:

This course is comprised of 12 lecture units:

<u>UNIT:</u>	<u>TITLE</u>
1	Introduction to Operating System Technology
2	Process Concepts
3	Thread Concepts and Concurrency
4	Deadlock and Indefinite Postponement
5	Real Memory Organization and Management
6	Virtual Storage Organization
7	Virtual Storage Management
8	Disk Performance
9	Files and Database Systems
10	Networking and Distributed Computing
11	Web Services
12	Security

UNITS(or chapters): Each unit is comprised of objectives; specifically:

Unit Objective: Tells you what you will be able to do after successfully completing the unit.

Method of Evaluation: Tells you the tools you should use for self-evaluation as well as those which will enable your instructor to evaluate your progress.

Estimated Time to Achieve: Gives you the approximate length of class time that you should allocate for completion of the unit.

Learning Objectives: Give you the details of each unit objective.

Recommended Learning Experiences: Tell you by what means you can complete the unit objective. These include – Class Meetings; your primary source of learning – Text Assignments; read material carefully – Programming Assignments(labs); your implementation of material learned.

Independent Study: Independent study, under certain circumstances maybe an option in the learning process. However, prior to embarking on this route, the student must consult and have the instructor's approval.

Attendance: Attendance is required every week. More than three unexcused absences will result in a failing grade.

GRADING STANDARD:

To be considered acceptable, a lab must be free of all syntax and logic errors and must meet all of the requirements outlined by the problem statement. Labs must also meet documentation and style requirements as outlined by the instructor. The final grade requirements for the course will be:

<u>Grade</u>	<u>Requirements</u>
A	Complete 5 Unix Lab Projects Complete Term Paper Translator Program Receive test average of 94 thru 100 on all tests
A-	Complete 5 Unix Lab Projects Complete Term Paper Translator Program Receive test average of 90 thru 93 on all tests
B+	Complete 4 Unix Lab Projects Complete Term Paper Translator Program Receive test average of 87 thru 89 on all tests
B	Complete 4 Unix Lab Projects Complete Term Paper Translator Program Receive test average of 84 thru 86 on all tests
B-	Complete 4 Unix Lab Projects Complete Term Paper Translator Program Receive test average of 80 thru 83 on all tests
C+	Complete 3 Unix Lab Assignments Complete Term Paper Translator Program Receive test average of 75 thru 79 on all tests
C	Complete 3 Unix Lab Assignments Complete Term Paper Translator Program Receive test average of 70 thru 74 on all tests
D	Complete 3 Unix Lab Assignments Complete Term Paper Translator Program

Receive test average of 60 thru 69 on all tests

If a grade of D is received and you are a Computer Science Major, it is highly recommended that the course be retaken.

F

Non-completion of Lab Assignments, or
Test average below 60.

INC

An Incomplete (INC) may be assigned at the discretion of the course faculty for students who have extraordinary circumstances of documented hardship or emergency. These are students who have been actively participating throughout the term and have completed a significant portion of the course in a satisfactory manner but approach the end of the term without completing all assignments. The following process should be followed: The student contacts the faculty with the appropriate documentation. The incomplete contract is completed by the faculty and must be signed by both the faculty and the student. Students will be notified by email to check their grades and to speak to their counselor about the impact of the incomplete. All course work should be completed by the twenty-first day after the end of the current semester or term, exclusive of official college closings. When a student completes the work satisfactorily, faculty will submit a change of grade. If work is not completed satisfactorily, the INC will be changed to an F by the registrar. Students will be notified by email. For the purpose of calculating academic standing, the INC will be treated as an F.

(College Grading System Regulation 5.0013R)

Testing: A minimum of a 60 grade must be received on each of the tests. If that grade is not achieved you **must** meet with the instructor to review your progress. There may be one retest, with a grade of 70 being the highest attainable. **Test will be at the end of Units 3, 7 and 11**

DEPARTMENT POLICIES:

Testing: Students will be allowed to take each test only one time. There are no retests. If a student has a valid excused absence on the day of the test, the test may be taken in the Testing Center with the permission of the instructor. The exam must be taken within 10 days and will be graded for full credit. Saturdays and Sundays count as days when calculating the 10 day limit. If not taken within the 10 days, a grade of zero will be assigned to the test. A valid Brookdale ID is required to take the test at the testing center. Only one in class test may be missed. Any other test taken in the testing center will receive a maximum grade of 70.

Resubmitted assignments: In the case that an assignment needs to be corrected, the assignment must be corrected and resubmitted for grading no later than 2 weeks from the original due date.

Late assignments: Labs are to be submitted on a timely basis. The instructor will assign due dates. No more than 25 percent of the total labs may be submitted during the last two weeks of the semester.

Attendance: Attendance is required every week. More than three inexcusable absences will result in a failing grade.

Addendums: Individual Instructors may add additional requirements to this syllabus in written form (such as assignment due dates, cover sheets, class behavior, etc.).

Independent study: This option is available for students who think they may satisfy the course requirements without the benefit of the classroom experience. All course requirements apply with the exception of attendance. The student may begin a course of independent study after attending class for the first 4 meetings and signing an Independent Study Contract with the instructor. Granting independent study is at the complete discretion of the instructor, and may also be revoked at anytime by the instructor.

<p>ACADEMIC VIOLATION: The instructor of the course has the authority to give a course grade of F if the student submits the work of another person in a manner that represents the work as one's own, or knowingly permits one's work to be submitted by another person without the instructor's authorization. All computer work must be on your own portable storage device.</p>

COLLEGE POLICIES:

For information regarding:

- Brookdale's Academic Integrity Code
- Student Conduct Code
- Student Grade Appeal Process

Please refer to the Student Handbook and BCC Catalog

Notification for students with disabilities:

Brookdale Community College offers reasonable accommodations and/or services to persons with disabilities. Students with disabilities who wish to self-identify, must contact the Disabilities Services Office at 732-224-2730 or 732-842-4211 (TTY), provide appropriate documentation of the disability, and request specific accommodations or services. If a student qualifies, reasonable accommodations and/or services, which are appropriate for the college level and are recommended in the documentation, can be approved.

UNIT 1

Name of Unit: Introduction to Operating Systems

Unit Objective: To provide an historical perspective of how current OS environments have evolved.

Method of Evaluation: Completion of Translator Project and Test 1

Estimated Time to Achieve: 1 week

Learning Objectives:

The student will be introduced to:

1. Operating Systems: Early History
2. Emergence of Software Engineering
3. Hardware – Software – Firmware

Recommended Learning Experiences:

Attend Class meetings

Read in Deitel Chapters 1 and 2, Pages 1 thru 93

Complete:

Begin design of Project 1 (Translator)

UNIT 2

Name of Unit: Process Concepts

Unit Objective: To introduce to the student the concept of process, which is central to today's multitasking Operating Systems

Method of Evaluation: Completion of Project 1 and Test 1

Estimated Time to Achieve: 2 week

Learning Objectives:

The student will be introduced to:

1. What is a "Process"
2. Process States
3. Process State Transitions
4. Process Control Block (PCB)
5. Interrupts
6. Context Switching

Recommended Learning Experiences:

Attend Class meetings

Read in: Deitel Chapter 3, Pages 109 thru 133

Complete:

Continue Project 1 (Translator)
Select Term Paper/Presentation Topic(s)

UNIT 3

Name of Unit: Thread Concepts and Concurrency

Unit Objective: To introduce to the student the organization and management of systems that support asynchronous concurrent processes through the use of threads.

Method of Evaluation: Completion of Project 1 and Test 1

Estimated Time to Achieve: 2 week

Learning Objectives:

The student will be introduced to:

1. Definition of Threads
2. Mutual Exclusion
3. Critical Sections
4. Mutual Exclusion Primitives
5. Dekkers Algorithm
6. Semaphores

Recommended Learning Experiences:

Attend Class meetings

Read in: Deitel Chapters 4,5 Pages 145 thru 233

Complete: Project 1 (Translator)

UNIT 4

Name of Unit: Deadlock and Indefinite Postponement

Unit Objective: To introduce to the student the areas of deadlock. Included will be prevention , avoidance, detection and system recovery from deadlock.

Method of Evaluation: Completion of Project 1 (Translator) and Test 1

Estimated Time to Achieve: 1 week

Learning Objectives:

The student will be introduce to:

1. What is Deadlock
2. Indefinite Postponement
3. Deadlock Prevention
4. Deadlock Prevention and the Banker's Algorithm
5. Deadlock Detection
6. Deadlock Recovery

Recommended Learning Experiences:

Attend Class meetings

Read in: Deitel Chapters 7, 8 Pages 289 thru 360

Complete:

Complete Project 1 (Translator)

UNIT 5

Name of Unit: Real Storage

Unit Objective: To introduce the student to the hierarchy of memory, and the schemes to organize and manage the different categories of storage.

Method of Evaluation: Completion of Project 2 , Test 2.

Estimated Time to Achieve: 1 week

Learning Objectives:

The student will be introduced to:

1. The different classifications of Storage organizations
2. Storage management
3. Storage Hierarchies
4. Contiguous and Noncontiguous Storage Allocation
5. Single User Environments
6. Multi User environments

Recommended Learning Experiences:

Attend Class meetings

Read in: Deitel Chapter 9, Pages 377 thru 399

**Complete: Begin Project 2 Creating a Directory Services program
First Term Paper Due**

UNIT 6

Name of Unit: Virtual Storage Organization

Unit Objective: To introduce the student to the concept and principles of Virtual Storage.

Method of Evaluation: Completion of Project 2, Test 2

Estimated Time to Achieve: 1 week

Learning Objectives:

The student will be introduced to:

1. Basic Concepts of Virtual Storage
2. Block Mapping
3. Paging Concepts
4. Segmentation

Recommended Learning Experiences:

Attend Class meetings

Read in: Deitel Chapter 10, Pages 413 thru 455

Complete: Project 2, Term Paper topic (if different)

UNIT 7

Name of Unit: Virtual Storage Management

Unit Objective: The student will be introduced to the various strategies for managing Virtual Storage environments.

Method of Evaluation: Completion of Project 2 and Test 2

Estimated Time to Achieve: 1 week

Learning Objectives:

The student will be introduced to:

1. Virtual Storage management Strategies
2. Page Replacement Strategies
3. Locality
4. Working Sets
5. Page Size
6. Page Release

Recommended Learning Experiences:

Attend Class meetings

Read in: Deitel Chapter 11, Pages 477 thru 508

Complete:

Project Directory Service Program

UNIT 8

Name of Unit: Disk Performance Optimization

Unit Objective: The student will be introduced to the variety of disk and disk-like devices that can be utilized in a multi-user environment.

Method of Evaluation: Completion of Project 3 and Test 3.

Estimated Time to Achieve: 1 week

Learning Objectives:

The student will be introduced to:

1. Concept of the Moving-Head Disk
2. Disk Scheduling
3. Scheduling Policies
4. Rotational Optimization
5. Performance Enhancement Techniques

Recommended Learning Experiences:

Attend Class meetings

Read in: Deitel Chapter 12, Pages 528 thru 563

Complete:

Project 3

UNIT 9

Name of Unit: File and Database Systems

Unit Objective: The student will be introduced to the various file and database formats.

Method of Evaluation: Completion of Project 4, Test 3

Estimated Time to Achieve: 1 week

Learning Objectives:

The student will be introduced to:

1. The File System
2. File Systems Functions
3. File Hierarchy
4. Blocking and Buffering
5. File Servers
6. Database Systems
7. Database Models

Recommended Learning Experiences:

Attend Class meetings

Read in: Deitel Chapter 13, Pages 583 thru 623

Complete:

Project 3 LAN Administration
Term Paper Due

UNIT 10

Name of Unit: Networking and Distributed Computing

Unit Objective: The student will understand the central role of networking in current computer systems.

Method of Evaluation: Completion of Project 4, Test 3

Estimated Time to Achieve: 1 week

Learning Objectives:

The student will be introduced to:

1. Network Topology
2. TCP/IP Protocol
3. OSI Layers

Recommended Learning Experiences:

Attend Class meetings

Read in: Deitel Chapter 16, Pages 746 thru 768

Complete:

Project 4
Term Paper Due

UNIT 11

Name of Unit: Web Services

Unit Objective: The student will understand characteristics of distributed file systems, peer to peer computing, grid models, Java technologies.

Method of Evaluation: Completion of Project 5, Test 3

Estimated Time to Achieve: 1 week

Learning Objectives:

The student will be introduced to:

1. Distributed File Systems
2. Clustering
3. Peer to peer technology
4. Grid Computing
5. Java Servlets

Recommended Learning Experiences:

Attend Class meetings

Read in: Deitel Chapter 18, Pages 817 thru 853

Complete:

Complete Project 5

UNIT 12

Name of Unit: Security

Unit Objective: The student will the need for secure systems though authentication, access control and digital signatures.

Method of Evaluation: Completion of Project 5 and Test 3

Estimated Time to Achieve: 2 week

Learning Objectives:

The student will be introduce to:

1. Authentication
2. Access control
3. Security Attacks
4. Attack Prevention
5. Secure Communication

Recommended Learning Experiences:

Attend Class meetings

Read in: Deitel Chapter 19, Pages 875 thru 909

Complete:

Completion of Project 5 and Test 3

TERM PAPER TOPICS

Here are some topics that may be considered, but don't limit yourself to this list.

- Lan
- Wireless
- Unix subsystems
- Web developments
- XML
- UML
- Databases
- Game Theory
- Program development
- WIN 32
- Napster Technology
- ISP
- DSL/CABLE
- Chip Technology (INTEL/MOTOROLA)
- Laser
- Networks in general

All Term papers must be 8-10 pages, double spaced with a title page and bibliography (not part of page length). Page numbers must be included. References can be anything; Books newspapers, individuals etc.

Presentation(Optional)

May be used to augment/improve grade. Must 10 – 15 minutes on Term paper topic. Presentation must be scheduled with instructor. May use any audio/visual/computer aids necessary to have presentation be as professional as possible.

ASSIGNMENTS FOR COMP-225

**ALL PROGRAMS NEED A COVER PAGE AND BOTH
SOURCE AND OUTPUT PRINTED !!**

Project # 1

1. Translator Program

This project requires 2 programs.

The first will be the translator program that will define the syntax for the next program. The translator program must be able to:

1. Allow the user to enter numeric data
2. Be able to add, sub, multiply and divide, then provide answers
3. Be able to have a loop process
4. Be able to display output
5. Have a user interface

The second program will be the running program in the syntax provide by the first program.

Both programs must be presented on a disk with a user manual to instruct users on technique to run the translator. Manual cannot be handwritten.

Part 1

Define and layout how your language will look. For example an arithmetic statement in C,C++ and Java looks like this:

a=b+c;

The instruction assigns to the left defined variable and ends with a “;”.

You need to design your instructions to follow a format that you have designed.

Part 2

You need to design how your I-O operations are to be performed, again in C, C++ you use cout and cin, functions that perform the actual tasks, how will you do yours. In Java all input and output occurs in strings, will yours be similar.

Part 3

How will your data be stored. You need to be able to input 2 values store them, perform the arithmetic operations and output the results.

Part 4

You need to create a user interface, so the user knows how to enter source code, run the compile/interpreter and receive output.

These steps needed to be done in order and according to the schedule in the Syllabus. Entire project due no later than Unit 10.

UNIX PROJECTS

There 3 required UNIX projects, then 1 more for a B, and 1 more for an A.

Here they are.

PROJECT 1

Using the account that your instructor assigned to you create a structure that will have 4 Regions (North, South, East, West) and 4 Departments in each Region (Sales, Accounting, Inventory and Manufacturing) and 4 people in each department (Names up to you). Using vi create a text file that you can propagate though all of the people directories. Print out the structure and file status.

PROJECT 2

Change all of the files in the North structure read only, in the South structure to hidden, and in both East and West to copy inhibit.

PROJECT 3

Create your own shell that will allow you to change file status and copy from one directory to another.

PROJECT 4

Write a shell that will allow you to search directories for a particular file. You must be able to incorporate wildcards in the search.

PROJECT 5

Write a shell that will act as a user interface for Lab 3 and Lab 4.