CEN 321

Operating System
Term 2 - 2014

Course Profile

All details in this course profile for CEN 321 have been officially approved by CCIS Majmaah University and represent a learning partnership between the University and you (our student). The information will not be change unless absolutely necessary and any change will be clearly indicated by an approved correction included in the profile.

General Information

OVERVIEW

This Course is designed to develop knowledge and understanding of the Computer Operating System. This course is an introduction to the theory and practice behind modern computer operating systems. Over all aim of the course is Understand general structure of an operating system and its functions, key concepts such as multiprogramming, understand the role of operating systems in management of computer resources such as processes, memory, CPU, files, disks, input output subsystems and apply important methods and algorithms for scheduling the different activities during the operation of a computer. Topics will include what an operating system does (and doesn't) do, system calls and interfaces, processes, concurrent programming, resource scheduling and management (of the CPU, memory, etc.), virtual memory, security, File System Structure & implementation, Mass-Storage Structure, I/O Systems and Overview of Window, Mac, iOS & Android OS . We will approach the subject from both a theoretical perspective (what are the abstractions and algorithms?) as well as a practical one (what are the mechanisms and how are they built?).

DETAILS

Level	6
Credit Points	3

PRE-REQUISITES OR CO-REQUISITES

Pre-requisite: CS 210

ATTENDANCE Requirements

All on-campus students are expected to attend scheduled classes – in some courses, these classes axe identified as a mandatory (pass/fail) component and attendance is compulsory.

ASSESSMENT OVERVIEW

Assessment Task	Weighting
1. Midterm Exam-1	15%
2. Midterm Exam-2	15%
3. Quizzes	5%
4. Assignments/Report/Seminar	5%
5. Lab	20%
6. Final Exam	40%

This is a graded course: your overall grade will be calculated from the marks or grades for each assessment task, based on the relative weightings shown in the table above. You must obtain an overall mark for the course of at least 50%, or an overall grade of 'pass' in order to pass the course. If any 'pass/fail' tasks are shown in the table above they must also be completed successfully ('pass' grade). You must also meet any minimum mark requirements specified for a particular assessment task, as detailed in the 'assessment task' section (note that in some instances, the minimum mark for a task may be greater than 60%). Consult the University's Grades and Results Procedures for more details of interim results and final grades.

Majmaah University Policies

All University policies are available on the mu.deu.sa .

You may wish to view these policies:

- Assessment of Coursework Procedures
- Grads and Results Procedure
- Review ox Grade Policy
- Plagiarism Procedure
- Student Misconduct and Plagiarism Policy
- Monitoring Academic Progress Policy
- Monitoring Academic Progress Policy
- Monitoring Academic Progress Procedures
- Refund Excess Payments (Credit Balances) Policy
- Student complaints Policy
- Use of Internet, mail and Computing Facilities Policy

This list is not an exhaustive list of all University policies. The full lists of University policies are available on the University Web site(www.mu.edu.sa)

Course Learning outcomes

On successful completion of this course, you will be able to:

1. Understand general structure of an operating system and its functions.(Understand issues and problems involved in the design and implementation of operating systems & Identify the abstract services common to all operating systems)

2. Understand processes and their different states during execution of programs, describe states diagrams of processes(Understand and analyze theory and implementation of: processes, threads,CPU Scheduling,)

3. Describe how important mechanisms such as synchronizations and implemented to support multiprogramming (Understand and analyze theory and implementation of synchronization, Memory Management)

4. Describe major scheduling techniques & how they are applied to real situations and management of the CPU & Memory.

5. Understand the File System Structure & implementation, Mass-Storage Structure, I/O Systems (Understand OS support for I/O, file systems, Mass-Storage Structure)

6. Understand the Concept of different OS i.e., Window, Mac, iOS & Android OS (Understand OS for PC & Smart Phone)

In addition, during the practical exercise and associated self-study, you will:

- become familiar (if not already) with the C language, gcc compiler, and Make files
- understand the high-level structure of the Linux kernel both in concept and source code
- acquire a detailed understanding of one aspect (the scheduler) of the Linux kernel

Learning outcomes, Assessment and Graduate attributes

ALLIGNMENT OF ASSESSMENT TASKS TO LEARNING OUTCOMES

Assessment Task	Learning Outcomes					
	1	2	3	4	5	6
1. Midterm Exam-1	.	.				
2. Midterm Exam-2			.	.	.	
3. Quizzes	.	.	.	.	.	.

4. Assignments/Report/Seminar	. . . . .	. .
5. Lab Exam	. . . . .	. .
6. Final Exam	. . . . .	. .

Textbook and Resources

PRESCRIBED TEXTBOOKS

Operating System Concepts , 8th edition International Student Version			
Author/s	:Silberschatz, Galvin, and Greg Gagne	Year	: 2010
Edition	: 8th	Publisher	: WILEY

IT RESOURCES

You will need access to the following IT resources:

- **http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-828-operating-system-engineering-fall-2006/lecture-notes/**
- **Understanding Operating System Resources - Oracle Documentation (docs.oracle.com/cd/B19306_01/server.102/b14211/ch23_os.htm)**
- **http://www.cs.fsu.edu/~engelen/courses/COP4610/**

Referencing style

All submissions for this course must use the **American Psychological Association (APA)** referencing style . For further information, see the Assessment Tasks below.

Teaching Contacts

Course Coordinator	**Prof. Shailendra Mishra** **College of Computer & Information Sciences** **Majmaah University,Majmaah,KSA**

Schedule

Week	Module/Topic	Chapter	Event and submission
Week-1	Introduction : • Different OSs (Mainframe, Desktop, Multiprocessor, Distributed, Clustered, Real-Time, Handheld). • Computer-System Structures (I/O, Storage, Storage Hierarchy, Hardware Protection, Network).	Chapter 1,Operating System Concepts , 8th edition International Student Version Silberschatz, Galvin, and Gagne, 8th edition, Wiley, 2010.	Brain storming and review of previous knowledge.
Week-2	OS-Structures (Components, Services, System Calls, System structure, Virtual Machines, System Design & Implementation).	Chapter 2 Operating System Concepts , 8th edition International Student Version Silberschatz, Galvin, and Gagne, 8th edition, Wiley, 2010.	
Week-3	Processes • Process Concept • Process Scheduling • Operations on Processes • Cooperating Processes • Inter-process Communication	Chapter 3, Operating System Concepts , 8th edition International Student Version Silberschatz, Galvin, and Gagne, 8th edition, Wiley, 2010.	Assignment I
Week-4	Threads • Multithreading models • Threading Issues • Pthreads, Solaris 2 threads, Windows 2000 threads, Linux Threads, Java	Chapter 4, Operating System Concepts , 8th edition International Student Version Silberschatz, Galvin, and Gagne, 8th edition, Wiley, 2010.	Quiz 1

	Threads		
Week-5	Scheduling • CPU Scheduling • Scheduling Criteria • Scheduling Algorithms, • Algorithm Evaluation • Process Scheduling Models	Chapter 5, Operating System Concepts , 8th edition International Student Version Silberschatz, Galvin, and Gagne, 8th edition, Wiley, 2010.	Assignment II
Vacation week			
Week-6			**Written Assessment Due** **Sunday (16 March 2014) 10:00 PM**
Week-7	Synchronization • Process Synchronization • Critical-Section Problem • Synchronization Hardware • Semaphores • Critical Regions • Monitors	Chapter 6, Operating System Concepts , 8th edition International Student Version Silberschatz, Galvin, and Gagne, 8th edition, Wiley, 2010.	Quiz II
Week-8	Memory Management Swapping • Contiguous Memory Allocation • Paging • Segmentation with Paging • Page Replacement	Chapter8, Operating System Concepts , 8th edition International Student Version Silberschatz, Galvin, and Gagne, 8th edition, Wiley, 2010.	Assignment III
Week-9	• Virtual Memory • Allocation of frames • Thrashing	Chapter 9,Operating System Concepts , 8th edition International Student Version	

		Silberschatz, Galvin, and Gagne, 8th edition, Wiley, 2010.	
Week-10	File System • File-System Interface • File-System Structure • File-System Implementation	Chapter10,11 Operating System Concepts , 8th edition International Student Version Silberschatz, Galvin, and Gagne, 8th edition, Wiley, 2010.	Assignment IV
Week-11			**Written Assessment Due** **Sunday (20 April 2014) 10:00 AM**
Week-12	Mass-Storage Structure • Disk Structure • Disk Scheduling • Disk Management • Swap-Space Management • RAID Structure	Chapter12, Operating System Concepts , 8th edition International Student Version Silberschatz, Galvin, and Gagne, 8th edition, Wiley, 2010	Quiz III
Week-13	I/O Systems • Kernel I/O Subsystem • Transforming I/O to Hardware • Protection & Security	Chapter13,14,15 Operating System Concepts , 8th edition International Student Version Silberschatz, Galvin, and Gagne, 8th edition, Wiley, 2010	
Week-14	Overview of Window,Mac,iOS & Andriod	Chapter22,23,Operating System Concepts , 8th edition International Student Version Silberschatz, Galvin, and Gagne, 8th edition, Wiley, 2010	Assignment V
Review Exam			

Week			
Exam Week			

Teaching Contacts

Contact information

Course Coordinator:	**Shailendra Mishra, Ph.D**
Lab/Tutorial Instructor:	
Email:	s.mishra@mu.edu.sa
Office Hours:	8.00 a.m. to 02.30 p.m.
Office Number:	0164045382
Office:	Level 1, CCIS Building Room No-3-2-20-2, CCIS,Majmaah University

For any individual queries, please email me and I will endeavour to reply as soon as practical.

Assessment Task

WRITTEN ASSESMENT (Mid Term I Exam)

Assessment Title	Written Assessment
Task Description	This assignment is aligned to learning outcomes 1, 2 In that regard, the assignment contains questions that assess: 1) Understand general structure of an operating system and its functions.(Understand issues and problems involved in the design and implementation of operating systems & Identify the abstract services common to all operating systems) 2) Understand processes and their different states during execution of programs, describe states diagrams of processes(Understand and analyze theory and implementation of: processes, threads, CPU Scheduling,)
Assessment Due Date	**Week 6**
Return Date to Students	Week 7
Weighting	15%
Assessment Criteria	The assessment criteria for this task are under continuous revision.
Referencing Style	American Psychological Association (APA)
Submission	
Learning Outcomes Assessed	1) Understand issues and problems involved in the design and implementation of operating systems & Identify the abstract services common to all operating systems 2) Understand and analyze theory and implementation of: processes, threads, CPU Scheduling.

WRITTEN ASSESMENT (Mid Term IIExam)

Assessment Title	Written Assessment
Task Description	This assignment is aligned to learning outcomes 3,4,5 In that regard, the assignment contains questions that assess: • Describe how important mechanisms such as synchronizations and implemented to support multiprogramming (Understand and analyze theory and implementation of synchronization, Memory Management) • Describe major scheduling techniques & how they are applied to real situations and management of the CPU & Memory. • Understand the File System Structure & implementation, Mass-Storage Structure, I/O Systems (Understand OS support for I/O, file systems, Mass-Storage Structure)
Assessment Due Date	**Week 12**
Return Date to Students	Week 13
Weighting	15%
Assessment Criteria	The assessment criteria for this task are under continuous revision.
Referencing Style	American Psychological Association (APA)
Submission	
Learning Outcomes Assessed	• Understand and analyze theory and implementation of synchronization, Memory Management • Describe major scheduling techniques & how they are applied to real situations and management of the CPU & Memory. • Understand OS support for I/O, file systems, Mass-Storage Structure

FINAL EXAMINATION

Outline	Complete an examination
Date	**During University examination period**
Weighting	**40%**
Length	180 Minutes
Details	Dictionary - non-electronic, concise, direct translation only (dictionary must not contain any notes or comments) No Calculator Permitted Closed Books
Learning Outcomes Assessed	1. Understand issues and problems involved in the design and implementation of operating systems & Identify the abstract services common to all operating systems 2. Understand and analyze theory and implementation of: processes, threads,CPU Scheduling.,) 3. Understand and analyze theory and implementation of synchronization, Memory Management 4. Describe major scheduling techniques & how they are applied to real situations and management of the CPU & Memory. 5. Understand OS support for I/O, file systems, Mass-Storage Structure 6. Understand OS for PC & Smart Phone