

UNIVERSITY OF SCIENCE FACULTY OF INFORMATION TECHNOLOGY

COURSE SYLLABUS

<CTT103>: <Operating Systems>

Term: 02 / 2014-2015

INSTRUCTOR INFORMATION

Instructor: Trần Trung Dũng

Office location: I-74

Email: ttdung@fit.hcmus.edu.vn

Phone:

Office hours:

COURSE INFORMATION

Credits:

Pre-requisites:C++

Class room:

COURSE OBJECTIVES

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

- To have an overview of different types of operating systems
- To know the components of an operating system
- To have a thorough knowledge of process management
- To have a thorough knowledge of storage management
- To know the concepts of I/O and file systems
- To understand what can affect the performance of the OS and applications
- To be able to write more efficient and better applications

COURSE DESCRIPTION

This course is an introduction to the internal operation of modern operating systems. In particular, the course will cover processes, threads, mutual exclusion, CPU scheduling, deadlock, memory management, and file systems.

COURSE MATERIALS

Textbooks

[1]. Class textbook: Andrew S. Tanenbaum, 2008. Modern Operating Systems (3rd Ed.) ISBN-10: 0136006639, ISBN-13: 9780136006633. Publisher: Prentice Hall

Reference books

[1].

Softwares

[1].Nachos

Course website

[1].Moodle

COURSE TOPICS

Unit I Introduction

Architecture of OS (Ex. Monolithic, Microkernel, Layered ,...), Operating system objectives and functions, Virtual Computers, Interaction of O. S. & hardware architecture, Evolution of operating systems, Batch, multiprogramming. Multitasking, Multiuser, parallel, distributed & real –time O.S., System calls, O. S. Shell, Linux Shell commands,. Examples of O. S.: Linux, MS-Windows, Handheld OS. History of O.S.

Unit II Process Management

Process, Process description, Process states, Process control, Threads, Processes and Threads, Uniprocessor Scheduling: Types of scheduling, Scheduling algorithms: FCFS, SJF, Priority, Round Robin, UNIX Multi-level feedback queue scheduling, Thread Scheduling, Multiprocessor Scheduling concept, Real Time Scheduling concepts.

Unit III Process Communication and Synchronization

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6 Hrs.

9 Hrs.

9 Hrs.

Concurrency: Principles of Concurrency, Mutual Exclusion H/W Support, software approaches, Semaphores and Mutex, Message Passing, Monitors, Classical Problems Of Synchronization: Readers-Writers Problem, Producer Consumer Problem, Dining Philosopher problem.

Deadlock: Principles of deadlock, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, An Integrated Deadlock Strategies.

Unit IV Memory Management

Memory Management requirements, Memory partitioning: Fixed ,dynamic, partitioning, Buddy System Memory allocation Strategies (First Fit, Best Fit, Worst Fit, Next Fit), Fragmentation, Swapping, Segmentation, Paging, Virtual Memory, Demand paging, Page Replacement Policies (FIFO, LRU, Optimal, clock), Thrashing, Working Set Model.

Unit V I/O and File Management

I/O Management and Disk Scheduling: I/O Devices, Organization of I/O functions, Operating System Design issues, I/O Buffering, Disk Scheduling (FCFS, SCAN, C-SCAN, SSTF), Disk Caches. File Management: Overview, File Organization and access, File Directories, File Sharing, Security issues, Record Blocking, Secondary Storage Management. Comparative study of Windows and UNIX file system.

Unit VI Protection and Security

Computer security & protection: Security Threats, Attacks and assets, Intruders, Malicious softwares, Protection: Protection Policy and mechanisms, Authentications: Internal Access Authorizations, Implementations

Every aspect of O.S. will be taught with e.g. WINDOWS OS & UNIX OS

COURSE REQUIREMENTS

Homework	During the term, periodic assignments will be assigned during the			
assignments	class period and must be submitted on their associated due date. No			
	late assignments will be accepted.			
Examinations	Each student will be responsible for completing a mid-term and a final			
	examination. The final examination will be cumulative. No makeup			
	examinations will be given.			
Quizzes	Brief ten (10) minute announced multiple-choice quizzes will be given			
	at the end of a class on any topics in any lecture covered and any			
	reading material assigned up to the time the quiz is administered.			
	Missed quizzes cannot be made up.			
Projects	There are two (2) projects in this course. Students are responsible for			
	completing a written report and oral presentation of the project.			

6 Hrs.

6 Hrs.

9 Hrs.

COURSE GRADING

Course Item	Percent of Final Grade
Homework assignments	
Quizzes	20%
Projects	30%
Mid-term examination	20%
Final examination	30%

RELATIONSHIP OF COURSE TO ABET CRITERIA

ABET Criteria	Level of Emphasis
	Course (Not
	Applicable, Low,
	Medium, High)
a. An ability to apply knowledge of computing and mathematics	low
appropriate to the discipline	
b. An ability to analyze a problem, and identify and define	low
the computing requirements appropriate to its solution	
c. An ability to design, implement, and evaluate a computer-based	medium
system, process, component, or program to meet desired needs	
d. An ability to function effectively on teams to accomplish a common	medium
goal	
e. An understanding of professional, ethical, legal, security and social	medium
issues and responsibilities	
f. An ability to communicate effectively with a range of audiences	high
g. An ability to analyze the local and global impact of computing on	low
individuals, organizations, and society	
h. Recognition of the need for and an ability to engage in continuing	low
professional development	
i. An ability to use current techniques, skills, and tools necessary for	medium
computing practice	

j. An ability to apply mathematical foundations, algorithmic principles,	medium
and computer science theory in the modeling and design of computer-	
based systems in a way that demonstrates comprehension of the	
tradeoffs involved in design choices	
k. An ability to apply design and development principles in the	medium
construction of software systems of varying complexity	

PROFESSIONALISM AND ETHICS

Mobile phones, etc. must be silenced during all classroom lectures. Those not heeding this rule will be asked to leave the classroom immediately so as to not disrupt the learning environment.

Course assignments and tests are designed to have educational value; the process of preparing for and completing these exercises will help improve your skills and knowledge. Material presented to satisfy course requirements is therefore expected to be the result of your own original scholarly efforts.

Plagiarism and cheating - presenting another's ideas, arguments, words or images as your own, using unauthorized material, or giving or accepting unauthorized help on assignments or tests - contradict the educational value of these exercises.

Plagiarism and Cheating of any kind on an examination, quiz, or assignment will result at least in an "0" (zero) for that assignment (and may, depending on the severity of the case, lead to an "0" for the entire course) and may be subject to appropriate referral to the Management Board of CLC for further action.

I will assume for this course that you will adhere to the academic creed of this Program and will maintain the highest standards of academic integrity. In other words, don't cheat by giving answers to others or taking them from anyone else. I will also adhere to the highest standards of academic integrity, so please do not ask me to change (or expect me to change) your grade illegitimately or to bend or break rules for one person that will not apply to everyone.

POLICIES

Class Attendance and Participation

- Regular class attendance is strongly advised and is necessary for students to fully grasp many of the course concepts.
- Please be on time to class.

- If you miss a class session, it will be your responsibility to find out the materials that were covered.
- Students in attendance are expected to be active participants in the course. This participation includes: contributing to class discussions, providing insight into the class discussion topics, raising questions, and relating class material to personal experiences and other course topics.

Computer Usage

Moodle and e-mail will be used to communicate with students and disseminate materials and assignments throughout the course. So, students should check Moodle and their e-mail at least once per day.

When sending e-mail to the instructor, please begin the "Subject:" of the message with the following: [CLC]<*space>*

COURSE SCHEDULE

(Includes course topics, relevant readings, homework assignments, project tasks, and examination)

Week	Day	Date	Торіс	Relevant Reading	Homework/Task
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					