COURSE SYLLABUS
CSC10007 – Introduction to Operating Systems

1. GENERAL INFORMATION

Course name:	**Introduction to Operating Systems**
Course name (in Vietnamese):	Nhập môn Hệ điều hành
Course ID:	CSC10007
Knowledge block:	Cơ sở ngành
Number of credits:	4
Credit hours for theory:	40
Credit hours for practice:	30
Credit hours for self-study:	90
Prerequisite:	Nonce
Prior-course:	Computer Systems
Instructors:	Phạm Tuấn Sơn

2. COURSE DESCRIPTION

This course covers the important problems in operating system design and implementation. It will also cover the tradeoffs that can be made between performance and functionality during the design and implementation of an operating system. Particular emphasis will be given to three major OS subsystems: process management (processes, threads, CPU scheduling, synchronization, and deadlock), memory management (segmentation, paging, swapping), and file systems; and on operating system support for distributed systems.

3. COURSE GOALS

At the end of the course, students are able to

ID	Description	Program LOs
G1	Learn a lot of practical information about how programming languages, operating systems, and architectures interact and how to use each effectively.	5.1.1, 5.1.3, 5.2.1, 5.2.2, 5.3.1, 6.1.1
G2	Learn about how operating system structured and its components working.	5.1.1, 5.1.3, 5.2.1

G3	Have knowledge to more effectively use and manipulate computers and computer program	5.1.3, 5.2.1, 5.2.2, 5.3.1
G4	Team work & Independent thinking	2.2, 2.3.1
G5	Understanding keywords	2.4.3, 2.4.5

4. COURSE OUTCOMES

CO	Description	I/T/U
G1.1	Describe and explain the fundamental components of a computer operating system	I,T
G1.2	Define, restate, discuss, and explain the policies for scheduling, deadlocks, memory management, synchronization, system calls, and file systems	I,T
G2.1	Describe and extrapolate the interactions among the various components of computing systems	I,T
G2.2	Design and construct the following OS components: System calls, Schedulers, Memory management systems, Virtual Memory and Paging systems	I,T
G3.1	Illustrate, construct, compose and design solutions via C/C++ programs, and through NACHOS	I,T
G3.2	Explain in detail a particular file system (FAT/NTFS/…) organization and operations Explain data recovery mechanism and use effective tools	I,T
G4.1	Criticize any topic related to OS	I
G5.1	Be able to work independently or work in group	I,U

5. TEACHING PLAN

ID	Topic	Course outcomes	Teaching/Learning Activities (samples)
1	Overview A brief of History Architecture	G1.1, G2.1	Lecturing Discussion Q&A, Quizzes
2	Disk File systems Detail of FAT/NTFS/…	G1.2, G2.1, G2.2, G3.2	Lecturing Demonstration, Case study Q&A, Exercises [Test T1] [Bonus B1]
3	Processes and Threads CPU Schedule	G1.2, G2.1, G2.2	Lecturing Demonstration Q&A, Exercises [Test T2]
4	Memory management Virtual memory	G1.2, G2.1, G2.2	Lecturing Demonstration, Discussion

			Q&A, Exercises [Test T3]
5	Synchronnization	G1.2, G2.1, G2.2	Lecturing Discussion Q&A, Exercises [Test T4]
6	Review	G1.1, G1.2, G2.1, G2.2, G4.1	Discussion Q&A, Exercises

For the practical laboratory work, there are 10 weeks which cover similar topics as it goes in the theory class. Each week, teaching assistants will explain and demonstrate key ideas on the corresponding topic and ask students to do their lab exercises either on computer in the lab or at home. All the lab work submitted will be graded. There would be a final exam for lab work.

6. LAB PLAN

ID	Topic	Course outcomes	Teaching/Learning Activities (samples)
1	Project 1 explaination	G3.1, G5.1	Lecturing Demonstration Q&A, Group discussion
2	Project 2 explaination	G3.1, G5.1	Lecturing Demonstration Q&A, Group discussion
3	Project 3 explaination	G3.1, G5.1	Lecturing Demonstration Q&A, Group discussion

7. ASSESSMENTS

ID	Topic	Description	Course outcomes	Ratio (%)
T	**Tests**			**30% - E1**
T1	FAT file system	Files/folders organized on FAT and their operations (copy, cut, delete, …)	G3.2	Up to 20%
T2	CPU scheduling	FIFO, SJF, …	G2.2	Up to 10%
T3	Memory, Virtual memory	Paging	G2.2	Up to 10%
T4	Synchronization	Semaphore	G2.2	Up to 10%
P	**Projects**			**30%**
P1	NachOS	Implementation system calls for file system operations on NachOS	G3.1	10%
P2	NachOS	Implemetation the multiprograming system on NachOS	G3.1	10%

P3	Linux	Implementation Linux kernel modules	G3.1	10%
B	**Bonus**	**Data recovery**		**Up to +/- 20%**
B1	Data recovery	Lost partitions, files, folders	G3.2	Up to +/- 20%
E	**Exams**			**Up to 70%**
E1	Midterm exam	Open book exam. Describe the understanding of different topics, analyze & program to solve problems	G2.2, G3.2	30% - T
E2	Final exam	Open book exam. Describe the understanding of different topics, analyze & program to solve problems	G1.1, G1.2, G2.1, G2.2	40%

8. RESOURCES

Textbooks

- ***Giao trinh He dieu hanh**, Tran Trung Dung & Pham Tuan Son*
- ***Modern Operating System**, 4th Edition, Andrew Tanenbaum & Herbert Bos, Pearson PLC, 2014*

Others

- ***Operating System Concepts,** 10th Edition, Abraham Silberschatz, Peter B. Galvin & Greg Gagne, John Wiley & Sons, 2018*

Software

Linux Operation System at https://github.com/torvalds/linux

9. GENERAL REGULATIONS & POLICIES

- All students are responsible for reading and following strictly the regulations and policies of the school and university.
- Students who are absent for more than 3 theory sessions are not allowed to take the exams.
- For any kind of cheating and plagiarism, students will be graded 0 for the course. The incident is then submitted to the school and university for further review.
- Students are encouraged to form study groups to discuss on the topics. However, individual work must be done and submitted on your own.