COURSE SYLLABUS

1. ## COURSE TITLE
   Operating Systems

2. ## COURSE CODE
   COMP3033

3. ## PRE-REQUISITE
   COMP1013 Structured Programming or
   COMP2013 Object-Oriented Programming

4. ## CO-REQUISITE
   Nil

5. ## NO. OF UNITS
   3

6. ## CONTACT HOURS
   42

7. ## OFFERING UNIT
   Computer Science and Technology Programme, Division of Science and Technology

8. ## SYLLABUS PREPARED & REVIEWED BY
   Prepared by Dr. Louis TANG
   Reviewed by Dr. Weifeng SU
   Revised by Dr. Judy FENG and Dr. Changjiang ZHANG

9. ## AIMS & OBJECTIVES

   This course aims to provide the fundamentals and major concepts of operating systems design and principles. Topics include an overview of the components of an operating system, mutual exclusion and synchronisation, deadlocks and starvation, implementation of processes and threads, resources scheduling algorithms, memory management, and file systems.

10. ## COURSE CONTENT

Operating Systems Overview   **3 hours**

A. Historical Development

B. Operating System Objectives and Functions

C. Major Achievements

Process & Thread Management   **6 hours**

A. Process Concepts

B. Thread Concepts

C. Descriptions, Structures, and Controls

Concurrency Control   **9 hours**

A. Mutual Exclusion

B. Synchronization

C. Deadlock

D. Starvation

Memory Management   **6 hours**

A. Multiprogramming and Partitions

B. Paging and Segmentation

C. Virtual Memory

D. Demand Paging

E. Page Replacement Algorithms

Processor Scheduling   **6 hours**

A. Scheduling Concepts

B. Scheduling Algorithms

C. Algorithm Evaluation

I/O & File Management   **6 hours**

A. I/O Devices

B. Disk Scheduling

C. File Organization

D. Directory Structures

Case Studies   **4 hours**

11. **COURSE INTENDED LEARNING OUTCOMES (CILOS) WITH MATCHING TO PILOS**

Programme Intended Learning Outcomes (PILOs)

Programme Title: Bachelor of Science (Honours) in Computer Science and Technology	
PILO	**Upon successful completion of the Programme, students should be able to:**
PILO 1	**analyze** the basic principles of computer science and technology;
PILO 2	**Translate** real world problems into IT requirements;
PILO 3	**design** and **develop** complex software;
PILO 4	**apply** up-to-date technology to **solve** general problems in specific areas;
PILO 5	**communicate** effectively and **collaborate** in a team.

CILOs-PILOs Mapping Matrix

Course Code & Title: COMP3033 Operating Systems		
CILO	**Upon successful completion of the course, students should be able to:**	**PILO(s) to be addressed**
CILO 1	**Explain** the basic principles of the operating system.	PILO 1
CILO 2	**Implement** operating systems concepts in detail.	PILO 3,5

12. TEACHING & LEARNING ACTIVITIES (TLAs)

CILO No.	TLAs
CILO 1	● **Lecture**: The instructor will explain the course material in detail. And students will be given extensive well-designed study cases during the class to help them understanding the concepts of Operating System. ● **Hands-on practice**: Each student is given some exercises during the class and after class. As for the class exercise, students will present their solution to the class. And there will be a short discussion after that. As for the exercises after class, students need to submit their answer to lecturer. ● **Programming Assignment**: Each student will implement some medium-sized programming tasks. ● **Project**: Each student is required to join a group to complete and implement a free project related to Operating System wherein students need to cooperate with each other to propose a new idea, analysis their problem, design a solution, and implement their solution.

CILO No.	TLAs
CILO 2	● **Programming Assignment**: Each student will implement some medium-sized programming tasks. ● **Project**: Each student is required to join a group to complete and implement a free project related to Operating System wherein students need to cooperate with each other to propose a new idea, analysis their problem, design a solution, and implement their solution.

13. ASSESSMENT METHODS (AMs)

Type of Assessment Methods	Weighting	CILOs to be addressed	Description of Assessment Tasks
Hands-on Exercise	10%	1	Exercise will give students the hand on experience to solve some simple programming task.
Programming Assignment	20%	1-2	Assignment will give students the hand on experience to implement some medium-sized programming tasks. Compared with exercise, the knowledge required in the assignment will be more broad and comprehensive.
Project	10%	1-2	This project aims to assess the major learning outcomes achieved by students upon completion of the course.
Mid-Term Exam	25%	1	This mid-term Exam will test the students' knowledge about operation systems' basic concepts and theories in the first five chapters.
Final examination	35%	1-2	This examination will test students' knowledge about operating systems' concepts and theories mainly in chapters after the mid-term exam.

14. TEXTBOOKS / RECOMMENDED READINGS

TEXTBOOK:

Nil

RECOMMEND READINGS:

[1] Abraham Silberschatz, Peter Baer Galvin, Greg Gagne, Operating System Concepts, John Wiley and Sons, 10th Ed., 2018.

[2] Maurice J. Bach, The Design of the Unix Operating System, Prentice Hall, 1986.

[3] Tom Carpenter, Microsoft Windows Operatingt System Essentials: Exam 98-349, Sybex, 2012.

[4] Norton Fausto Garfield, Distributed Operating System, Anim, 2011.

[5] Qinghua Lu, JARTOS: A Real-Time Operating System in Java, Lambert Academic, 2012.

[6] Sahar Sabbeh, Adaptation of Web Operating System Using Semantic Web Techniques, Lambert Academic, 2012.

[7] Ralf G. Herrtwich, Network and Operating System Support for Digital Audio and Video: Second International Workshop, Heidelberg, Germany, November 18-19, 1991. Proceeding, Springer.

[8] Jose M. Garrido, Performance Modeling of Operating Systems Using Object-Oriented Simulations: A Practical Introduction, Springer, 2014.

[9] Iain D. Craig, Formal Refinement for Operating System Kernels, Springer, 2007.

[10] Iain D. Craig, Formal Models of Operating System Kernels, Springer, 2006

15. MEDIUM OF INSTRUCTION (MOI)

English

Revised on: <2021-12-31>