TQF. 3

☑ Bachelor's Degree

☐ Master's Degree

Course Specification

Course Code: CPE3201

Course Title: Operating Systems

Credits: 3(3-0-6)

Program: Bachelor of Engineering (Computer Engineering)

Semester: 1 **Academic Year:** 2023

Faculty of Industrial Technology

Suan Sunandha Rajabhat University

Section 1 - General Information

1. Course code and course title

Course code: CPE3201

Course title (English): Operating Systems

ชื่อวิชา (ภาษาไทย): ระบบปฏิบัติการ

2. Credits

3(3-0-6)

3. Curriculum and course category

Curriculum: Bachelor of Engineering (Computer Engineering)

Course Category:

☐ General Education ☐ Specialized Course

☑ Required Course ☐ Elective Course ☐ Internship

4. Teacher in charge and lecturer

Teacher in charge: Dr.Pongrapee Kaewsaiha

Lecturer: Dr.Pongrapee Kaewsaiha

5. Contact

Room Number: 4724A Email: pongrapee.ka@ssru.ac.th

6. Semester/Academic year

Semester: 1 Academic Year: 2023

Section: 001 Number of enrolled students: 29

7. Pre-requisite (if any)

None

8. Co-requisite (if any)

None

9. Time/Venue

Wed, 13:00-16:00, Room 4733, Faculty of Industrial Technology, SSRU

10. Last date for preparing and revising this course

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Section 2 - Aims and Objectives

1. Course aims

This course provides knowledge for those who seek an introduction to how operating systems work at a basic level. This course provides learners with a basic knowledge of operating systems suitable for the developer role. Students will learn about the core components of an operating system and how they operate, such as software, user, and file management.

2. Course objectives

By the end of this course, you will be able to:

1) Understand how system processes work.
2) Manage files, directories, software, and connected devices and memory using a graphical user interface (GUI) and command-line interface (CLI) in major operating systems.
3) Solve common IT problems and maximize the system performance.

3. Purposes for developing and revising course

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Section 3 - Characteristics and Operations

1. Course description

(English) Design principles; Concurrency; Scheduling and dispatch; Memory management; Device management; File systems; System performance evaluation; Security and protection

(ไทย) หลักการออกแบบระบบปฏิบัติการ ภาวะพร้อมกัน การจัดการและการกำหนดลำดับกระบวนการ การจัดการหน่วยความจำ การจัดการอุปกรณ์ ระบบแฟ้มข้อมูล การประเมินประสิทธิภาพระบบ ความปลอดภัยของระบบและการป้องกัน

2. Time length per semester (Lecture/Practice/Self-study hours)

Lecture	Practice	Self-Study	Remedial Class
3 hours/week	-	6 hours/week	As needed

3. Individual consulting and guidance

Self-consulting at the lecturer's office:

Room Number 4724A, Faculty of Industrial Technology, SSRU

Mon., 13:00-15:00 or by appointment

Consulting via office telephone/mobile phone:

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Consulting via email:

pongrapee.ka@ssru.ac.th

Consulting via social media platform:

Line OpenChat

Consulting via a web forum:

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Section 4 - Developing Students' Learning Outcomes

Expected students' learning outcomes are categorized into five domains, developed from curriculum specification (TQF2), as follows:

1. Morals and ethics

1.1 Learning outcomes to be developed

- 1) Have knowledge, understanding, and realizing value, morality, ethics, sacrifice, and honesty. Have academic and professional ethics.
- 2) Be disciplined, punctual, and responsible for oneself and society. Be able to comply with organizational and social regulations.
- 3) Be able to take leader and follower roles, work as a team, resolve conflicts and priorities.
- 4) Be open-minded and respect rights, value, and dignity of human beings.
- 5) Have a conscience that considers common interests rather than personal interests.

1.2 Teaching strategies

Establish an organizational culture to instill discipline in students. Emphasis on attending classes on time as well as dressing according to university regulations. Students responsible for group work must be trained to know the responsibilities of being a group leader and being a member of a group. Be honest by not committing fraud in exams or plagiarizing other people's homework. In addition, all instructors must include morality and ethics in teaching all subjects. Also, there are activities to promote morality and ethics, such as honoring students who have done well in benefit the public and sacrifice.

1.3 Assessment & evaluation strategies

1) Evaluate from attentiveness and diligence in participating in class activities.
2) Assess students' punctuality in class, submission of work, and participation in activities.
3) Evaluate the responsibilities of assigned duties.

2. Knowledge

2.1 Learning outcomes to be developed

- 1) Have knowledge and understanding of important principles and theories in the course.
- 2) Have knowledge and understanding of other areas related to the course which can be integrated and applied appropriately.
- 3) Have knowledge of operational techniques using experiential learning methods.
- 4) Be able to continuously monitor academic and professional changes both in theory and in practice.

2.2 Teaching strategies

Use a variety of teaching methods emphasizing theoretical principles and practical application in real-world environments to keep pace with technological changes. This shall be in accordance with the nature of the course as well as the content of that course.

2.3 Assessment & evaluation strategies

1) Quiz
2) Mid-term and final exams
3) Report
4) Presentation

3. Cognitive skills

3.1 Learning outcomes to be developed

- 1) Be able to think critically and systematically.
- 2) Be able to search, interpret, process, and evaluate data to identify, analyze, and solve problems creatively.
- 3) Be able to follow up, evaluate, and report results accurately and completely.

3.2 Teaching strategies

1) Teachers always teach and show rational thinking as an example.
2) Presentations and group discussions.
3) Provide students the opportunity to practice.

3.3 Assessment & evaluation strategies

Assess according to the real situation from the work and practice of students, such as assessing from class presentations, testing using quiz, interviews, etc.

4. Interpersonal skills and responsibilities

4.1 Learning outcomes to be developed

- 1) Be able to help and facilitate in solving problems in various situations in the group, either as a leader or a team member.
- 2) Have good human relations. Be able to work well with others and adapt well to situations and corporate culture.
- 3) Have responsibility for their own actions and for group work and learning development, both personally and professionally.
- 4) Be able to work and take responsibility for assigned tasks efficiently.

4.2 Teaching strategies

Use instructions with activities that involve group work, work that requires coordination with others, across curriculum, across faculties, external parties, external agencies, or work that students need to research information from interviewing other people or experts.

4.3 Assessment & evaluation strategies

Assess student behavior and expression in presenting group reports in class and observe the behavior shown in participating in various activities and the completeness and clarity of the information.

5. Numerical analysis, communication, and information technology skills

5.1 Learning outcomes to be developed

- ○ 1) Be able to use quantitative analysis to make creative decisions in interpretation and suggest ways to solve problems or disputes.
- ○ 2) Be able to communicate effectively both verbally and in writing. Know how to choose a presentation style that is suitable for different problems and audience groups.
- ○ 3) Be able to choose appropriate information technology and communication techniques to collect data, interpretation, and information communication.

5.2 Teaching strategies

Organize learning activities in various subjects for students to analyze simulated situations, numerical analysis skills, virtual situations, and propose appropriate solutions. Learn techniques for applying technology in a variety of situations.

5.3 Assessment & evaluation strategies

Assess presentation techniques based on theory, selection of technological tools or related mathematics and statistics. Assess the ability to explain the limitations, reasons for choosing different tools, discussions, and case studies that are presented to the class.

Remark: The symbol ● means “major responsibility.”
The symbol ○ means “minor responsibility.”
No symbol means “no responsibility.”

Section 5 - Lesson Plan and Assessment

1. Lesson plan

Week	Content	Teaching Management	Program/Teaching Strategies	Material/Media	Assessment
1	**Course introduction** **Chapter 1:** Principles of operating systems	On-site, Online	- Introduce course outlines. - Introduce the course LMS (Moodle) and provide technical assistance as needed. - Learn how operating systems work at a fundamental level: programming language, processes, scheduling, and memory. - Students complete a self-evaluation form. - Students attempt a quiz. - Discuss expected outcome and grading criteria.	- Presentation - Online form - Online quiz	- Participation record - Quiz result
2-3	**Chapter 2:** File system	On-site, Online	- Learn how directory and file system works in major operating systems. - Learn how to manipulate files and directories using graphical user interface (GUI) and command-line interface (CLI). - Students attempt a quiz.	- Presentation - Online quiz	- Participation record - Quiz result
4-5	**Chapter 3:** Memory management	On-site, Online, On-demand	- Learn about segmentation, paging, swapping, and virtual memory. - Students attempt a quiz.	- Presentation - Online quiz	- Participation record - Quiz result

Week	Content	Teaching Management	Program/Teaching Strategies	Material/Media	Assessment
6-7	**Chapter 4:** Scheduling and dispatch	On-site, Online, On-demand	- Learn the scheduling and dispatch process, including different types of schedulers. - Students attempt a quiz.	-	-
8	**Mid-term examination**		-	-	-
9	**Chapter 4:** Concurrency	On-site, Online	- Learn about threads, locking data structures and multi-CPU scheduling. - Students attempt a quiz.	- Presentation - Online quiz	- Participation record - Quiz result
10-11	**Chapter 5:** Device management	On-site, Online, On-demand	- Learn about input and output communication. - Students attempt a quiz.	- Presentation - Online quiz	- Participation record - Quiz result
12-13	**Chapter 6:** System performance evaluation	On-site, Online, On-demand	- Learn about system integrity, how to evaluate system performance, and factors affecting the system performance. - Students attempt a quiz.	- Presentation - Online quiz	- Participation record - Quiz result
14-15	**Chapter 7:** Security and protection	On-site, Online	- Learn about system vulnerability and protection measures. - Students attempt a quiz.	- Presentation - Online quiz	- Participation record - Quiz result
16	**Final examination**		-	-	-

2. Learning assessment plan

Learning Outcomes	Assessment Activities	Schedule (Week)	Proportion for Assessment (%)
1	Participation record	1-15	10
2, 3	Quiz	1-15	40
	Examinations	8, 16	20, 30

Section 6 - Learning and Teaching Resources

1. Required textbooks and materials

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2. Documents and important information

Documents suggested by the lecturer

3. Recommended resources for extra study

Information retrieved from search engines

Section 7 - Course Evaluation and Revising

1. Strategies for evaluation of course effectiveness by students

Students will complete the evaluation form after the end of the course.

2. Strategies for course evaluation by the lecturer

The lecturer observes the class and collects feedback from students.

3. Teaching revision

The lecturer revises the teaching and learning process based on the evaluation results.

4. Feedback for achievement standards

The administration committees collect data and analyze students' academic performance each semester.

5. Methodology and planning for course review and improvement

Revise the curriculum, teaching methods, and learning methods by referring to the evaluation results from those involved. Meetings will be held to review the course's effectiveness and improve the curriculum.