



TQF. 3

Bachelor's Degree

Master's Degree

Course Specification

Course Code: CPE3202

Course Title: Software and Systems Engineering

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: CPE3202

Course title (English): Software and Systems Engineering

ชื่อวิชา (ภาษาไทย): วิศวกรรมซอฟต์แวร์และระบบ

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: 30

7. Pre-requisite (if any)

None

8. Co-requisite (if any)

None

9. Venue

Fri, 13:00-16:00, Room 4736, 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 discusses software and systems development life cycles, software development methods which rely on introductory programming principles, software architecture and deployment, as well as system development to meet user requirements.

2. Course objectives

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

- 1) Describe software engineering, Software Development Lifecycle (SDLC), and some known software development tools.
- 2) List different types of programming languages and their uses.
- 3) Outline approaches to application architecture, design, and deployment.
- 4) Analyze needs and choose appropriate system design approaches.

3. Purposes for developing and revising course

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Section 3 - Characteristics and Operations

1. Course description

(English) Software evolution; Software processes; Software tools and environments; Software requirements and specifications; Language translation; Software design; Software project management; Software testing and validation; Software fault tolerance

(ไทย) วิวัฒนาการซอฟต์แวร์ กระบวนการทางซอฟต์แวร์ เครื่องมือและสภาพแวดล้อม การกำหนดความต้องการ การแปลภาษา การออกแบบซอฟต์แวร์ การบริหารโครงการซอฟต์แวร์ การทดสอบซอฟต์แวร์ การแก้ไขข้อบกพร่องซอฟต์แวร์

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: Software and System Development Life Cycle	On-site, Online	<ul style="list-style-type: none"> - Introduce course outlines. - Introduce the course LMS (Moodle) and provide technical assistance as needed. - Explain the Software Development Lifecycle - Students complete a self-evaluation form. - Students attempt a quiz. - Discuss expected outcome and grading criteria. 	<ul style="list-style-type: none"> - Presentation - Online form - Online quiz 	<ul style="list-style-type: none"> - Participation record - Quiz result
2-3	Chapter 2: Introduction to Software Development	On-site, Online	<ul style="list-style-type: none"> - Introduce web development. - Introduce application development. - Students attempt a quiz. 	<ul style="list-style-type: none"> - Presentation - Online quiz 	<ul style="list-style-type: none"> - Participation record - Quiz result
4-5	Chapter 3: Basics of Programming	On-site, Online	<ul style="list-style-type: none"> - Learn about different categories of programming languages. - Explore basic programming logic. - Students attempt a quiz. 	<ul style="list-style-type: none"> - Presentation - Online quiz 	<ul style="list-style-type: none"> - Participation record - Quiz result
6-7	Chapter 4: Software Architecture, Design, and Patterns	On-site, Online	<ul style="list-style-type: none"> - Learn about the foundations of enterprise software development. - Students attempt a quiz. 	<ul style="list-style-type: none"> - Presentation - Online quiz 	<ul style="list-style-type: none"> - Participation record - Quiz result
8	Mid-term examination		-	-	-

Week	Content	Teaching Management	Program/Teaching Strategies	Material/Media	Assessment
9	Chapter 5: Discipline of systems engineering	On-site, Online, On-demand	- Describe the discipline of systems engineering. Outline its relevance and benefits. - Students attempt a quiz.	- Presentation - Online quiz	- Participation record - Quiz result
10	Chapter 6: Needs and Requirements	On-site, Online, On-demand	- Learn how to examine needs and requirements viewed by businesses and systems designers. - Students attempt a quiz.	- Presentation - Online quiz	- Participation record - Quiz result
11	Chapter 7: Conceptual Design	On-site, Online	- Recognize how needs and requirements are translated into system requirements. - Students attempt a quiz.	- Presentation - Online quiz	- Participation record - Quiz result
12	Chapter 8: Detailed Design and Prototyping	On-site, Online	- Translate the conceptual design into detailed design and prototype. - Students attempt a quiz.	- Presentation - Online quiz	- Participation record - Quiz result
13	Chapter 9: Production and Utilization	On-site, Online, On-demand	- Learn how to move onto the construction and production of the system based on the design. - Students attempt a quiz.	- Presentation - Online quiz	- Participation record - Quiz result
14	Chapter 10: Model-Based Systems Engineering	On-site, Online, On-demand	- Learn concepts of MBSE from across digital manufacturing and design disciplines. - Students attempt a quiz.	- Presentation - Online quiz	- Participation record - Quiz result
15	Chapter 11: Systems Engineering Management	On-site, Online	- Look at some critical issues in system engineering. - 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, 4, 5	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 immediate feedback from students.

3. Teaching revision

The lecturer revises the teaching and learning process based on the questionnaire 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.