TQF. 3

☑ Bachelor's Degree

☐ Master's Degree

Course Specification

Course Codes: CPE5012, CPE5013

Course Titles: Front-end and Back-end Programming

Credits: 6(4-4-10)

Program: Bachelor of Engineering (Computer Engineering)

Semester: 1 **Academic Year:** 2024

Faculty of Engineering and Industrial Technology

Suan Sunandha Rajabhat University

Section 1 - General Information

1. Course code and course title

Course codes: CPE5012, CPE5013

Course title (English): Front-end and Back-end Programming

ชื่อวิชา (ภาษาไทย): การโปรแกรมฟรอนต์เอนด์และแบ็คเอนด์

2. Credits

3(2-2-5)

3. Curriculum and course category

Curriculum: Bachelor of Engineering

Course Category:

☐ General Education ☐ Specialized Course ☐ Professional Foundation

☐ 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: 4222 Email: pongrapee.ka@ssru.ac.th

6. Semester/Academic year

Semester: 1 Academic Year: 2024

Sections: 001 Number of enrolled students: TBA

7. Pre-requisite (if any)

None

8. Co-requisite (if any)

None

9. Time/Venue

Tue, 08:00-12:00, 13:00-17:00, Room 4222, SSRU

10. Last date for preparing and revising this course

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Section 2 - Aims and Objectives

1. Course aims

This course aims to provide students with a comprehensive understanding of both front-end and back-end web development. Students will learn to create dynamic, responsive, and user-friendly web applications by mastering a range of technologies and tools. By the end of the course, students will have the skills needed to develop and deploy full-stack web applications.

1. Course objectives

At the end of this course, students will be able to perform in the following areas of performance:

1) Foundational knowledge: Equip students with a solid understanding of web development principles, including the structure, design, and functionality of websites and web applications.

2) Front-end development skills: Ensure students are proficient in front-end technologies such as HTML, CSS, and JavaScript, as well as frameworks and libraries like React, Angular, or Vue.js, to build responsive and interactive user interfaces.

3) Responsive and accessible design: Ensure students understand the importance of creating web applications that are accessible to all users and perform well on various devices and screen sizes.

4) Back-end development skills: Develop students' abilities in back-end technologies, including server-side languages (e.g., PHP, Node.js, Python, Ruby) and frameworks (e.g., Express, Django, Rails), to create robust and scalable server-side logic.

5) Database Management: Teach students how to design, implement, and manage databases using SQL and NoSQL technologies, ensuring data integrity and efficiency in web applications.

6) Ethical and professional standards: Instill a sense of ethical responsibility and professional conduct in web development practices, emphasizing user privacy, data protection, and the ethical use of technology.

7) Lifelong learning and adaptability: Encourage continuous learning and adaptability, equipping students with the mindset and skills to stay current with evolving web technologies and industry trends.

2. Purposes for developing and revising course

Students take front-end and back-end programming courses in the same semester with the same instructor. Therefore, the block courses are organized so that students can learn in the appropriate sequence, namely front-end before back-end.

Section 3 - Characteristics and Operations

1. Course description

(English) Introduction to developing applications for frontend; User experience; Front-end design; Mobile and web technology; Methods for storing and retrieving information; Internet communication; Multimedia and security. Dynamic webpage; HTTP protocol; Web server; Server-side programming; Cookies; Database connection; Java script; AJAX.

(ไทย) พื้นฐานการพัฒนาโปรแกรมประยุกต์บนอุปกรณ์ส่วนหน้า ประสบการณ์ของผู้ใช้งาน การออกแบบส่วนหน้า เทคโนโลยีของอุปกรณ์เคลื่อนที่และเว็บ วิธีการเก็บและเรียกใช้งานข้อมูลข่าวสาร การเชื่อมต่อโครงข่าย สื่อผสม และ การรักษาความปลอดภัย การพัฒนาไดนามิกเว็บเพจ โพรโทคอลเอชทีทีพี แม่ข่ายเว็บ การพัฒนาโปรแกรมเว็บฝั่งแม่ข่าย การจัดการคุ้กกี้ การพัฒนาโปรแกรมเว็บติดต่อกับฐานข้อมูล จาวาสคริปต์และเทคโนโลยีเอแจ็กซ์

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

Lecture	Practice	Self-Study	Remedial Class
4 hours/week	4 hours/week	10 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) Assignment
3) Mid-term and final exams

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/ Session	Content	Teaching Management	Program/Teaching Strategies	Material/Media	Assessment
Week 1 Sessions 1-2	Introduction HTML	HyFlex	- Introduce course outlines. - Introduce the course LMS (Moodle) and provide technical assistance as needed. - Discuss expected outcome and grading criteria. - Introduce the fundamental of web development. - Prepare front-end development environment. - Introduce HTML. - Complete activities.	- Presentation - Quiz - Discussion - Practice	- Attendance record - Activity result
Week 2 Sessions 3-4	CSS	HyFlex	- Explain CSS. - Introduce Bootstrap. - Provide some examples and practices. - Complete activities.	- Presentation - Quiz - Practice	- Attendance record - Activity result
Week 3 Sessions 5-6	JavaScript	HyFlex	- Introduce JavaScript. - Introduce conditional statements. - Provide some examples and practices. - Complete activities.	- Presentation - Online lesson - Practice	- Attendance record - Activity result
Week 4 Sessions 7-8	Dynamic web features	HyFlex	- More practice with real applications. - Complete activities.	- Presentation - Quiz - Practice	- Attendance record - Activity result

Week/ Session	Content	Teaching Management	Program/Teaching Strategies	Material/Media	Assessment
Week 5 Sessions 9-10	React	HyFlex	- Introduce React library. - Provide some examples and practices. - Complete activities.	- Presentation - Quiz - Practice	- Attendance record - Activity result
Week 6 Sessions 11-12	Special topic in front-end development	HyFlex	- Special topic in front-end development. - Provide some examples and practices. - Complete activities.	- Presentation - Online lesson - Practice	- Attendance record - Activity result
Week 7 Sessions 13-14	Review	HyFlex	- Review lessons	- Presentation - Online lesson	- Attendance record - Activity result
Week 8 Sessions 15-16	Mid-term examination				
Week 9 Sessions 17-18	Introduction to PHP	HyFlex	- Introduce the fundamental of back-end development. - Prepare back-end development environment. - Introduce PHP. - Complete activities.	- Presentation - Online lesson - Practice	- Attendance record - Activity result
Week 10 Sessions 19-20	Expressions and operations Loops	HyFlex	- Learn PHP expressions and operations. - Introduce loops. - Provide some examples and practices. - Complete activities.	- Presentation - Practice	- Attendance record - Activity result
Week 11 Sessions 21-22	Arrays Functions	HyFlex	- Introduce arrays and functions. - Provide some examples and practices. - Complete activities.	- Presentation - Quiz - Practice	- Attendance record - Activity result

Week/ Session	Content	Teaching Management	Program/Teaching Strategies	Material/Media	Assessment
Week 12 Sessions 23-24	Inputs Sessions and cookies	HyFlex	- Learn how to receive user inputs. - Use sessions and cookies to keep states. - Provide some examples and practices. - Complete activities.	- Presentation - Practice	- Attendance record - Activity result
Week 13 Sessions 25-26	Database	HyFlex	- Introduce SQL database. - Introduce phpMyAdmin. - Learn SQL. - Provide some examples and practices. - Complete activities.	- Presentation - Practice - Assignment	- Attendance record - Activity result
Week 14 Sessions 27-28	Building web applications	HyFlex	- Build a simple web application, such as a registration and login system.	- Presentation - Practice - Assignment	- Attendance record - Activity result
Week 15 Sessions 29-30	Special topic in web development	HyFlex	- Special topic in web development	- Presentation - Practice	- Attendance record - Activity result
Week 16 Sessions 31-32	Review	HyFlex	- Review lessons	- Presentation - Hand-on activity	- Attendance record - Activity result
17	Final examination				

2. Learning assessment plan

Learning Outcomes	Assessment Activities	Schedule (Week)	Proportion for Assessment (%)
1	Participation record Volunteer score	1-16	10 (10) 10 (10)
2, 3, 4, 5	Activities Examinations	1-16 8, 17	50 (50) 30 (30)

Remark: There will be 100% for CPE5012 and another 100% for CPE5013

Section 6 - Learning and Teaching Resources

1. Required textbooks and materials

Howe, S. (2014). *Learn to Code HTML and CSS: Develop and Style Websites.* New Riders.

Mendez, M. (2014). *The Missing Link - An Introduction to Web Development and Programming.* Open SUNY Textbooks.

2. Documents and important information

Documents suggested by the lecturer

3. Recommended resources for extra study

https://www.w3schools.com/

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.