

Course Code: CPE1009

Degree: Bachelor's Degree

Course Title: Computer Programming

Curriculum: B.Eng. (Computer Engineering)

Credits: 3(2-2-5)

Faculty/College: Faculty of Engineering and Industrial Technology

Course Specification (OBE3)

Section 1 General Information

1. Course Code and Title

English: CPE1009 Computer Programming

Thai: CPE1009 การโปรแกรมคอมพิวเตอร์

2. Credits

3 Credits

3. Course Category

Required Course

4. Teacher(s) in Charge and Instructor(s)

Teacher(s) in Charge: Dr.Pongrapee Kaewsaiha

Instructor(s): Dr.Pongrapee Kaewsaiha

Contact: Faculty of Engineering and Industrial Technology, SSRU

E-mail: pongrapee.ka@ssru.ac.th

5. Semester and Academic Year

Semester: 1

Academic Year: 2026

Year: 1

6. Pre-requisites (if any)

-

7. Co-requisites (if any)

-

8. Venue

Faculty of Engineering and Industrial Technology, SSRU

9. Last Update

July 2025

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10. Consistency between the Curriculum and the University Vision, and Higher Education Curriculum Standards

University vision: “A leader in producing professionals”	Promote self-learning skills in practice and work development for professional careers (Lifelong learning)	Promote digital skills
The Computer Programming course aligns with the professional qualification standards in the Digital Industry field, specifically in Software and Applications, with the competency unit focusing on program development.	The Computer Programming course utilizes an automated code checking system. Student code is tested against predefined test cases, and the results are reported to the student. This allows students to practice coding anytime, anywhere, as evidenced by the course's log files.	Computer programming is a foundation of other digital fields such as data analysis, system development, game development, web development, security, embedded systems, and more.

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Section 2 Course Description and Course Learning Outcomes: CLOs

1. Course Description

(English) Logic; flowcharts; pseudo codes; high-level languages programming; operators; conditions; iterations; variables; arrays; strings; functions; structures; pointers; reading and writing files and implementation

(Thai) ตรรกศาสตร์ ผังงาน รหัสคำสั่งเทียม การโปรแกรมด้วยภาษาระดับสูง ตัวดำเนินการ เงื่อนไข การทำซ้ำ ตัวแปร อาร์เรย์ สตริง ฟังก์ชัน โครงสร้าง พอยน์เตอร์ การอ่านและเขียนไฟล์ และการประยุกต์ใช้งานจริง

2. Number of Hours per Semester

Lecture	Practice/Field Work/Internship	Self-study
2 hours/week	2 hours/week	5 hours/week

Course type ☐ Lecture ☒ Practice

3. Number of Hours of Individual Student Counseling

- 1) Academic advising (at least 1 hour per week)
- 2) The use of digital technology in academic advising

4. Course Objectives

Upon completion of the course, students will be able to:

- 1) Describe basic programming structures such as variables, data types, functions, and error handling.
- 2) Program in at least one programming language, such as Python, Java, or C++.
- 3) Think analytically and use logic to design programs to solve a wide variety of problems.
- 4) Apply programming concepts to real-world situations.
- 5) Continuously learn and adapt to stay up to date with new technologies and changing programming styles.

5. Course Learning Outcomes (CLOs)

CLO 1 Describe the structure of a programming language.

CLO 2 Use programming to solve fundamental engineering problems.

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6. Relationship between Program Learning Outcomes (PLOs) and Course Learning Outcomes (CLOs)

PLOs	Knowledge (K)	Skills (S)	Ethics (E)	Characteristics (C)
PLO 1 Can apply basic knowledge to solve fundamental engineering problems.	✓			
PLO 2 Can apply knowledge to create works and develop innovations in computer engineering.	✓			
PLO 3 Can develop programs and improve code efficiently.	✓			
PLO 4 Can apply computer technology in the design and development of computer systems that meet user needs.		✓		
PLO 5 Can analyze and solve technical problems that arise in the computer engineering field.		✓		
PLO 6 Can demonstrate patience, diligence, honesty, responsibility, and the ability to work well with others.			✓	
PLO 7 Aware of and possess morality, ethics, and professional conduct in academic and professional fields.			✓	
PLO 8 Can apply information technology in the workplace, demonstrating leadership qualities, being creative, and possessing communication skills with various individuals in both Thai and English.				✓

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PLOs/CLOs Consistency	CLO 1	CLO 2
PLO 3 Can develop programs and improve code efficiently.	✓	✓

CLOs	Cognitive Domain (Knowledge)						Psychomotor Domain (Skills)	Affective Domain (Attitude)
	R	U	Ap	An	Ev	C		
CLO1		✓					1, 2	1, 2
CLO2			✓				1, 2	1, 2

Cognitive Domain

R=Remembering U=Understanding Ap=Applying An=Analyzing Ev=Evaluating

C=Creating

Psychomotor Domain

1=Imitation 2=Manipulation 3= Precision 4= Articulation 5= Naturalization

Affective Domain

1= Receiving 2= Responding 3= Valuing 4= Organizing 5= Characterizing

Quality Assurance Criteria:

1.2 The curriculum reflects the expected learning outcomes of all subjects, is appropriately designed and organized and is consistent with the general education learning outcomes.

Course Learning Outcomes (CLOs) for OBE Curriculum

CLOs	Knowledge (K)	Cognitive Skills (S)	Morals and Ethics (E)	Interpersonal Relationship and Responsibility (C)	Additional Outcomes Specified by the Professional Council (if applicable)
CLO1	✓				
CLO2	✓				

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7. Course Improvements based on Stakeholder Feedback

Stakeholder Feedback	Improvements based on Feedback
A topic on hardware should be added to illustrate the diverse applications of programming beyond data-related work.	Add a microcontroller workshop to allow students to experiment with programming to control hardware via microcontrollers, aligning it with the Circuits and Electronics course.

Quality Assurance Criteria:

3.6 Information on course improvement based on stakeholder feedback to demonstrate that the teaching and learning process is continuously improved to ensure that it meets the needs of the industrial sector and is consistent with the expected learning outcomes.

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Section 3 Student Improvement in relation to Course Learning Outcomes (CLOs)

1. Consistency between Course Learning Outcomes (CLOs/LOs) and Teaching Methods, Measurement, and Evaluation

CLOs	Outcome	Teaching methods and feedback (Active Learning) (Must be related to Section 2, Item 6)	Methods of Measurement and Evaluation
CLO 1	K	Explain important programming commands, their structures, and provide examples. Students will input code to receive specific input and generate output that meets certain conditions. A code checking tool will display the results against test cases, and the instructor will provide feedback.	Automated code checking tool Quiz
CLO 2	K	Define problems and provide sufficient information for solving them using a programming approach. The defined problem can utilize various approaches. Students initially verify the code using a code checking tool. Then, students share their code and provide peer feedback to observe diverse thought processes and critique the effectiveness of different code versions that can solve the same problem.	Automated code checking tool

* OBE curriculum must have CLOs cover K S E C

* TQF curriculum must have LOs cover K S E C IT

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2. Learning Outcome Index

Scoring criteria (rubrics) for measurement and assessment must be consistent with the learning outcome index.

CLO 1: Describe the structure of a programming language. Cognitive Level (Bloom's Taxonomy): Understanding Behavior to be assessed (Action verb): Describe		
Below Expectations (Performance 0% - 59%)	Meets Expectations (Performance 60% - 89%)	Exceeds Expectations (Performance 90% - 100%)
The program code is created by assembling various pieces of code without being able to specify the concept or reasoning behind the choice of those commands. The program may or may not work.	The program code demonstrates systematic thinking in creating a program that meets the requirements, and the program is executable.	Choose appropriate variable names and include comments to explain the program's structure, ensuring that others can understand its operation or algorithm. The program is executable.

CLO 2: Use programming to solve fundamental engineering problems. Cognitive Level (Bloom's Taxonomy): Applying Behavior to be assessed (Action verb): Use		
Below Expectations (Performance 0% - 59%)	Meets Expectations (Performance 60% - 89%)	Exceeds Expectations (Performance 90% - 100%)
Unable to understand the problem and identify the requirements for writing program code; requires step-by-step instructions or assistive tools such as AI.	Write a program code based on specified conditions using basic methods. Rely on the format, data, and comments provided by the instructor, as well as additional information found on the internet.	Write a program code based on specified conditions, applying engineering concepts, theories, principles, and related disciplines to solve new problems, and selecting efficient and safe methods.

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Quality Assurance Criteria:

3.3 A variety of learning activities are organized, with a focus on learners.

3.4 Learning activities are organized to promote learning, learning how to learn, and instill in learners lifelong learning skills (e.g. creative and critical questioning, data processing skills, presentation skills, and new approaches).

3.5 Learning activities are organized to encourage learners to think creatively, innovate, and be entrepreneurial.

4.1 A variety of assessment methods are available, consistent with the achievement of expected learning outcomes and teaching objectives.

4.2 A clear policy for assessment and appeals is in place, communicated to learners, and consistently applied.

4.3 Assessment must have clear standards and processes that demonstrate learners' progress and achievement, communicated to learners, and consistently applied.

4.4 Assessment methods must demonstrate rubrics, marking schemes, timelines, and regulations, and must be fair, consistent, and impartial.

4.5 Assessment methods must demonstrate achievement of general education learning outcomes. and course learning outcomes

4.6 There is timely feedback on assessment results to learners.

4.7 The assessment of learners and processes is reviewed and improved continuously to ensure that it meets the needs of the work industry and is consistent with the expected learning outcomes.

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Section 4 Lesson Plan and Assessments

1. Lesson plan

Week	Topic	CLOs	Hours	Learning Activities and Instructional Media	Test Blueprint	Instructor
1	Introduction to programming	CLO 1	T2, P2	- Introduce course outlines - Introduce the course LMS and provide technical assistance as needed - Discuss expected outcome and grading criteria - Introduce the overview of programming languages - Complete activities	Q (5 items)	PK
2	Python syntax	CLO 1, 2	T2, P2	- Explain variables and data types - Learn how to display outputs and retrieve user inputs - Provide some examples and practices - Complete activities	Q (6 items) L (10 items) E (9 items)	PK
3	Python IF	CLO 1, 2	T2, P2	- Introduce comments and error handling - Introduce conditional statements - Provide some examples and practices - Complete activities	L (9 items) E (5 items)	PK

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Week	Topic	CLOs	Hours	Learning Activities and Instructional Media	Test Blueprint	Instructor
4	Python loops	CLO 1, 2	T2, P2	- Introduce Python loops - Learn how to explain the program using flow charts, pseudo codes, and natural language - Complete activities	L (4 items) E (4 items) A (1 items)	PK
5	Python functions	CLO 1, 2	T2, P2	- Learn basics of functions in programming - Provide some examples and practices - Complete activities	Q (9 items) E (1 item)	PK
6	Lessons review	CLO 1, 2	T2, P2	Lessons review	E (10 items)	PK
7	Mid-term examination	CLO 1, 2			M (10 items)	PK
8	Microcontroller workshop	CLO 2	T2, P2	- Learn how to program a microcontroller - Complete activities	A (2 items)	PK
9	Python strings	CLO 1, 2	T2, P2	- Learn basics of string and string manipulation - Provide some examples and practices - Complete activities	L (7 items) E (3 items)	PK
10	Python collections	CLO 1, 2	T2, P2	- Introduce collection-type variables: List, set, tuple, and dict - Provide some examples and practices - Complete activities	L (13 items) E (2 items)	PK

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Week	Topic	CLOs	Hours	Learning Activities and Instructional Media	Test Blueprint	Instructor
11-12	C programming	CLO 1, 2	T2, P2	- Learn how to program in C - Introduce C syntax and structure - Provide some examples and practices - Complete activities	L (8 items) E (18 items)	PK
13	Vide coding exercise	CLO 1, 2	T2, P2	- Learn how to vibe code - Provide some examples and practices - Complete activities	A (1 items)	PK
14	C++ programming	CLO 1, 2	T2, P2	- Learn how to program in C - Introduce C++ syntax and structure - Provide some examples and practices - Complete activities	L (5 items) E (10 items)	PK
15	Career paths in programming	CLO 1	T2, P2	- Visualize the holistic view of career paths in programming - Suggest ways of programming skill development - Introduce other programming languages and their uses	L15 (4 items) E15 (3 items) A15 (1 item)	PK
16	Lessons review	CLO 1, 2	T2, P2	Lessons review	E (10 items)	PK
17	Final examination	CLO 1, 2			F (10 items)	PK

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Note:

1. *T = Theory, P = Practice*
2. *Abbreviation of the teacher's name: PK - Dr.Pongrapee Kaewsaiha*
3. *"Teaching Activities" mean activities and media that teachers use to conduct learning and "Learning Activities" mean activities that teachers must determine and assign in class (or outside the class) so that students can have a "learning experience" by themselves.*
4. *Abbreviation of the test plan:*
 - Q: Quiz (Auto graded)*
 - L: Lesson (Auto graded, allows re-attempt)*
 - E: Coding Exercise (Auto-graded, comments from the instructor, code sharing, and peer feedback.)*
 - A: Assignment (Grade by the instructor)*
 - M: Midterm Examination (Auto graded, reviewed by the instructor)*
 - F: Final Examination (Auto graded, reviewed by the instructor)*

2. Evaluation plan

Measurement and Evaluation	Proportion	CLO 1	CLO 2
Quiz (Q)	20%	✓	
Coding Exercise (E) + Assignment (A)	30%	✓	✓
Lesson (L)	10%	✓	✓
Mid-term Examination (M)	20%	✓	✓
Final Examination (F)	20%	✓	✓

3. Test Blueprint

Topic	Proportion	CLO 1	CLO 2
Quiz (Q)	20%		
Introduction to programming		5 items	
Python syntax		6 items	
Python functions		9 items	

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Topic	Proportion	CLO 1	CLO 2
Coding Exercise (E) + Assignment (A)	30%		
Python syntax			9 items
Python IF			5 items
Python loops			5 items
Python functions			1 item
Lessons review (Mid-term)			10 items
Microcontroller workshop			2 items
Python strings			3 items
Python collections			2 items
C Programming			18 items
Vide coding exercise			1 item
C++ Programming			10 items
Career paths in programming			4 items
Lessons review (Final)			10 items
Lesson (L)	10%		
Python syntax		10 items	
Python IF		9 items	
Python loops		4 items	
Python strings		7 items	
Python collections		13 items	
C programming		8 items	
C++ programming		5 items	
Career paths in programming		4 items	
Mid-term Examination (M)	20%	5 items	5 items
Final Examination (F)	20%	5 items	5 items

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4. Grading Criteria

Percentage	Grade	Explanation
86 – 100	A	Excellent
82 – 85	A-	Almost Excellent
78 – 81	B+	Very Good
74 – 77	B	Good
70 – 73	B-	Quite Good
66 – 69	C+	Fairly Good
62 – 65	C	Fair
58 – 61	C-	Fairly Poor
54 – 57	D+	Quite Poor
50 – 53	D	Poor
46 – 49	D-	Very Poor
0 – 45	F	Failed

5. Course Learning Outcomes Assessment Criteria

Achievement Level	Achievement Criteria	Description
Level 3	At least 80% of students fall into either “Level 2 - Meets Expectations” or “Level 3 - Exceeds Expectations” categories.	Demonstrate outstanding learning outcomes, with the majority of students exceeding set expectations, such as scoring above standard criteria and demonstrating the ability to apply knowledge in complex situations.
Level 2	60-79% of students fall into either “Level 2 - Meets Expectations” or “Level 3 - Exceeds Expectations” categories.	Demonstrate expected learning outcomes. Most students can achieve the minimum goals, with learning outcomes reflecting good understanding and application of basic knowledge.

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Achievement Level	Achievement Criteria	Description
Level 1	Less than 60% of students fall into either of the “Level 2 Meets Expectations” or “Level 3 Exceeds Expectations” categories.	Indicate that learning outcomes are still below the expected criteria. Most students may not be able to achieve the intended outcomes at a satisfactory level and need to improve or develop their learning further.

Quality Assurance Criteria:

4.5 The method of assessing learners must demonstrate the achievement of general education learning outcomes and course learning outcomes.

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Section 5 Learning Resources and Support Facilities

1. Learning Media and Learning Support

- 1) Website: programiz.com, w3schools.com
- 2) Practice and training locations: Computer room 4222
- 3) Technical and academic support: Line OpenChat

2. Learning Platform

pongrapee.net (Moodle)

3. Learning Media from External Sources

- 1) W3School
- 2) Stack Overflow
- 3) GeeksforGeeks

4. Supporting Research Studies

Kaewsaiha, P., Klaysung, C., & Norasedsophon, S. (2026, April). Vibe Coding and AI-assisted Programming in Undergraduate Computer Education: A Systematic Review of Pedagogical Benefits and Foundational Skill Risks. In *International Academic Multidisciplinary Research Conference (ICBTSPARIS2026)* (pp. 33-44).

Quality Assurance Criteria:

3.4 *There are teaching and learning activities to promote learning, learning how to learn, and instilling in students lifelong learning skills (e.g. creative and critical questioning, data processing skills, skills in presenting new ideas and new practices).*

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Section 6 Course Evaluation and Improvement

1. Course Evaluation by Students

- ☒ Course evaluation form
- ☒ Teacher evaluation form (reg.ssru.ac.th)
- ☒ Conversation, exchange of ideas between teachers and students
- ☐ Reflection of student behavior
- ☒ Suggestions from students through communication channels specified by the teacher
- ☐ Other (Please specify): ...

2. Strategies for Evaluating Teaching Management

- ☒ Student examination results
- ☒ Verification of academic achievement and student learning outcomes
- ☐ Assessment by the examination committee
- ☐ Observation by the teaching team
- ☐ Observation by stakeholders (Please specify): ...
- ☐ Other (Please specify): ...

3. Course Implementation Improvement Plan

- ☒ Organizing seminars or conferences on teaching and learning with stakeholders
- ☒ Conducting research on learning management inside and outside the classroom
- ☐ Other (Please specify): ...

4. Review of Student Learning Outcomes Aligned with GELOs and CLOs

- ☒ Establishing a committee to review the learning outcomes assessment results, such as exam review, assignment review, grading, and evaluation
- ☒ Review of grading and evaluation by the Gen-Ed academic committee
- ☒ Random checking of grading results by teachers/experts who are not responsible for the course
- ☐ Other (Please specify): ...

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5. Course Review and Improvement Plan

- ☒ Annual course improvement based on the auditor's suggestions in (4)
- ☒ Annual course revision based on student evaluations and feedback
- ☐ Other (Please specify): ...

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(Dr.Pongrapee Kaewsaiha)

Teacher in charge

5 June 2026