Course Specification

Name of Institution	Mahidol University
Campus/faculty/department	Salaya campus Mahidol University International College Science Division

Section 1 General Information

1. **Course Code and course title**

(Thai)	EGCI 213	กระบวนทัศน์ในการเขียนโปรแกรม
(English)	EGCI 213	Programming Paradigms

2. **Number of Credits** 4(4-0-8) (Lecture/Lab/Self-study)

3. **Curriculum and type of subject**
   3.1 Curriculum Bachelor of Engineering (Computer Engineering)
   3.2 Type of subject Required course

4. **Responsible faculty member**
   Assoc. Prof. Dr. Rangsipan Marukatat

5. **Trimester / year of study**
   5.1 Trimester 2rd / year of study 2nd year
   5.2 Number of students 5-30 students

6. **Pre-requisite(s)** EGCI 212

7. **Co-requisite(s)** none

8. **Venue of study** Mahidol University, Salaya campus

9. **Date of latest revision** December 2014

Section 2 Goals and Objectives

1. Goal

1. Students can explain the principles of various programming paradigms
2. Students can choose appropriate paradigms to solve engineering problems
3. Students can design and write programs using high-level languages

2. Objective of development revision

To up-date the knowledge content of the course

Section 3 Course Management

1. Course Description

(Thai) แนะนำกระบวนทัศน์ในการเขียนโปรแกรมและภาษาโปรแกรม แนวคิดพื้นฐานการเขียนโปรแกรม: ชนิดของข้อมูล คำสั่งโปรแกรมพื้นฐาน ฟังก์ชัน การจัดการหน่วยความจำ การเขียนโปรแกรมเชิงวัตถุ การเขียนโปรแกรมพร้อมกัน การเขียนโปรแกรมเชิงเหตุการณ์

(English) Introduction to programming paradigms and programming languages; fundamental programming concepts: data types, basic programming statements, functions, memory management; object-oriented programming, concurrent programming, event-driven programming.

2. Credit hours / trimester

Lecture (hours)	**Additional Class (hours)**	**Laboratory/field trip/internship (hours)**	**Self-study (hours)**
44 hours (4 hours x 11 weeks)	-	-	88 hours (8 hours x 11 weeks)

3. Numbers of hours that the lecturer provides individual counseling and guidance

1 hour/week

Section 4 Development of Students' Learning Outcome

1. Expected outcome on students' skill and knowledge

Student will be able to apply the knowledge from lecturer and additional research with the ideas received from analysis and synthesis to set up solutions / precautions to benefit individuals and their community.

2. Teaching Methods

- Lecture
- Self-study
- Programming exercises.

3. Evaluation methods

1 Morality and Ethics

1.1 ***Expected outcome on morality and ethics:***

1.1.1 To be aware of values and morality, ethics, scarification and honesty.

● 1.1.2 To process self-discipline, punctuality, self-responsibility, and social responsibility.

1.1.3 To process leadership and supporter skills and be able to work in a team with integrity and cooperation.

1.1.4 To demonstrate good listening behavior and have respect for the rights and value of others.

○ 1.1.5 Respect and follow rules and regulations of institution and society

1.1.6 To demonstrate the ability to analyze ethical impacts of computer usage to personals, organizations and social.

● 1.1.7 To demonstrate the ability to analyze ethical impacts of computer usage to personals, organizations and social.

1.2 ***Teaching methods:***

Learning Centered Education: Emphasis on knowledge development, important skills in career development and living, encourage students to use their full potentials

1.2.1 Case studies, emphasizing on morality and ethics

1.2.2 Self-study

1.3 ***Evaluation methods:***

1.3.1 Class attendance, class participation, and behavior in class
1.3.2 On-time submission of reports and assignments, and their quality

2. Knowledge development

2.1 *Expected outcome on knowledge development:*

● 2.1.1 To process the knowledge related to principles, theories, and practice in the course.
○ 2.1.2 To be able to analyze, understand, and explain the computer requirements and be able to apply knowledge and skills using the appropriate tools to solve a problem.
2.1.3 To be able to analyze, design and install, and/or evaluate computer components to meet the requirements of the users
2.1.4 To have the ability to remain current in research, and pursue new knowledge and perform ability to apply the knowledge.
2.1.5 To know, understand and perform eagerness to develop computer knowledge and skills continuously.
2.1.6 To have a breadth knowledge in order to oversee the changes and understand the impact of new technology.
● 2.1.7 To have a hand-on experience in software development and/or software applications.
2.1.8 To demonstrate knowledge integration with other related sciences.

2.2 *Teaching methods:*

Learning Centered Education: Emphasis on knowledge development, important skills in career development and living, encourage students to use their full potentials

2.2.1 Lecture and in-class participation
2.2.2 Demonstration of example programs
2.2.3 Case studies with past experiences and current events
2.2.4 Self study

2.3 *Evaluation methods:*

2.3.1 Written examination
2.3.2 Quality of reports and assignments

3. Intellectual development

3.1 *Expected outcome on intellectual development:*

● 3.1.1 To have discretionary and systematic thinking skill.

3.1.2 To have the ability to search, consolidate and evaluate ideas and evidence for problem solving.

○ 3.1.3 To be able to apply knowledge and experience to analyze and creatively solve problems both in general and in academic contexts.

● 3.1.4 To be able to apply knowledge and experience to synthesize solution and precautions.

3.2 ***Teaching method:***

3.2.1 Systematic problem solving through case studies

3.2.2 Self study

3.3 ***Evaluation methods:***

3.3.1 Written examination

3.3.2 Quality of reports and assignments

4. Interpersonal relationship and responsibility

4.1 ***Expected outcome on interpersonal relationship and responsibility:***

○ 4.1.1 To perform good communication skills with various groups of people.

4.1.2 To be a constructive team member (in various roles).

4.1.3 To process the knowledge of the course to identify social problems.

● 4.1.4 To demonstrate self and team responsibility.

4.1.5 To be initiative in problem solving.

4.1.6 To take responsibility in a life-long learning.

4.2 ***Teaching methods:***

4.2.1 Group assignments and group discussion

4.2.2 Self study

4.3 ***Evaluation methods:***

4.3.1 Presentation

4.3.2 Class attendance, class participation, and behavior in class

4.3.3 On-time submission of reports and assignments, and their quality

5. **Mathematical analytical thinking, communication skills and information technology skills**

5.1 ***Expected outcome on mathematical analytical thinking, communication skills and information technology skills:***

● 5.1.1 To be able to select and apply existing tools for computer related work.
5.1.2 To possess the ability to apply information technology for data gathering, processing, interpreting and presenting information/results.
5.1.3 To have the ability to communicate effectively and select appropriate methods for presentation.
5.1.4 To use information technology appropriately.

5.2 ***Teaching methods:***

5.2.1 Demonstration of program development tools
5.2.2 Case studies with past experiences and current events

5.3 ***Evaluation methods:***

5.3.1 Quality of reports and assignments

Section 5 Teaching and Evaluation Plans

1. Teaching plan

Week	**Topics**	**Hours**			**Teaching methods/ multimedia**	**Instructor**
		Lecture	**Lab**	**Self-Study**		
1	Introduction to programming paradigms, programming languages, program development tools	4	0	8	Lecture, case studies, demonstration, self study	Assoc. Prof. Dr. Rangsipan Marukatat
2	Review of fundamental programming concepts: data types, statements, functions, memory management	4	0	8	Lecture, case studies, self study	
3-5	Object-oriented programming: encapsulation, inheritance, polymorphism, interfaces and abstract classes, templates	12	0	24	Lecture, case studies, exercises	
6	Exception handling; **Midterm Examination**	4	0	8	Lecture,	

Week	Topics	Hours			Teaching methods/ multimedia	Instructor
		Lecture	Lab	Self-Study		
					case studies, exercises	
7-8	Concurrent programming: threads, schedule, interrupt, competition, cooperation, synchronization	8	0	16	Lecture, demonstration, case studies, exercises	
9-11	Graphical user interface (GUI) and event-driven programming: components, listeners, event handling; Project presentation	12	0	24	Lecture, demonstration case studies, exercises**,** discussion	
12	**Final Examination**					
	Total	**44**	**0**	**88**		

2. Evaluation Plan

Expected outcomes	Methods / activities	Week	Percentage
1.1.2, 1.1.5, 4.1.1, 4.1.4	Attendance and in class behavior	1-11	5%
2.1.1, 2.1.2, 3.1.1, 3.1.4	Midterm Examination Final examination	6 12	30% 30%
1.1.7, 2.1.2, 2.1.7, 3.1.4, 5.1.1	Exercises	1-11	5%
1.1.7, 2.1.2, 2.1.7, 3.1.3, 3.1.4, 4.1.4, 5.1.1	Group Projects	5, 8, 11	30%

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Section 6 Teaching Materials and Resources

1. Texts and main documents

Tucker AB, Noonan R. Programming languages (2nd edition). New York (NY): McGraw Hill, 2006.

Sebesta RW. Concepts of programming languages (8th edition). Boston (MA): Addison-Wesley, 2007.

2. Documents and important information

None

3. Documents and recommended information

Website: http://java.sun.com/reference/index.jsp.

Section 7 Evaluation and Improvement of Course Management

1. Strategies for effective course evaluation by students

1.1 Evaluation of peers by students

1.2 Student evaluation

- 1.2.1 Course content
- 1.2.2 Course management
- 1.2.3 Suggestions
- 1.2.4 Overall opinion

2. Evaluation strategies in teaching methods

2.1 Student evaluation

2.2 Presentation

3. Improvement of teaching methods

Workshop on course improvement with the participation of all instructors in the course

4. Evaluation of students' learning outcome

Analysis of students' learning outcomes using scores from class attendance, group activity and presentation of project and poster presentation

5. Review and improvement for better outcome

Review the course before trimester starts and before each teaching period

Symbol ● represents major responsibility / Symbol ○ represents minor responsibility / Space represents no responsibility

These symbols will appear in Curriculum Mapping