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 212 เทคนิคการเขียนโปรแกรม

    (English)   EGCI 212 Programming Techniques

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**

    Dr. Noppadol Wanichworanant

5. **Trimester / year of study**

    5.1 Trimester 1 / year of study 2nd year

    5.2 Number of students   5-30 students

6. **Pre-requisite(s)** EGCI 111

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

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

9. **Date of latest revision** October 2011

Section 2 Goals and Objectives

1. **Goal**
   1.1 Describe differences between pointers and arrays.
   1.2 Write programs using data structure.
   1.3 Understand Object-Oriented Programming concept.
   1.4 Write programs using OOP concept.

2. **Objective of development revision**
   To up-datethe knowledge content of the course

Section 3 Course Management

1. **Course Description**

(Thai)   เทคนิคและแนวคิดในการเขียนโปรแกรม   เทคนิคต่างๆ   ในการเขียนโปรแกรมให้มี

ประสิทธิภาพ การป้องกันการเกิดข้อบกพร่องของซอฟต์แวร์ การแก้จุดบกพร่อง การทดสอบโปรแกรม และ

การบำรุงรักษารหัสต้นทาง ขอบเขตและอายุของตัวแปร ตัวชี้ การกำหนดสาระสำคัญของข้อมูล การจัดการ

ความผิดพลาด และแนวคิดในการเขียนโปรแกรมเชิงวัตถุ

(English)   Programming techniques and concepts. Various techniques for Efficient
Programming, Software-Bug Prevention, Debugging, Testing, and Source-Code
Maintenance. Scope/Lifespan of variables, Pointers, Data Abstraction, Error Handling, and
Object-Oriented Programming Concept.

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 (8hours 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

3. **Evaluation methods**
   1. **Morality and Ethics**
      3.1 *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 To pay respect to the rule of organization and social.
      1.1.6 To demonstrate the ability to analyze ethical impacts of computer usage to personals, organizations and social.
      ● 1.1.7 To demonstrate good academic ethical behaviors.

      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 Lecture
      1.2.2 Emphasis on morality and ethics
      1.2.3 Group assignments
      1.2.4 Group discussion

      1.3 *Evaluation methods:*
      1.3.1 Written examination
      1.3.2 Presentation
      1.3.3 Class attendance, class participation and behavior in class
      1.3.4 On-time submission of reports and assignments and their quality

2   Knowledge development

1.2 *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 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 Case studies with past experiences and current events
2.2.3 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 examples and case studies with past experiences and current events
    3.2.2   Self Study

3.3 *Evaluation methods:*

    3.3.1   Written examination
    3.3.2   Presentation
    3.3.3   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 have initiative in problem solving.
    4.1.6   To take responsibility in a life-long learning.

4.2 *Teaching methods:*

    4.2.1   Group discussion in case studies
    4.2.2   Group discussion
    4.2.3   Group assignment

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:*

      5.1.5   Computer programming with exercises.

      5.1.6   Case studies with past experiences and current events

      5.1.7   Group discussion

      5.1.8   Group assignment

      5.1.9   Self Study

5.2 *Evaluation methods:*

      5.2.1   Written examination

      5.2.2   Presentation with appropriate technology

      5.2.3   Class attendance, class participation and behavior in class

      5.2.4   On-time submission of reports and assignments and their quality

Section 5 Teaching and Evaluation Plans

1. **Teaching plan**

week	Topics	Hours			Teaching methods/multi media	Instructor
		Lecture	**Lab**	**Self-Study**		
1	Review of programming concepts, and scope/lifespan of variables	4	-	8	Lecture and programming exercises	Dr. Mingmanas Sivaraksa
2	Pointers VS Arrays	4	-	8	Lecture and programming exercises	
3-4	Data Structures and Linked-lists	4	-	8	Lecture and programming exercises	
5	Algorithms	4	-	8	Lecture and programming exercises	
6	**Midterm Examination**				Lecture and programming	

week	Topics	Hours			Teaching methods/multi media	Instructor
		Lectu re	**Lab**	**Self-Study**		
					exercises	
7	Object-Oriented Programming Concept	4	-	8	Lecture and programming exercises	
8	Inheritance and Encapsulation	4	-	8	Lecture and programming exercises	
9	Overloading and Persistence	4	-	8	Lecture and programming exercises	
10	Polymorphisms	4	-	8	Lecture and programming exercises	
11	Exceptions and presentations	4	-	8	Lecture and programming exercises	
	Total	44	-	88		

2. Evaluation Plan

Expected outcomes	Methods / activities	Week	Percentage
1.1.2,1.1.3, 1.1.7,2.1.5, 4.1.4	Attendance and in class behavior	1-11	5%
1.1.2,1.1.3,2.1.1, 2.1.3,2.1.5, 2.1.7, 3.1.1, 4.1.2,4.1.5,5.1.3	Report and Presentation	1-11	20%

1.1.7,2.1.1,3.1.3,3.1.4, 4.1.4,4.1.5,5.1.2,5.1.4	Exams	6,12	70%

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Section 6 Teaching Materials and Resources

1. **Texts and main documents**

    Deitel H.M. and Deitel P.J., C++ How to Program, Peason Publishing;9ed;2010

    Kerningham B.W., Ricchie C Programming Language; Prentice Hall; 2 edition ;1988

2. **Documents and important information**

    Online Open course ware (ocw) from MIT :

    http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-088-introduction-to-c-memory-management-and-c-object-oriented-programming-january-iap-2010/

3. **Documents and recommended information**

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 main responsibility / Symbol○representsminor responsibility/Space represent no responsibility

These symbols will appear in Curriculum Mapping