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 252   การเขียนโปรแกรมระบบ
   (English)   EGCI 252   System Programming

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 2rd / year of study 2nd year

   5.2 Number of students   5-30 students

6. **Pre-requisite(s)**   none

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. Understand basic concepts of system programming.
    2. Describe fundamental concepts in process management, concurrency and communication.
    3. Write programs using signals, thread, thread synchronization, semaphores, Inter-Process Communication.

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

Section 3 Course Management

1. **Course Description**

(Thai)   นักศึกษาจะได้เรียนรู้แนวความคิดเบื้องต้นของการโปรแกรมระบบ

แนวคิดพื้นฐานในการจัดการ โพรเซส การทำงานควบคู่กัน และ การสื่อสารระหว่างกัน รวมถึง สัญญาณ เธรด

การประสานเวลาของเธรด เซมาฟอร์ และการสื่อสารระหว่างโพรเซส

(English)   Students will be introduced the basic concepts of system programming. Fundamental concepts in process management, concurrency and communication will be described including signals, thread, thread synchronization, semaphores, Inter-Process Communication.

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

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 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

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 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 demonstrate leadership qualities in uncertain situations.

    4.1.7   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:

    5.2.1   Computer programming with exercises.
    5.2.2   Case studies with past experiences and current events
    5.2.3   Group discussion
    5.2.4   Group assignment
    5.2.5   Self Study

5.3 Evaluation methods:

    5.3.1   Written examination
    5.3.2   Presentation with appropriate technology
    5.3.3   Class attendance, class participation and behavior in class
    5.3.4   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	Basic concepts of system programming	4	-	8	Lecture and programming exercises	Dr. Noppadol Wanichworanant
2	Low-level file access	4	-	8	Lecture and programming exercises	
3	Processes and Threads	4	-	8	Lecture and programming exercises	
4	Race Condition	4	-	8	Lecture and programming exercises	
5	Inter-process Communication Concepts	4	-	8	Lecture and programming exercises	

Week	Topics	Hours			Teaching methods/multi media	Instructor
		Lecture	**Lab**	**Self-Study**		
6	Signals	4	-	8	Lecture and programming exercises	
7	Named pipes	4	-	8	Lecture and programming exercises	
8	Message queues	4	-	8	Lecture and programming exercises	
9	Shared Memory	4	-	8	Lecture and programming exercises	
10	Mapped Memory	4	-	8	Lecture and programming exercises	
11	Thread	4	-	8	Lecture and programming exercises	
12	Final Examination					
	Total	44	-	88		

2. Evaluation Plan

Expected outcomes	Methods / activities	Week	Percentage
1.1.2, 1.1.7, 4.1.4, 4.1.5	Attendance and in class behavior	1-11	10%
2.1.1, 2.1.5, 2.1.7, 3.1.1, 3.1.2, 3.1.3, 5.1.4	Report and Presentation	11	30%
	Final examination	12	30%
2.1.7, 3.1.1, 3.1.2, 3.1.3, 5.1.2	Exercises and Project	1-11	30%

Section 6 Teaching Materials and Resources

1. **Texts and main documents**
   Love R. Linux System Programming. O'Reilly Media; 2007.

   Mitchell M, Oldham J, and Samuel A. Advanced Linux Programming. New Riders Publishing; 2001.

2. **Documents and important information**
   none

3. **Documents and recommended information**
   none

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 ○ represents minor responsibility / Space represent no responsibility

These symbols will appear in Curriculum Mapping