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   ICCS 222 หลักการของระบบปฏิบัติการ

  English   ICCS 222 Operating Systems

2. **Number of credit**   4 (4-0-8)

           (lecture 4 hours – self study 8 hours/ week)

3. **Curriculum and type of subject**

  3.1 Curriculum   offered in international curriculum

  3.2 Type of subject Major Core course, Computer Science

4. **Responsible faculty member** Full-time faculty members, Mahidol University

               International College, Mahidol University

5. **Trimester / year of study**

  5.1 Trimester   2, 3 / Third, Fourth year

  5.2 Number of students _____ students

6. **Pre-requisites**   ICCS 200 Data Structures and Algorithms

7. **Co-requisites**   -

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

Section 2 Goals and Objectives

1. Goals

This course is focused on functions and components of operating systems. Students are going to study for contemporary multiprocessing / multiprogramming systems. Exploration of systems programs: their design, internal structure and implementation are also included. Advanced topics in operating systems, performance measurement and evaluation and design of operating system modules will be taught.

2. Objectives of development/revision

By the end of the course students should be able to:

(1) Describe the components of contemporary operating systems
(2) Criticize the design of the operating system structures
(3) Explain different issues in modern operating systems
(4) Measure the performance of operating systems in different environment
(5) Select the optimal algorithms in different operating systems parts
(6) Criticize different operating systems in different platform

Section 3 Course Management

1. Course descriptions

ความหมายของหน้าที่และส่วนประกอบของระบบปฏิบัติการต่างๆ ระบบคอมพิวเตอร์ที่มีหลายหน่วยประมวลผล ระบบคอมพิวเตอร์ที่ปฏิบัติได้หลายชุดคำสั่งพร้อมกัน การออกแบบโครงสร้างและการพัฒนาโปรแกรมเพื่อติดต่อกับระบบปฏิบัติการ การจัดการงานของหน่วยประมวลผลกลาง การจัดการหน่วยความจำแบบลำดับชั้นและแบบเสมือน หัวข้อขั้นสูงในระบบปฏิบัติการ การวัดสมรรถนะ การประเมินและการออกแบบของระบบปฏิบัติการและการออกแบบโครงสร้างของระบบปฏิบัติการ

Basic data structures including linear data structures, trees, and graphs; storage allocation, design and evaluation of algorithms for manipulating data structures, data structure in programming languages, criteria for selecting data structures to fit their applications.

2. Credit hours / trimester

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

3. Number of hours that the lecture provides individual counseling and guidance

1 hour / week

Section 4 Development of Students' Learning Outcome

1. Expected outcome on students' skill and knowledge

Students will be able to apply the knowledge from lectures and with the ideas received from analysis and synthesis to set up solutions/ precautions to benefit individuals;

2. Teaching methods

Course organized using lecture, demonstration and presentation.

3. Evaluation methods

1. Morality and Ethics

1.1 Expected outcome on morality and ethics

- ●)1(To posses morality and ethics
- ●)2(To have self-discipline, honesty, kindness, self- responsible and social responsibility
- ●)3(To demonstrate academic ethical behavior
- ●)4(To respect others' rights and be a good listener
- ●)5(To respect rules and regulations
- ○)6(To have good attitude toward professors/career
- ○)7(To demonstrate Leadership, team player

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)   Lecture

      (2)   Demonstration

      (3)   Presentation

1.3 Evaluation methods

      (1)   Written examination

      (2)   Term project

      (3)   Class attendance

      (4)   On-time submission of assignments and their quality

2. **Knowledge development**

2.1 *Expected outcome on knowledge development*

- ●)1(To posses basic knowledge, theories and concepts towards the understanding of self, society, surrounding in order to be well-rounded person
- ●)2(To process the knowledge related to principles, theories and practice in the course
- ●)3(To integrate the knowledge to other related subjects
- ○)4(To remain current in research and new knowledge

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

      (1) Lecture

      (2) Demonstration

      (3) Presentation

2.3 Evaluation methods

    (1) Written examination

    (2) Term project

    (3) Class attendance

    (4) On-time submission of assignments and their quality

3. Intellectual development

3.1 Expected outcome on intellectual development

- ●)1(To have systematic and analytical thinking
- ●)2(To be able to search, consolidate and evaluate ideas and evidence for problem solving
- ●)3(To be able to apply knowledge and experience to analyze and creatively solve problems both in general and academic

3.2 Teaching methods

    (1) Lecture

    (2) Demonstration

    (3) Presentation

3.3 Evaluation methods

    (1) Written examination

    (2) Term project

    (3) Class attendance

    (4) On-time submission of assignments and their quality

4. Interpersonal relationship and responsibility

4.1 Expected outcome on Interpersonal relationship and responsibility

- ●)1(To posses good interpersonal relationship skills (self esteem and dignity) and have respect for the rights and value of others
- ○)2(To possess leadership and initiative in problem solving
- ●)3(To be constructive team member (in various roles) and be responsible for assignment tasks, professional and society

4.2 Teaching methods

    (1) Lecture

    (2) Demonstration

       (1)   Presentation

4.3 Evaluation methods

       (1)   Written examination

       (2)   Term project

       (3)   Class attendance

       (4)   On-time submission of 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

   ○)1(To be able to select and apply appropriate statistical and mathematical methods to research problems

)2(To be able to apply information technology for data gathering, processing, interpreting and presenting information/results

)3(To have the ability to communicate effectively and select appropriate methods of presentation

5.2 Teaching methods

      (1) Lecture

      (2) Demonstration

      (3) Presentation

5.3 Evaluation methods

      (1) Written examination

      (2) Term project

      (3) Class attendance

      (4) On-time submission of assignments and their quality

Section 5 Teaching and Evaluation Plans

1. Teaching plan

Week	Topic	Hours	Teaching methods/ multimedia	Instructor
1	Introduction	4	Lecture	
2	Computer system-structures:- I/O Storage structure	4	Lecture	
3	Operating System Structures	4	Lecture	
4	Processes Concept	4	Lecture	
5	CPU Scheduling	4	Lecture	
6	Process Synchronization	4	Lecture	
7	Deadlock concept	4	Lecture	
8	Memory Management	4	Lecture	
9	Virtual Memory	4	Lecture	
10	I/O system concepts and its structures	4	Lecture	
11	Protection & Security	4	Lecture	
12	Final Examination	4	Lecture	

2. Evaluation plan

Expected outcomes	Methods / activities	Week	Percentage

Section 6 Teaching Materials and Resources

1. **Texts and main documents**

   (1)   A.Silberschatz, et. al., Operating System concepts, Sixth edition , Addison Wesley,

   2001

   (1)   A.Silberschatz, et. al., Applied Operating System concepts, First edition , Addison

   Wesley, 2000

2. **Documents and important information**

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 lecturers in this 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**

   Meeting of lecturers to review the course before semester starts and before each
period of

   teaching