

Detail of Course Description

Name of University/Institute

King Mongkut's University of Technology Thonburi

Faculty/College/Department

School of Information Technology

Section1 General Information of Course

1.1 Code and Name of Course

CSC710/INT710 Research Methodology

1.2 Credits

3 Credits (3-0-6)

1.3 Academic Program

Doctor of Philosophy in Computer Science/Information Technology (English Program)

1.3.1 Type of Course

Core Course for Ph.D. students

1.4 Lecturer

Assoc. Prof. Jonathan H. Chan, Ph.D., Lecturer

1.5 Level of Education/Year of Study

First semester of study for entering postgraduate students (usually)

1.6 Pre-requisite (If any)

None

1.7 Co-requisites with this course (If any)

None

1.8 Study Site

The School of Information Technology, King Mongkut's University of Technology Thonburi

1.9 Date of Proposed Course Specification or Latest Revision

July 7, 2017

Section 2 Purposes and Objectives

2.1 Course Purposes

This course will provide a comprehensive outlook of research methodology, especially pertaining to computer science and information technology.

2.2 Course Objectives / Action Objectives

1. To familiarize the students with the philosophy of science and the ethics of research
2. To provide the students with an understanding of computer science and information technology as a discipline
3. To enable the students to master the craftsmanship of scientific research work
4. To refine the students' skills in the art of technical writing and scientific presentations
5. To ensure the students would possess adequate data analysis skills for their research work
6. To act as an early preparation for the PhD proposal and dissertation

2.3 Objectives of Course Development

Postgraduate students, especially at the doctoral level, need to have an effective research methodology to guide them throughout their study. They should have an appreciation for knowledge acquisition as well as practical application of subject matter. The course aims to develop the analytical and critical thinking skills of the students and they will be encouraged to pro-actively participate in class discussions.

Section 3 Course Components

3.1 Course Description

This course covers the following topics: Introduction to research methodology; research terminology and scientific methods; designing and implementing a research project; ethics in research; types of research; measurements in research; primary and secondary data; communicating research results; scientific and electronic publishing; discussion of methodological issues in computer science research; variable determination and hypothesis; data collection and questionnaire; data analysis and interpretation; research conclusion.

3.2 Hours per Semester			
Lecture	Extra Teaching	Field Experience	Self-study
Lecture 45 hours per semester	if necessary	No field experience	Self-study 6 hours per week

3.3 Office Hours for questions and advisory outside classroom

- Thursday between 4:30 to 5:30 p.m. It will be officially announced.

- By Appointment via jonathan@sit.kmutt.ac.th

Section 4 Outcome to Student

4.1 Ethics

(1) Ethical Development

Students should be responsible to society when applying research concepts to solve real-world problems. They would apply their ethical training with the code of conduct of their profession.

(2) Teaching Method

- Lecture-based with variety of problems applicable to moral situation
- Discussion with classmates

(3) Evaluation

- Full credit for complete, and on-time assignments without plagiarism
- Proper references added when referencing a document

4.2 Knowledge

(1) Knowledge Earned

A continual stream of knowledge acquisition in various aspects of research methodology in accordance with the current body of scientific literature in the area of computer science and information technology.

(2) Teaching Method

Lecture and discussion on given assignments and case studies. Research on selected project of interest to the students' research, summarize them and present to the class.

(3) Evaluation

- Midterm, and final examinations on written paper
- Present the summary of in-class and take-home assignments
- Evaluate take-home assignments
- Evaluate individual project

4.3 Analytical Skill

(1) Analytical Development

Develop skill of systematic thinking, problem solving, decision making

(2) Teaching Method

- Lecturer

- Discuss the principles of research methodology
- Demonstrate the application of research methodology by analyzing and solving case study problems in computer science and information technology

(3) Evaluation

- Midterm and final examinations on concept understanding
- Present the analysis of reading assignments and project
- In-class participation (in-class assignments, discussion, attendance)

4.4 Communication, Teamwork, and Responsibility

(1) Skill of communication, teamwork, and responsibility

- Ability to express ideas, share knowledge, and critically comment on others' work
- Develop skill of self-learning
- Be responsible to complete assignments to be on-time, correct, and non-plagiarized

(2) Teaching Method

- Assign individual work on information searching and reading
- Assign group work based on peer-review concepts
- Project presentation
- Class discussion

(3) Evaluation

- Self and classmate evaluation on a given evaluation form
- Report
- Individual and group research
- Number of valid discussions

4.5 Numerical Analysis and Information Technology

(1) Skill of numerical analysis and information technology

- Develop skill of oral communication, listening, reading, writing in report and present to the class.
- Academic research on practical topic from reliable sources on internet, in library, and others
- Use appropriate tools in IT to present project
- Critical thinking on problem solving on real-life situations

(2) Teaching Method

- Assign self study assignments to research information and write reports based on statistics and valid references
- Use appropriate technology tools to demonstrate the work

(3) Evaluation

- Demonstrate work and report with information media for assignments and project

Section 5 Lesson and Evaluation Plan

5.1 Lesson Plan

Week	Description	Activities	Hrs	Lecturer
Week 1	Research terminology and scientific methods <ul style="list-style-type: none"> - What is research and why is methodology important - Terms used in research - Present the various scientific methods 	Lecture Discussion Example In-class assignment	3	Jonathan H. Chan
Week 2	Designing and implementing a research project <ul style="list-style-type: none"> - Defining a research problem - How to execute research methodology 	Lecture Discussion Example Assignment	3	Jonathan H. Chan
Week 3	Case study I <ul style="list-style-type: none"> - Present and discuss a case study involving the use of research methodology 	Lecture Discussion Student presentations In-class assignment	3	Jonathan H. Chan
Week 4	Scientific and electronic publishing <ul style="list-style-type: none"> - Format - Content 	Lecture Discussion Example	3	Jonathan H. Chan
Week 5	Communicating research results <ul style="list-style-type: none"> - Technical writing & presentations - Critical reviews 	Lecture Discussion In-class assignment	3	Jonathan H. Chan
Week 6	Ethics in research <ul style="list-style-type: none"> - Conflict of interest - Plagiarism 	Lecture Discussion Example	3	Jonathan H. Chan
Week 7	Methodology issues in CS/IT research <ul style="list-style-type: none"> - Discussion of various methodology issues relating to the fields of CS and IT Student progress presentation 	Lecture Discussion Example Student presentations	3	Jonathan H. Chan
Week 8	Midterm Examination			
Week 9	Variable Determination and Hypothesis <ul style="list-style-type: none"> - Type of variable - Hypothesis testing 	Lecture Discussion Example	3	Jonathan H. Chan
Week 10	Data Collection <ul style="list-style-type: none"> - Measurements in research - Type of data collection 	Lecture Discussion Example	3	Jonathan H. Chan
Week 11	Design of questionnaire <ul style="list-style-type: none"> - Questionnaire design - Evaluation questionnaire 	Lecture Discussion In-class assignment	3	Jonathan H. Chan
Week 12	Data Analysis <ul style="list-style-type: none"> - Editing data - Analysis of data 	Lecture Discussion Example	3	Jonathan H. Chan

Week	Description	Activities	Hrs	Lecturer
Week 13	Interpretation of results - Data Interpretation	Lecture Discussion Example	3	Jonathan H. Chan
Week 14	Research conclusion	Lecture Discussion In-class assignment	3	Jonathan H. Chan
Week 15	Case study II - Present and discuss a case study involving the use of research methodology	Lecture Discussion Example	3	Jonathan H. Chan
Week 16	Final project presentations + Case study III	Lecture Discussion Student presentation of their projects	3	Jonathan H. Chan
Week 17	Final Examination			

5.2 Evaluation Plan

Learning Outcome	Activities for Evaluation (such as Report, Project, Quiz, Midterm, and Final Examination)	Evaluation Time (Week)	Ratio of Evaluation
4.2, 4.3	Midterm Examination Final Examination	9 17	60%
4.1, 4.2, 4.3, 4.4	Class Discussions Reading Assignments and summary Reports	Throughout Semester	5%
4.1, 4.2, 4.3, 4.4, 4.5	Take-Home Assignments In-Class Assignments Individual Project Project Presentation	Throughout Semester 16	35%

Section 6 Learning Resource

6.1 Textbook

None

6.2 Reference Sources

Research articles

Internet articles

Library at King Mongkut's University of Technology Thonburi (KMUTT), library of School of Information Technology (SIT) at KMUTT, and libraries of other universities

6.3 Reference Textbooks and Publications

Handouts will be given out throughout the course

6.4 Electronic Information / Website

Electronic handouts and relevant literature search websites such as www.scopus.com and scholar.google.com.

6.5 Other Document

None

Section 7 Course Evaluation and Improvement Processes

7.1 Strategies of teaching evaluation and suggestions from students about the efficiency of the course

- Discussion among lecturer and students
- Reflection on students' behavior
- Teaching evaluation form and course evaluation form

7.2 Other strategies to evaluate the efficiency of the course

- Outcome of other lecturers in the program
- Result of examinations
- Comparison of results of teaching evaluation with other courses

7.3 Processes of efficiency improvement of the course

- Seminar on teaching improvement
- Research on education both inside and outside classroom

7.4 Reevaluation of the efficiency of the course by other lecturers or field professionals as external committees

- Reevaluate grading process of random students by other lecturers or field professionals as external committees
- Set up program committees to verify grading process of the lecturer by validating the examination, and grading policy

7.5 Process of course improvement planning to increase the efficiency of the courses

- Improve the course by following the suggestion in reevaluation process in 7.4 to increase the efficiency of the course