หลักสูตรวิทยาศาสตรมหาบัณฑิต
สาขาวิชาวิทยาการคอมพิวเตอร์
(หลักสูตรนานาชาติ)
(หลักสูตรภาคปกติและภาคพิเศษ)

MASTER OF SCIENCE PROGRAM
IN
COMPUTER SCIENCE
(INTERNATIONAL PROGRAM)
(REGULAR AND SPECIAL PROGRAM)

FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY
AND
FACULTY OF GRADUATE STUDIES
MAHIDOL UNIVERSITY

REVISED PROGRAM ACADEMIC YEAR B.E.2563

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Master of Science Program in Computer Science
(International Program) (Regular and Special Program)
Revised Program Academic Year B.E.2563

Name of Institution Mahidol University

Campus/Faculty/Department Faculty of Information and Communication Technology

Section 1 General Information

1. Curriculum Name

Thai หลักสูตรวิทยาศาสตรมหาบัณฑิต สาขาวิชาวิทยาการคอมพิวเตอร์ (หลักสูตรนานาชาติ)

English Master of Science Program in Computer Science (International Program)

2. Name of Degree and Major

Full Title	Thai:	วิทยาศาสตรมหาบัณฑิต (วิทยาการคอมพิวเตอร์)
Abbreviation	Thai:	วท.ม. (วิทยาการคอมพิวเตอร์)
Full Title	English:	Master of Science (Computer Science)
Abbreviation	English:	M.Sc. (Computer Science)

3. Major Subjects None

4. Required Credits: not less than 36 credits

5. Curriculum Characteristics

5.1 **Curriculum type/model:** Master's Degree

5.2 **Language:** English

5.3 **Recruitment:** Both Thai and international candidates

5.4 **Collaboration with Other Universities:** Mahidol University's Program

5.5 **Graduate Degrees Offered to the Graduates:** One degree with one major

6. Curriculum Status and Curriculum Approval

6.1 Revised Program Academic Year 2020 (B.E.2563)

6.2 Starting in semester 1, academic year 2020 (B.E.2563) onwards

6.3 Curriculum committee approved the program in its meeting 5/2019 on May 27, 2019

6.4 The Mahidol University Council approved the program in its meeting 553 on February, 2020

7. Readiness to Implement/Promote the Curriculum

The curriculum is ready to be announced and has met the quality and standards requirements of the Thailand Quality Framework in year 2022 (2 years after the starting of the program).

8. Opportunities for Graduates

8.1 Computer and Information Technology Technical Officer

8.2 Software and System Developer

8.3 Information Technology Manager

8.4 Data Analyst and Data Scientist

8.5 Multimedia Developer

9. Name, ID Number, Title and Degree of the Faculty in Charge of the Program

No.	Identification Card Number Academic position - Name - Surname	Degree (Field of Study) University: Year of graduate	Department
1.	x-xxxx-xxxxx-xx-x Assistant Professor Dr. Boonsit Yimwadsana	Ph.D. (Electrical Engineering) Columbia University, USA. : 2007 M.S. (Electrical Engineering) Columbia University, USA. : 2001 B.S. (Electrical Engineering) Columbia University, USA. : 2000	Faculty of Information and Communication Technology
2.	x-xxxx-xxxxx-xx-x Assistant Professor Dr. Songsri Tangsripairoj	Ph.D. (Computer Science) Oklahome State University, USA: 2004 M.Sc. (Computer Science) Mahidol University : 1996 B.Sc. (Computer Science) 2nd Class Honors Thammasat University : 1994	Faculty of Information and Communication Technology

No.	Identification Card Number Academic position - Name - Surname	Degree (Field of Study) University: Year of graduate	Department
3.	x-xxxx-xxxxx-xx-x Assistant Professor Dr. Robert Egrot	Ph.D. (Computer Science) University College London, United Kingdom : 2013 M.Sc. (Computing) Oxford Brookes University, United Kingdom : 2008 B.A. (Mathematics) University of Oxford, United Kingdom : 2007	Faculty of Information and Communication Technology

10. Venue for Instruction

Faculty of Information and Communication Technology, Mahidol University

11. External Factors to Be Considered in Curriculum Planning

11.1 Economic Situation/Development

This curriculum follows Thailand's 20-Year National Strategy, which describes a vision for improving the nation's competitiveness in economy and human quality development, with the aim of increasing income-per-capita and becoming a developed country. This curriculum supports the National Strategy in 2 different areas including

Strategy 2: Competitiveness Development, and

Strategy 3: Human Resource Development.

In addition to the 20-Year National Strategy, the Royal Thai Government proposes the Thailand 4.0 policy which focuses on innovation along with the Twelfth National Economic and Social Development Plan (2017 – 2021), which has several strategies related to this curriculum as follows:

Strategy 1: Strategy for Strengthening and Realizing the Potential of Human Capital,

Strategy 3: Strategy for Strengthening the Economy,

Strategy 8: Strategy for the Development of Science, Technology, and

Strategy 10: Strategy for International Cooperation for Development.

In order to support the 20-Year National Strategy and the Twelfth National Economic and Social Development Plan (2017 – 2021), the Cabinet approves the Ministry of Industry's strategic plan called Industry 4.0 (2017-2036). This aims to enhance the development of 10 target industries, including 5 competent industries (First S-Curve) and 5 future industries (New S-Curve), and computer science will play a key role in supporting every target industry. In particular: Digital, Next-Generation Automotive, Intelligent Electronics, and Robotics and Automation.

It is important for the country to produce quality human resources who are competent in developing and using technologies, as well as conducting advanced research in order to create new knowledge, and to innovate in target industries of. The philosophy and goal of this curriculum, which follows the strategic plan of the Ministry of Education and Mahidol University, is to support the country's present and future demand for human resources, knowledge and innovation.

11.2 Social and Cultural Situation/Development

The development of this curriculum takes the social and cultural situations into account. Computer science is now integrated into our daily life. Computing technology is now being used in various kinds of business and social activities. New economic and social activities are being created. The digital economy development initiative for the country aims at creating innovative businesses and enhancing business operations. This demands quality software and hardware development. High speed networks need access to vast amounts of data, from anywhere in the country, at any time, in order to enhance business and industry. Social networking has become the norm, and people communicate with each other more conveniently than before. People can now have inexpensive and convenient access to various services and applications from the Internet Cloud. This brings changes to the way people do businesses and communicate, and this development significantly affects our behavior in business, social and cultural interactions. In order to maintain social, cultural, national and personal values, this curriculum is set up with the task of educating new generations of students about the advantages and disadvantages of computing technologies in various settings. Our graduates will be equipped with the ethical knowledge required to appropriately choose and apply computing technologies which fit the Thai society and culture.

12. The Effects Mentioned in No.11.1 and 11.2 on Curriculum Development and Relevance to the Missions of the University/Institution

12.1 Curriculum Development

The world economy and society have changed quickly and dramatically in recent years due to the widespread use of new technologies. In order to cope with this change, this curriculum must be extended with content relating to new and advanced technology. Graduates must have sufficient knowledge and skills to develop and apply new technologies, for supporting new innovative businesses, and therefore improving the competitiveness of the country. This follows the mission of Mahidol University and the Faculty of ICT, which is to provide excellence in education and research for the country.

12.2 Relevance to the Missions of the University/Institution

The Faculty of ICT has missions in accordance with the missions of Mahidol University, especially in research and education. This curriculum aims to produce excellent education and research programs which help develop competent graduates in the area of computer science. The graduates will increase national competitiveness, reduce reliance on foreign experts in information and communication technology, and enhance the national economy by applying their knowledge and skills to improve business operations and create innovations according to the demand of the country. In addition, the graduates will be proficient in English, and equipped with the professional skills necessary to compete internationally. The curriculum also focuses on the ethical use of technology, with professional codes of conduct in alignment with Thai and international culture.

13. Collaboration with Other Curricula of the University

None

Section 2 Information about the Curriculum

1. Philosophy, Justification, and Objectives of the Curriculum

1.1 Philosophy and Justification of the Curriculum

This curriculum focuses on producing graduates who have the knowledge and skills necessary to create and deploy disruptive technologies for solving complex scientific and business problems, develop knowledge and technology through research in the area of computer science, and integrate knowledge in computer science with other fields effectively for national development.

1.2 Objectives of the Program

The objectives of the program are as follows:

1.2.1 To produce graduates with academic and IT professional morals and ethics.

1.2.2 To produce graduates with knowledge in the principles and theory of computer science, and the ability to independently study related technological advancement in computer science.

1.2.3 To produce graduates who can analyze and solve computing problems using original research and sound knowledge of computer science.

1.2.4 To produce graduates who have self-responsibility and social interaction skills.

1.2.5 To produce graduates who can effectively use analytical thinking skills, information technology, and fluency in English.

1.3 Program Learning Outcomes (PLOs)

By the end of the study, graduates will be able to:

1.3.1 Demonstrate the ability to follow appropriate ethical and professional codes of conduct in research and IT professional practice.

1.3.2 Demonstrate knowledge and capability in the theory and principles of computer science. Continue learning independently, expanding computer science knowledge through analysis and synthesis, and understanding new and disruptive technologies.

1.3.3 Analyze problems using logical reasoning based on computer science knowledge, synthesize and integrate knowledge in computer science and use research methodology for presenting and solving problems.

1.3.4 Demonstrate self-responsibility and teamwork skills with the ability to communicate and transfer knowledge effectively.

1.3.5 Apply tools of information and communication technology, mathematics, and statistics to solve problems related to the field of study. Proficiently apply English skills for communication and presentation.

2. Plan for Development and Improvement

Plan for Development/Revision	Strategies	Evidences/Indexes
1. Plan for revising Master of Science in Computer Science program to comply with the Office of the Higher Education Commission's Post Graduate Curriculum Standard Criterion B.E. 2558 and Guidelines for Managing Post Graduate Curriculum Standard Criterion B.E. 2558.	1. Develop curriculum to comply with the Office of the Higher Education Commission's Post Graduate Curriculum Standard Criterion B.E. 2558 and Guidelines for Managing Post Graduate Curriculum Standard Criterion B.E. 2558. 2. Follow-up, review, evaluate, and revise the curriculum according to curriculum revision cycle.	1. Curriculum approval from Mahidol University's Council. 2. Curriculum and course evaluation result. 3. Meeting reports of curriculum administrative committee.
2. Plan for revising the curriculum to satisfy employers' and social demand in order to cope with rapid change of computing technology.	1. Revising the curriculum and course content to satisfy the expected learning outcomes of employers and society. 2. Survey social demand.	1. Evaluation of results of graduates. 2. Evaluation report of employer satisfaction for graduates.
3. Plan for faculty development for building research experience and capability in order to apply knowledge and experience in research to improve teaching and research work.	1. Support faculty and staff research activities. 2. Support faculty to provide academic service to agency within and outside university. 3. Support faculty to seek new knowledge from training and conference participation.	1. Publications by faculty in the curriculum. 2. Academic services by faculty in the curriculum. 3. Training and conference participation by the faculty.

Section 3 Educational Management System, Curriculum Implementation, and Structure

1. Educational Management System

1.1 **System:** Two Semester Credit system. 1 Academic Year consists of 2 Regular Semesters, each with not less than 15 weeks of study.

1.2 **Summer Session** The program does not offer a summer session.

1.3 **Credit Equivalence to Semester System** None.

2. Curriculum Implementation

2.1 Teaching Schedule

Regular Program: Weekdays.

Special Program: Weekdays evening and weekends.

- Semester 1 August – December
- Semester 2 January – May
- Summer Semester May - July

2.2 Qualifications of Prospective Students

Plan A (A.2)

2.2.1 Applicants should hold a Bachelor's degree from an institute accredited by the Office of the Permanent Secretary, Ministry of Higher Education, Science, Research and Innovation, in either one of the following categories:

2.2.1.1 A degree in computer science, computer engineering, information technology, information and communication technology, electrical engineering, mathematics, or physics.

2.2.1.2 A degree in another related field with at least 12 credits of computer related courses, and having at least 1 year of work experience in computing or IT development.

2.2.2 Applicants should have a cumulative GPA of not less than 2.5

2.2.3 Applicants should have an English Proficiency Examination score as required by the Faculty of Graduate Studies.

2.2.4 Applicants with qualifications other than 2.2.1-2.2.3 may be considered by the Program Director, and the Dean of the Faculty of Graduate Studies.

Plan B

2.2.1 Applicants should hold a Bachelor's degree with at least 6 credits of computer related courses from an institute accredited by the Office of the Permanent

Secretary, Ministry of Higher Education, Science, Research and Innovation and have at least 2 years of work experience in computing or IT development.

2.2.2 Applicants should have a cumulative GPA of not less than 2.5

2.2.3 Applicants should have an English Proficiency Examination score as required by the Faculty of Graduate Studies.

2.2.4 Applicants with qualifications other than 2.2.1-2.2.3 may be considered by the Program Director, and the Dean of the Faculty of Graduate Studies.

2.3 Problems New Students Encounter

New students need to improve learning skills for studying in graduate programs, especially the ability to self-study, analyze problems, and research. Most new students' English skills are at the minimum acceptance level. They need to practice using English in real life scenarios, such as communication with friends and faculty members. In addition, time management is very important for students who are also working while studying for a graduate degree.

2.4 Strategies for Problem Solving/Limited Requirements in No. 2.3

Problems of New Students	Strategies for Problem Solving
Student adaptation for studying in master's degree and time management.	- Providing guidance on learning skills during new student orientation meeting. - Providing academic advisor to students to help guide students on a suitable study plan.
English skills at the level of writing research reports and publications.	- Encourage students to take extra English courses at the Faculty of Graduate Studies. - Provide extra English support from the Faculty's English instructor team.

2.5 Five-Year-Plan for Recruitment and Graduation of Students

2.5.1 Regular Program

Plan A (A2)

Academic Year	2020	2021	2022	2023	2024
First-year student	4	4	4	4	4
Second-year student		4	4	4	4
Cumulative numbers	4	8	8	8	8
Expected number of students graduated		4	4	4	4

Plan B

Academic Year	2020	2021	2022	2023	2024
First-year student	4	4	4	4	4
Second-year student		4	4	4	4
Cumulative numbers	4	8	8	8	8
Expected number of students graduated		4	4	4	4

2.5.2 Special Program

Plan A (A2)

Academic Year	2020	2021	2022	2023	2024
First-year student	4	4	4	4	4
Second-year student		4	4	4	4
Cumulative numbers	4	8	8	8	8
Expected number of students graduated		4	4	4	4

Plan B

Academic Year	2020	2021	2022	2023	2024
First-year student	4	4	4	4	4
Second-year student		4	4	4	4
Cumulative numbers	4	8	8	8	8
Expected number of students graduated		4	4	4	4

2.6 Budget based on the plan

Plan A (A2) (regular and special program)

Registration fee	**credits**	**Fee per credit**	**Amount (Baht)**
Tuition fee			
Thesis registration fee			
Research supplies fee			
Equipment and facilities maintenance fee			
Total income per student			

Estimated expenses

Variable expenses per student	**Amount (Baht)**
College/university allocation	
Position allowance of thesis advisor and committee	
Research Scholarship	
Total variable expenses per student	
Fixed expenses	
Teaching payment	
Utility fee (Electricity etc.)	

Total Fixed expenses	

Number of students at break-even point 3 persons

Cost of students at break-even point

Cost per student at break-even point

Plan B (regular and special program)

Registration fee	**credits**	**Fee per credit**	**Amount (Baht)**
Tuition fee			
Thematic paper registration fee			
Thematic paper supplies fee			
Equipment and facilities maintenance fee			
Total income per student			

Estimated expenses

Variable expenses per student	**Amount (Baht)**
College/university allocation	
Position allowance of thesis advisor and committee	
Research Scholarship	
Total variable expenses per student	
Fixed expenses	
Teaching payment	
Total Fixed expenses	

Number of students at break-even point 3 persons

Cost of students at break-even point

Cost per student at break-even point

2.7 Educational System: Classroom Mode

2.8 Transfer of Credits, Courses and Cross University Registration

Transfer of credits is in compliance with Mahidol University' s regulations on Graduate Studies. Should you need more information, please visit the Faculty of Graduate Studies website: www.grad.mahidol.ac.th.

3. Curriculum and Instructors

3.1 Curriculum

3.1.1 Number of credits (not less than) 36 credits

3.1.2 Curriculum Structure

The curriculum structure is set in compliance with Announcement of the Ministry of Education on the subject of Criteria and Standards of Graduate Studies B.E. 2558, The curriculum structure for this Master of Science degree, Plan A (A2) and Plan B are as follows:

	Plan A (A2) (credits)	**Plan B (credits)**
Required courses	18	18
Elective courses not less than	6	12
Thesis	12	-
Thematic paper	-	6
Total not less than	**36**	**36**

3.1.3 Courses in the curriculum

1) Required Courses

			Credits (lecture – practice – self-study)
ITCS	509	Research Methodology in Computer Science	2 (2-0-4)
*ทสคพ	509	วิทยาระเบียบวิธีวิจัยด้านวิทยาการคอมพิวเตอร์	
ITCS	521	Agile Software Product Management	3 (3-0-6)
*ทสคพ	521	การจัดการผลิตภัณฑ์ซอฟต์แวร์แบบอไจล์	
ITCS	522	Edge Computing and Internet of Things	3 (3-0-6)
*ทสคพ	522	การประมวลผลใกล้แหล่งข้อมูลและอินเทอร์เน็ตของสรรพสิ่ง	
ITCS	523	Data Sciences Essentials	3 (3-0-6)
*ทสคพ	523	ส่วนสำคัญของวิทยาการข้อมูล	
ITCS	603	Seminar in Computer Science	1 (1-0-2)
*ทสคพ	603	การสัมมนาทางวิทยาการคอมพิวเตอร์	

ITCS	659	Multimedia Technologies and Applications	3 (3-0-6)
ทสคพ	659	เทคโนโลยีและการประยุกต์งานสื่อผสม	
ITCS	661	Advanced Artificial Intelligence	3 (3-0-6)
ทสคพ	661	ปัญญาประดิษฐ์ขั้นสูง	

* new course

2) Elective Courses

Credits (lecture – practice – self-study)

ITCS	503	Design and Analysis of Algorithms	3 (3-0-6)
ทสคพ	503	การออกแบบและวิเคราะห์ขั้นตอนวิธี	
ITCS	504	Computer System Organization and Architecture	3 (3-0-6)
ทสคพ	504	สถาปัตยกรรมและการจัดระบบคอมพิวเตอร์	
ITCS	507	Mathematical Foundations for Computer Science	3 (3-0-6)
ทสคพ	507	พื้นฐานทางคณิตศาสตร์สำหรับวิทยาการคอมพิวเตอร์	
ITCS	513	Project Management	3 (3-0-6)
ทสคพ	513	การจัดการโครงการ	
ITCS	517	Machine Learning	3 (3-0-6)
ทสคพ	517	การเรียนรู้เชิงเครื่องจักร	
ITCS	518	Image Analysis and Understanding	3 (3-0-6)
ทสคพ	518	การวิเคราะห์และความเข้าใจภาพ	
ITCS	551	Service Oriented and Cloud Computing	3 (3-0-6)
ทสคพ	551	การคำนวณเชิงบริการและคลาวด์	
ITCS	552	Mobile and Pervasive Computing	3 (3-0-6)
ทสคพ	552	การคำนวณแบบเคลื่อนที่และทุกที่	
ITCS	554	Information Security Management	3 (3-0-6)
ทสคพ	554	การจัดการความมั่นคงของสารสนเทศ	
ITCS	612	Network Programming	3 (3-0-6)
*ทสคพ	612	การโปรแกรมเครือข่าย	
ITCS	613	Tools and Environments for Software Development	3 (3-0-6)
*ทสคพ	613	เครื่องมือและสภาพแวดล้อมสำหรับการพัฒนาซอฟต์แวร์	
ITCS	615	Empirical Software Engineering	3 (3-0-6)
*ทสคพ	615	วิศวกรรมซอฟต์แวร์เชิงประจักษ์	
ITCS	621	Database Design and Administration	3 (3-0-6)
ทสคพ	621	การออกแบบและการบริหารฐานข้อมูล	

ITCS	628	Data Mining and Knowledge Discovery	3 (3-0-6)
ทสคพ	628	เหมืองข้อมูลและการค้นพบความรู้	
ITCS	631	Computer Communications and Networks	3 (3-0-6)
ทสคพ	631	เครือข่ายสื่อสารคอมพิวเตอร์	
ITCS	643	Software Engineering	3 (3-0-6)
ทสคพ	643	วิศวกรรมซอฟต์แวร์	
ITCS	644	Software Quality Assurance	3 (3-0-6)
ทสคพ	644	การประกันคุณภาพซอฟต์แวร์	
ITCS	655	Computer Graphics	3 (3-0-6)
ทสคพ	655	คอมพิวเตอร์กราฟิกส์	
ITCS	658	Human Computer Interaction	3 (3-0-6)
ทสคพ	658	ปฏิสัมพันธ์ของคอมพิวเตอร์และมนุษย์	
ITCS	665	Natural Language Processing	3 (3-0-6)
ทสคพ	665	การประมวลผลภาษาธรรมชาติ	
ITCS	667	Advanced Computer Vision	3 (3-0-6)
ทสคพ	667	คอมพิวเตอร์วิทัศน์ขั้นสูง	
ITCS	668	Cloud Database and Big Data Technology	3 (3-0-6)
*ทสคพ	668	ฐานข้อมูลระบบคลาวด์และเทคโนโลยีข้อมูลขนาดใหญ่	
ITCS	669	System Performance Modeling	3 (3-0-6)
*ทสคพ	669	แบบจำลองประสิทธิภาพของระบบ	
ITCS	682	Advanced Database Systems	3 (3-0-6)
ทสคพ	682	ระบบฐานข้อมูลขั้นสูง	
ITCS	696	Advanced Topics in Computer Science	3 (0-6-3)
*ทสคพ	696	หัวข้อขั้นสูงด้านวิทยาการคอมพิวเตอร์	

* new course

In addition to the elective courses mentioned above, a student may register for other graduate level courses from international programs offered by other faculties, both of Mahidol University and of other universities, according to the student's interest, with the approval of the curriculum committee and the advisor.

3) Thesis

			Credits (lecture – practice – self-study)
ITCS	698	Thesis	12 (0-36-0)
ทสคพ	698	วิทยานิพนธ์	

4) Thematic paper

			Credits (lecture – practice – self-study)
ITCS	697	Research Project in Computer Science	6 (0-18-0)
ทสคพ	697	โครงงานวิจัยทางวิทยาการคอมพิวเตอร์	

3.1.4 Research Project (for Plan A(A2))

Research areas for conducting a thesis (Plan A) are as follows:

(1) Research project in intelligent systems

(2) Research project in data management systems

(3) Research project in internet of things

(4) Research project in communication and network systems

(5) Research project in security systems

(6) Research project in software engineering

(7) Research project in data science

(8) Research project in image and video processing

Students can choose to conduct research in other areas related to computer science given approval from academic advisor and program director.

3.1.5 Thematic Paper Project (for Plan B)

Areas of thematic paper project are as follows:

(1) Project in intelligent systems

(2) Project in data management systems

(3) Project in internet of things

(4) Project in communication network systems

(5) Project in security systems

(6) Project in software engineering

(7) Project in data science

(8) Project in image and video processing

Students can choose to conduct a project in other areas related to computer science if given approval from the academic advisor and program director.

3.1.6 Definition of Course Codes

Course codes are defined as follows:

- The first two characters abbreviate the faculty offering the course.
- ทส (IT) is the abbreviation of the Faculty of Information and Communication Technology
- The latter two characters are an abbreviation of the department or the major offering the course.
- คพ (CS) is the abbreviation of the Computer Science major.
- The 3 digit course number of form 5XX and 6XX indicates that the course is graduate level.

3.1.7 Study Plan

Plan A (A2)

Year	Semester 1	
1	ITCS 509 Research Methodology in Computer Science	2 (2-0-4)
	ITCS 521 Agile Software Product Management	3 (3-0-6)
	ITCS 523 Data Sciences Essentials	3 (3-0-6)
	ITCS 661 Advanced Artificial Intelligence	3 (3-0-6)
	Total 11 credits	
	Semester 2	
	ITCS 659 Multimedia Technologies and Applications	3 (3-0-6)
	ITCS 522 Edge Computing and Internet of Things	3 (3-0-6)
	ITCS 603 Seminar in Computer Science	1 (1-0-2)
	Elective Courses not less than	3 credits
	Total 10 credits	
2	**Semester 1**	
	Elective Courses not less than	3 credits
	ITCS 698 Thesis	6 (0-18-0)
	Total 9 credits	
	Semester 2	
	ITCS 698 Thesis	6 (0-18-0)
	Total 6 credits	

Plan B

Year	Semester 1	
1	ITCS 509 Research Methodology in Computer Science	2 (2-0-4)
	ITCS 521 Agile Software Product Management	3 (3-0-6)
	ITCS 523 Data Sciences Essentials	3 (3-0-6)
	ITCS 661 Advanced Artificial Intelligence	3 (3-0-6)
	Total 11 credits	
	Semester 2	
	ITCS 659 Multimedia Technologies and Applications	3 (3-0-6)
	ITCS 522 Edge Computing and Internet of Things	3 (3-0-6)
	ITCS 603 Seminar in Computer Science	1 (1-0-2)
	Elective Courses not less than	3 credits
	Total 10 credits	
2	**Semester 1**	
	Comprehensive Examination	
	Elective Courses not less than	9 credits
	Total 9 credits	
	Semester 2	
	ITCS 697 Research Project in Computer Science	6 (0-18-0)
	Total 6 credits	

Examples of research and career development area through elective course selection

1. **Intelligent Systems, Image and Video Processing**

ITCS 503	Design and Analysis of Algorithms	3 (3-0-6)
ITCS 507	Mathematical Foundations for Computer Science	3 (3-0-6)
ITCS 518	Image Analysis & Understanding	3 (3-0-6)
ITCS 655	Computer Graphics	3 (3-0-6)
ITCS 517	Machine Learning	3 (3-0-6)
ITCS 667	Advanced Computer Vision	3 (3-0-6)

2. **Data Management Systems, Data Science**

ITCS 503	Design and Analysis of Algorithms	3 (3-0-6)
ITCS 507	Mathematical Foundations for Computer Science	3 (3-0-6)
ITCS 517	Machine Learning	3 (3-0-6)

ITCS 551	Service Oriented and Cloud Computing	3 (3-0-6)
ITCS 621	Database Design and Administration	3 (3-0-6)
ITCS 628	Data Mining and Knowledge Discovery	3 (3-0-6)
ITCS 655	Natural Language Processing	3 (3-0-6)
ITCS 668	Cloud Database and Big Data Technology	3 (3-0-6)
ITCS 682	Advanced Database Systems	3 (3-0-6)

3. Software Engineering

ITCS 513	Project Management	3 (3-0-6)
ITCS 613	Tools and Environments for Software Development	3 (3-0-6)
ITCS 621	Database Design and Administration	3 (3-0-6)
ITCS 643	Software Engineering	3 (3-0-6)
ITCS 644	Software Quality Assurance	3 (3-0-6)
ITCS 517	Machine Learning	3 (3-0-6)
ITCS 615	Empirical Software Engineering	3 (3-0-6)
ITCS 551	Service Oriented and Cloud Computing	3 (3-0-6)

4. Communication Network Systems, Internet of Things, Security Systems

ITCS 507	Mathematical Foundations for Computer Science	3 (3-0-6)
ITCS 552	Mobile and Pervasive Computing	3 (3-0-6)
ITCS 554	Information Security Management	3 (3-0-6)
ITCS 631	Computer Communications and Networks	3 (3-0-6)
ITCS 517	Machine Learning	3 (3-0-6)
ITCS 551	Service Oriented and Cloud Computing	3 (3-0-6)
ITCS 612	Network Programming	3 (3-0-6)
ITCS 669	System Performance Modeling	3 (3-0-6)

3.1.8 Course Description

Please see Appendix A.

3.2 Name, I.D. Number, Title and Degree of Instructors

3.2.1 Full time instructors of the curriculum (Please see Appendix B)

No.	Identification Card Number Academic position - Name - Surname	Degree (Field of Study) University: Year of graduate	Department
1.	x-xxxx-xxxxx-xx-x Professor Dr. Peter Fereed Haddawy	Ph.D. (Computer Science) University of Illinois at Urbana-Champaign, USA : 1991 M.Sc. (Computer Science) University of Illinois at Urbana-Champaign, USA : 1987 B.A. (Mathematics) Pomona College, Claremont, California, USA : 1981	Faculty of Information and Communication Technology
2.	x-xxxx-xxxxx-xx-x Associate Professor Dr. Chomtip Pornpanomchai	Ph.D. (Computer Science) Asian Institute of Technology : 2000 M.Sc. (Computer Science) Chulalongkorn University : 1986 B.Sc. (General Science) Kasetsart University : 1981	Faculty of Information and Communication Technology
3.	x-xxxx-xxxxx-xx-x Associate Professor Dr. Damras Wongsawang	Ph.D. (Information Engineering) Shinshu University, Japan : 1994 M.Sc. (Applied Mathematics) Mahidol University : 1980 B.Ed. (Mathematics) 1st Class Honor Srinakharinwirot University Prasarnmit : 1978	Faculty of Information and Communication Technology
4.	x-xxxx-xxxxx-xx-x Associate Professor Dr. Jarernsri Mitrpanont	Ph.D. (Computer Science) Oklahoma State University, USA : 1994 M.Sc. (Applied Mathematics) Mahidol University : 1983 B.Sc. (Physics) Mahidol University : 1980	Faculty of Information and Communication Technology

No.	Identification Card Number Academic position - Name - Surname	Degree (Field of Study) University: Year of graduate	Department
5.	x-xxxx-xxxxx-xx-x Associate Professor Dr. Sudsanguan Ngamsuriyaroj	Ph.D. (Computer Science and Engineering) The Pennsylvania State University, USA : 2002 M.Sc. (Physical Chemistry) Mahidol University : 1981 B.Sc. (Chemistry) 2nd Class Honor Mahidol University : 1979	Faculty of Information and Communication Technology
6.	x-xxxx-xxxxx-xx-x Associate Professor Dr. Vasaka Visoottiviseth	Ph.D. (Computer Engineering) Nara Institute of Science and Technology, Japan : 2003 M.Eng. (Computer Engineering) Tokyo University of Agriculture and Technology, Japan : 1999 B.Eng. (Computer Engineering) Tokyo University of Agriculture and Technology, Japan : 1997	Faculty of Information and Communication Technology
7.	x-xxxx-xxxxx-xx-x Assistant Professor Dr. Ananta Srisuphab	Ph.D. (Computer Science) Mahidol University : 2009 M.Sc. (Computer Science) Mahidol University : 2002 B.Sc. (Computer Science) Mahidol University : 1991	Faculty of Information and Communication Technology
8.	x-xxxx-xxxxx-xx-x Assistant Professor Dr. Boonsit Yimwadsana	Ph.D. (Electrical Engineering) Columbia University, USA : 2007 M.S. (Electrical Engineering) Columbia University, USA : 2001 B.S. (Electrical Engineering) Columbia University, USA : 2000	Faculty of Information and Communication Technology

No.	Identification Card Number Academic position - Name - Surname	Degree (Field of Study) University: Year of graduate	Department
9.	x-xxxx-xxxxx-xx-x Assistant Professor Dr. Charnyote Pluempitiwiriyawej	Ph.D. (Computer Engineering-CISE) University of Florida, USA : 2001 M.S. (Computer Science) University of Maryland, USA : 1997 B.Eng. (Computer Engineering) 2nd Class Honor King Mongkut's institute of Technology Thonburi : 1994	Faculty of Information and Communication Technology
10.	x-xxxx-xxxxx-xx-x Assistant Professor Dr. Piyanuch Silapachote	Ph.D. (Computer Science) University of Massachusetts Amherst, USA : 2011 M.S. (Computer Science) University of Massachusetts Amherst, USA : 2006 B.S. (Computer Science) Cornell University, USA : 2001	Faculty of Information and Communication Technology
11.	x-xxxx-xxxxx-xx-x Assistant Professor Dr. Robert Egrot	Ph.D. (Computer Science) University College London, United Kingdom : 2013 M.Sc. (Computing) Oxford Brookes University, United Kingdom : 2008 B.A. (Mathematics) University of Oxford, United Kingdom : 2007	Faculty of Information and Communication Technology
12.	x-xxxx-xxxxx-xx-x Assistant Professor Dr. Songsri Tangsripairoj	Ph.D. (Computer Science) Oklahoma State University, USA : 2004 M.Sc. (Computer Science) Mahidol University : 1996 B.Sc. (Computer Science) 2nd Class Honor Thammasat University : 1994	Faculty of Information and Communication Technology

No.	Identification Card Number Academic position - Name - Surname	Degree (Field of Study) University: Year of graduate	Department
13.	x-xxxx-xxxxx-xx-x Assistant Professor Dr. Sukanya Pongsuphap	Ph.D. (Intelligent System Science) Tokyo Institute of Technology, Japan : 1999 M.Eng. (Intelligent Science) Tokyo Institute of Technology, Japan : 1996 B.S. (Mathematics) 1st Class Honor Chiang Mai University : 1984	Faculty of Information and Communication Technology
14.	x-xxxx-xxxxx-xx-x Assistant Professor Dr. Suppawong Tuarob	Ph.D. (Computer Science and Engineering) Pennsylvania State University, USA : 2015 M.S. (Industrial Engineering) Pennsylvania State University, USA : 2015 M.SE. (Computer Science and Engineering) University of Michigan, Ann Arbor, USA : 2010 B.SE. (Computer Science) University of Michigan, Ann Arbor, USA : 2009	Faculty of Information and Communication Technology
15.	x-xxxx-xxxxx-xx-x Assistant Professor Dr. Thanwadee Sunetnanta	Ph.D. (Distributed Software Engineering) Imperial College, United Kingdom : 1999 M.Sc. (Foundation of Advanced Information Technology) Imperial College, United Kingdom : 1993 B.Sc. (Computer Science) 2nd Class Honor Thammasat University : 1991	Faculty of Information and Communication Technology
16.	x-xxxx-xxxxx-xx-x Assistant Professor Dr. Thitinan Tantidham	Ph.D. (Computer Science) RWTH Aachen University, Germany : 2010 M.Sc. (Computer Science) Mahidol University : 1997 B.Eng. (Computer Engineering) Kasetsart University : 1993	Faculty of Information and Communication Technology

No.	Identification Card Number Academic position - Name - Surname	Degree (Field of Study) University: Year of graduate	Department
17.	x-xxxx-xxxxx-xx-x Assistant Professor Dr. Worapan Kusakunniran	Ph.D. (Computer Science and Engineering) University of New South Wales, Australia : 2013 B.Eng. (Computer Engineering) 1st Class Honor University of New South Wales, Australia : 2008	Faculty of Information and Communication Technology
18.	x-xxxx-xxxxx-xx-x Lecturer Dr. Assadarat Khurat	Dr.-Ing. (Computer Security) Hamburg University of Technology, Germany : 2014 M.Sc. (Information and Communication Systems) Hamburg University of Technology, Germany : 2005 B.Eng. (Telecommunication Engineering) 2nd Class Honor King Mongkut's Institute of Technology Ladkrabang : 2001	Faculty of Information and Communication Technology
19.	x-xxxx-xxxxx-xx-x Lecturer Dr. Karin Sumongkayothin	Ph.D. (Information Science) Japan Advance Institute of Science and Technology, Japan : 2017 Ph.D. (Engineering and Technology) Sirindhorn International Institute of Technology : 2017 M.Eng. (Microelectronics) Asian Institute of Technology : 2003 B.Eng. (Electrical Engineering) Kasetsart University : 1999	Faculty of Information and Communication Technology

No.	Identification Card Number Academic position - Name - Surname	Degree (Field of Study) University: Year of graduate	Department
20.	x-xxxx-xxxxx-xx-x Lecturer Dr. Mores Prachyabrued	Ph.D. (Computer Science) University of Louisiana at Lafayette, USA. : 2013 M.S. (Computer Science) University of Louisiana at Lafayette, USA. : 2007 M.Eng. (Computer Engineering) Kasetsart University : 2002 B.Eng. (Computer Engineering) Kasetsart University : 1998	Faculty of Information and Communication Technology
21.	x-xxxx-xxxxx-xx-x Lecturer Dr. Pattanasak Mongkolwat	Ph.D. (Computer Science) Illinois Institute of Technology, USA. : 1996 M.Sc. (Computer Science) McNeese State University, USA. : 1991 B.Sc. (Computer Science) University of the Thai Chamber of Commerce : 1988	Faculty of Information and Communication Technology
22.	x-xxxx-xxxxx-xx-x Lecturer Dr. Pawitra Chiravirakul	Ph.D. (Computer Science) University of Bath, United Kingdom : 2015 M.Sc. (Software Systems Engineering) University College London, United Kingdom : 2010 B.Sc. (Information and Communication Technology) 1st Class Honor Mahidol University : 2008	Faculty of Information and Communication Technology
23.	x-xxxx-xxxxx-xx-x Lecturer Dr. Siripen Pongpaichet	Ph.D. (Computer Science) University of California, Irvine, USA : 2016 M.S. (Computer Science) University of California, Irvine, USA : 2011 B.Sc. (Information and Communication Technology) 1st Class Honor Mahidol University : 2008	Faculty of Information and Communication Technology

No.	Identification Card Number Academic position - Name - Surname	Degree (Field of Study) University: Year of graduate	Department
24.	x-xxxx-xxxxx-xx-x Lecturer Dr. Srisupa Palakvangsa Na Ayudhya	Ph.D. (Computation) University of Manchester, United Kingdom : 2006 M.S. (Advanced Computing) Imperial College of Science, Technology and Medicine, United Kingdom : 2000 B.Sc. (Computer Science) 1st Class Honor Thammasat University : 1998	Faculty of Information and Communication Technology
25.	x-xxxx-xxxxx-xx-x Lecturer Dr. Wudhichart Sawangphol	Ph.D. (Information Technology) Monash University, Australia : 2017 MIT Honours (Software Engineering and Data Management) Monash University, Australia : 2012 B.Sc. (Information and Communication Technology) 1st Class Honor Mahidol University : 2009	Faculty of Information and Communication Technology

3.2.2 Full time instructors

No.	Identification Card Number Academic position - Name - Surname	Degree (Field of Study) University: Year of graduate	Department
1.	x-xxxx-xxxxx-xx-x Assistant Professor Dr. Rawesak Tanawongsuwan	Ph.D. (Computer Science) Georgia Institute of Technology, USA : 2003 M.S. (Computer Science) Georgia Institute of Technology, USA : 1999 B.S. (Computer Science and Mathematics) University Honors Carnegie Mellon University, USA : 1996	Faculty of Information and Communication Technology
2.	x-xxxx-xxxxx-xx-x Lecturer Dr. Preecha Tangworakitthaworn	Ph.D. (Computer Science) University of Southampton, United Kingdom : 2014 M.Sc. (Computer Science) Mahidol University : 2006 B.Sc. (Computer Science) Mahidol University : 1998	Faculty of Information and Communication Technology

3.2.3 Part time instructors

No.	Identification Card Number Academic position - Name - Surname	Degree (Field of Study) University: Year of graduate	Department
1.	x-xxxx-xxxxx-xx-x Associate Professor Dr. Supavadee Aramvith	Ph.D. (Electrical Engineering) University of Washington, USA. : 2001 M.Sc. (Electrical Engineering) University of Washington, USA. : 1996 B.Sc. (Computer Science) 1st Class Honor Mahidol University : 1993	Department of Electrical Engineering, Faculty of Engineering, Chulalongkorn University
2.	x-xxxx-xxxxx-xx-x Associate Professor Dr. Waraporn Jirapunthong	Ph.D. (Computer Science) City University, United Kingdom : 2006 M.Sc. (Computer Science) Mahidol University : 2000 B.Sc. (Computer Science) Thammasat University : 1997	College of Creative Design and Entertainment Technology, Dhurakij Pundit University

No.	Identification Card Number Academic position - Name - Surname	Degree (Field of Study) University: Year of graduate	Department
3.	x-xxxx-xxxxx-xx-x Lecturer Dr. Arthorn Luangsodsai	Ph.D. (Computer Science) University of Essex, United Kingdom : 2011 M.Sc. (Computer Science) University of Essex, United Kingdom : 2004 M.Sc. (Analysis, Design, and Management of Information Systems) London School of Economics, United Kingdom : 1995 B.Sc. (Computer Science) Thammasat University : 1992	Department of Mathematics and Computer Science, Faculty of Science, Chulalongkorn University
4.	x-xxxx-xxxxx-xx-x Lecturer Dr. Kunwadee Sripanidkulchai	Ph.D. (Electrical and Computer Engineering) Carnegie Mellon University, USA. : 2005 M.Sc. (Electrical and Computer Engineering) Carnegie Mellon University, USA. : 1999 B.Sc. (Electrical Engineering) University Honors, Cornell University, USA. : 1997	Department of Computer Engineering, Faculty of Engineering, Chulalongkorn University
5.	x-xxxx-xxxxx-xx-x Dr. Anon Plangprasopchok	Ph.D. (Computer Science) University of Southern California, USA. : 2010 M.Sc. (Computer Science) University of Southern California, USA. : 2005 B.Eng. (Computer Engineering) Chulalongkorn University : 2001	National Electronics and Computer Technology Center

No.	Identification Card Number Academic position - Name - Surname	Degree (Field of Study) University: Year of graduate	Department
6.	x-xxxx-xxxxx-xx-x Dr. Siwaruk Siwamogsatham	Ph.D. (Telecommunication Engineering) Ohio State University, USA. : 2002 M. Eng. (Telecommunication Engineering) Ohio State University, USA. : 1997 B.Eng. (Computer Engineering) Chulalongkorn University : 1994	National Electronics and Computer Technology Center
7.	x-xxxx-xxxxx-xx-x Dr. Somchart Fugkaew	Ph.D. (Electrical Engineering and Information Systems) The University of Tokyo, Japan : 2017 M.Sc. (Computer Science) Mahidol University : 2003 B.B.A. (Management Information Systems) Thammasat University : 2000	Thai Digital ID Company Limited

4. Details of Practicum

None

5. Thesis requirement

5.1 Short Description

To complete the thesis required by this curriculum, a student must identify a research topic in an area of Computer Science according to the list of research projects in 3.1.4, develop a relevant research proposal, conduct research using methodology appropriate for the topic (including, but not limited to, experiment design, data collection, and data analysis), and present the findings through a dissertation report, presentation at an academic conference, and publication in an academic journal or proceedings. The dissertation report must be submitted to the Faculty of Graduate Studies, with the submission deadline and format as designated by the Faculty of Graduate Studies.

5.2 Standard Learning Outcomes

Students will be able to analyze the core knowledge in the field of computer science, and to conduct research in a related area using appropriate methodology, and of sufficient quality

to be presented to the relevant academic community and published in an appropriate scientific venue.

5.3 Thesis duration:

From the first semester of the second year of study onwards.

5.4 Number of credits: 12 credits

5.5 Preparation

Advising time must be provided including advice from advisors. Thesis information from the official document or website is continually revised and up-to-date.

5.6 Evaluation process

The research process shall be evaluated by the advisor for the student's thesis. Evaluation occurs during each consultation during the period of research. The final oral examination is systematically evaluated by the thesis committee, following the standards of the Faculty of Graduate Studies, Mahidol University. In addition, part or all of the student's thesis must be published in an academic journal, or presented at a national or international conference with published proceedings.

6. Thematic paper requirements

6.1 Short Description

The thematic paper of this curriculum requires the students to identify a project topic in the area of Computer Science according to the list of thematic paper projects in 3.1.5, develop a thematic paper proposal related to the topic, and conduct a project using computer science knowledge learnt from the curriculum. The thematic paper report must be submitted to the Faculty of Graduate Studies with the submission deadline and format designated by the Faculty of Graduate Studies.

6.2 Standard Learning Outcomes

Students are able to apply core knowledge in the field of computer science to develop a project and a thematic paper.

6.3 Thematic paper duration

From the second semester of the second year of study onwards

6.4 Number of credits: 6 credits

6.5 Preparation

Students will receive advice from advisors. Information on the thematic paper available from official documents and online is up-to-date.

6.6 Evaluation process

The project process shall be evaluated by the student's advisor during each meeting relating to the project. The final oral examination is systematically evaluated by the thematic paper committee, following the standards of the Faculty of Graduate Studies, Mahidol University.

Section 4 Learning Outcome, Teaching Strategies and Evaluation

1. Development of Students' Specific Qualifications

Key characteristics for students according to the objectives of the program

Special Characteristics	Teaching Strategies or Student Activities
1. Morals and ethics	In addition to the research methodology courses that provide training in morals and ethics for conducting research in computer science, students are encouraged to take extra-curricular courses and workshops related to plagiarism and human and animal-related research offered by Mahidol University.
2. Knowledge in computer science	Students are encouraged to gain extra knowledge by participating in seminar courses, special talks, and conferences organized by Faculty of ICT, Mahidol University and computer science and IT communities.
3. Ability to analyze and solve computing problems.	Students are encouraged to gain extra skills in analyzing and solving computing problems by participating in competitions organized by Faculty of ICT, Mahidol University and computer science and IT communities.
4. Self-responsibility and social interatction skills	Students are encouraged to develop self-responsibility and social interaction skills by following university rules and regulations, and participating in student activities organized by the Faculty and the University.
5. Analytical thinking, information technology, and English skills	Students are encouraged to learn extra analytical thinking and information skills through the use of computers and solve research problems outside the classroom. They are also encouraged to use English in class and outside of class to improve their English. The Faculty of ICT and Mahidol University also provide opportunities for students to participate in international internships, competitions, hackathons, English, and information technology courses to help students improve their analytical thinking, presentation, information technology, and English skills.

2. Development of Learning Outcome in Each Objective

Expected Outcome	Teaching Strategies	Evaluation Strategies
Morality and Ethics 1) Possesses morality, ethics and honesty. 2) Have discipline, punctuality and professional integrity. 3) Respect the rights and opinions of others, as well as not violating the rights and intellectual property of others.	1) Lectures, case studies, discussion. 2) Monitor student discipline and class participation. 3) Assignments to practice writing reports or articles with appropriate citations.	1) Assessment from participation in class discussions. 2) Assessment of punctuality from class attendance and assignment submission. 3) Assessment of plagiarism and appropriateness of citations in written reports and assignments.
Knowledge 1) Have knowledge and understanding of principles and theories in the field of computer science. 2) Have ability to self-learn new knowledge and trends in computer science.	1) Lectures, case studies, discussion. 2) Individual assignments, problem-solving exercises, reading assignments, class project and presentation.	1) Assessment from written examination and/or presentation. 2) Assessment from quality of assignments, class projects and class participations.
Intellectual Development 1) Able to review related literature, analyze and summarize issues and problems systematically. 2) Able to apply knowledge and tools to develop solutions to problems in computer science. 3) Can synthesize existing knowledge to create new knowledge in computer science.	1) Lectures, case studies, discussion. 2) Reading assignments, assignments to summarize the content of a research paper. Problem solving assignments. 3) Demonstration or presentation of a project, research or real world problem assignment.	1) Assessment from written examination and/or presentation. 2) Assessment from quality of assignments, class projects and class participations. 3) Evaluation of research project or thematic paper.

Expected Outcome	Teaching Strategies	Evaluation Strategies
Interpersonal Relationships and Responsibility 1) Able to work with others, have skills in building relationships and interacting with others. 2) Demonstrate responsibility for their own actions, being responsible for work in the group, display leadership, be able to work as a team.	1) Group assignments, class project and presentation. 2) Teacher will set a good example, and encourage group participation.	1) Assessment of quality of group work, interpersonal communication skills and responsibility by role 2) Evaluation of participation and responsibility based on the opinions of advisors and peers.
Mathematical Analytical Thinking, Communication Skills, and Information Technology Skills 1) Have skills to use the available information and communication technology tools. 2) Be able to solve problems using mathematical and statistical methods. 3) Be able to communicate clearly, and to explain and present information effectively using English.	1) Lectures, case studies. 2) Individual or group assignments, class project and presentation. 3) Presentations and group discussions.	1) Assessment from written examination and/or presentation. 2) Assessment of submitted work and assignments. 3) Assessment of the ability to present work effectively using English in class.

3. Curriculum Mapping

See Appendix C**.**

Section 5 Criteria for Student Evaluation

1. Grading System

The system for grading and graduation shall comply with the criteria stated in the Regulations of Mahidol University on Graduate studies.

2. Evaluation Process for the Learning Outcome of Students

2.1 Evaluation for the learning outcome of students during study.

2.1.1 Course evaluation by students and the evaluation of students' learning outcomes by curriculum committee.

2.1.2 The curriculum committee will monitor the progress of students as they conduct research for their thesis or thematic paper.

2.2 Evaluation for the learning outcome of students after graduation

2.2.1 Survey of the employment situations of graduates, evaluation by alumni in terms of time to find jobs, and opinions on the knowledge and skills graduates gained from the curriculum for careers in computing.

2.2.2 Survey of employer satisfaction with graduates by interview and questionnaires.

2.2.3 Survey of career advancement of graduates.

2.2.4 Survey of graduate preparedness and knowledge from external experts evaluating the curriculum.

2.2.5 Evaluation by curriculum committee of graduate employment situations, employer satisfaction, graduate career advancement, and opinions of external experts to verify students' learning outcomes after graduation.

3. Graduation Requirement

3.1 Plan A (A2)

3.1.1 Total time of study should not exceed the study plan.

3.1.2 Students must complete courses as stated in the curriculum. At least 24 credits excluding thesis (12 credits) for 36 credits in total, with a minimum CUM-GPA of 3.00.

3.1.3 Students must meet the English Competence Standard of Graduate Students, Mahidol University as defined by the Faculty of Graduate Studies, Mahidol University.

3.1.4 Students must participate in skill development activities by the Faculty of Graduate Studies, Mahidol University.

3.1.5 Students must submit theses and pass the thesis defence in accordance with the Regulations of Mahidol University on Graduate Studies and the oral thesis defense must be open to public.

3.1.6 Theses are required to be published in an international academic journal or proceedings that is listed by the Faculty of Graduate Studies, Mahidol University.

3.2 Plan B

3.2.1 Total time of study should not exceed the study plan.

3.2.2 Students must complete courses as stated in the curriculum at least 30 credits excluding the thematic paper (6 credits) for 36 credits in total, with a minimum CUM-GPA of 3.00.

3.2.3 Students must meet the English Competence Standard of Graduate Students, Mahidol University as defined by the Faculty of Graduate Studies, Mahidol University.

3.2.4 Students must participate in skill development activities by the Faculty of Graduate Studies, Mahidol University.

3.2.5 Students must pass the comprehensive examination following Regulations of Mahidol University on Graduate Studies.

3.2.6 Student must propose and complete a thematic paper and pass the oral thematic paper Examination required for graduation according to regulations of Faculty of Graduate Studies, Mahidol University and the oral thematic paper Examination must be open to public.

3.2.7 The Thematic paper or a part of thematic paper must be published and searchable.

Section 6 Faculty Development

1. The Orientation for New Faculty Members

1.1 New faculty members have to attend an orientation that aims to provide knowledge and understanding about the policies of Mahidol University and the faculty/institute/college.

1.2 New full-time and part-time faculty members are trained to acknowledge and understand the curriculum, including divisional activities.

1.3 The head of the program explains relevant disciplines, curriculum, process of teaching, and assignments to the new faculty members.

1.4 First orientation is required for the new faculty members to know and understand the policies and philosophy of the university and the faculty.

1.5 To understand the process of teaching and research, the new faculty members are required to be a co-advisor of a thesis.

2. Skill and Knowledge Development for New Faculty Members

2.1 Skills Development in Teaching and Evaluation.

2.1.1 Provide workshops to develop skills on teaching and learning methods.

2.1.2 Allow the instructor to participate in the evaluation and revision of the curriculum and its courses.

2.2 Other Academic and Professional Skill Development.

2.2.1 Support instructors in their research projects.

2.2.2 Support instructors publishing in national and international conferences and journals.

2.2.3 Support instructors to attend meetings, training sessions, seminars and studies at other institutes and organizations.

Section 7 Quality Assurance

1. Regulatory Standard

1.1. The program follows the regulations of Thailand's Ministry of Education relevant to the development and management of postgraduate academic programs such as

- Office of the Higher Education Commission's Postgraduate Curriculum Standard Criterion B.E. 2558.
- Office of the Higher Education Commission's Guidelines for Managing Postgraduate Curriculum Standard Criterion B.E. 2558.
- Mahidol University Regulations for Postgraduate Studies B.E. 2556.
- Office of the Higher Education Commission's Thai Qualifications Framework for Higher Education B.E. 2552 and related guidelines (B.E. 2552, 2554, 2558).

The quality of the program is assured by identifying performance indicators for evaluating effectiveness and efficiency in accordance with the regulations mentioned above.

The program also follows the visions, goals, strategies and regulations of Mahidol University in order to ensure the students are produced according to the demand of the country, and who will contribute to the society. The regulations include the establishment of a program administrative committee consisting of 3 responsible faculty appointed by the Faculty of ICT. This will plan the teaching strategies along with the adminstrators of the Faculty of ICT, as well as follow-up and collect performance data in order to continuously improve the program.

The teaching and learning approach follows the educational goals of the Faculty of ICT and Mahidol University. The expected learning outcomes of students, the program structure, teaching methods, and assessment methods are regularly reviewed with all stakeholders, including current students, alumni, teachers and employers in order to ensure that the program is up-to-date and correspond to the demands of stakeholders. The expected learning outcomes are monitored and adjusted to satisfy the demands of employers. Teaching and assessment methods are adjusted in order to support the achievement of the expected learning outcomes for students in the form of quality learning through the regular revision of program (at least once every five years).

To promote quality learning, the program committee and teachers spearhead the development and improvement of a teaching-learning plan through the revision of program (TQF 2) and creating a learning environment that enables individuals to learn and participate. The program must be flexible and enable learners to make meaningful choices in terms of subject content, programme

routes, approaches to assessment and modes and duration of study. The teaching and learning approach should promote learning, learning how to learn, and instil in students a commitment to lifelong learning (e.g. commitment to critical inquiry, information-processing skills, a willingness to experiment with new ideas and practices, etc.) under the five learning objectives of the Ministry of Education, including ethics, body of knowledge, problem-solving skills, teamwork and analytical, IT and communication skills.

The quality of the program is managed, assessed and monitored according to the Office of Higher Education Commission's Thai Qualifications Framework for Higher Education B.E. 2552 and its related guidelines (B.E. 2552, 2554, 2558), Internal Quality Assurance B.E. 2557, and ASEAN University Network-Quality Assurance (AUN-QA).

1.2. The planning development and evaluation of the program according to the time duration specified in the regulations of the Ministry of Education. Each year, the program submits an annual program evaluation report, TQF 7, to Mahidol University and Ministry of Education. The program is also updated every 5 years.

1.3. The program follows the Internal Quality Assurance regulations of the Office of the Higher Education Commission as follows

1.3.1. At least 50 percent of the program's responsible faculty members are involved in meetings for planning, follow-up and review of the operation of the program.

1.3.2. The program produces TQF 2 document (this document) in accordance to Office of the Higher Education Commission's Thai Qualifications Framework for Higher Education.

1.3.3. The program produces TQF 3 and TQF 4 documents describing the details of each course prior to the start of each semester.

1.3.4. The program reports the results of the operations of each course in the form of TQF 5 and TQF 6 after the end of each semester according to the regulations of the Faculty of Graduate Studies.

1.3.5. The program submits the reports describing the performance evaluation of all courses and the entire program according to the regulations of the Faculty of Graduate Studies.

2. Graduates

To produce quality graduates, the program follows the regulations of Thailand's Ministry of Education relevant to the development and management of postgraduate academic programs such as

- Office of the Higher Education Commission's Postgraduate Curriculum Standard Criterion B.E. 2558.

- Office of the Higher Education Commission's Guidelines for Managing Postgraduate Curriculum Standard Criterion B.E. 2558.
- Mahidol University Regulations for Postgraduate Studies B.E. 2556.
- Office of the Higher Education Commission's Thai Qualifications Framework for Higher Education B.E. 2552 and related guidelines (B.E. 2552, 2554, 2558).

The program measures graduate quality with respect to the program's expected learning outcomes in order to align graduates' competencies with the demands of employers. The quality of the graduates is managed, assessed and monitored according to the Office of Higher Education Commission's Thai Qualifications Framework for Higher Education B.E. 2552 and its related guidelines (B.E. 2552, 2554, 2558), Internal Quality Assurance B.E. 2557, Baldrige's Education Performance Excellence (EdPEx) and ASEAN University Network-Quality Assurance (AUN-QA) via performance indicators of each regulatory standard. In addition, the program includes employability-related performance indicators such as employer's satisfaction level and ability of graduates evaluated by employers and graduates themselves.

3. Students

The quality of graduate students is managed according to the Office of Higher Education Commission's Thai Qualifications Framework for Higher Education B.E. 2552 and its related guidelines (B.E. 2552, 2554, 2558), Internal Quality Assurance B.E. 2557, Baldrige's Educational Performance Excellence (EdPEx) and ASEAN University Network-Quality Assurance (AUN-QA).

The program ensures that the students achieve the expected learning outcomes with good performance by regularly monitoring student learning. The program collects information concerning student quality as performance indicators according to the following regulations:

- Student intake policy and admission criteria are clearly defined in this curriculum document (section 2) and the program admits students according to the policy under supervision of the Faculty of Graduate Studies.
- The program together with the Faculty of Graduate Studies provide adequate student monitoring system to follow up on student's academic performance and progress as well as their involvement in extracurricular activities.
- The program provides clear student performance indicators, reflecting the students' learning outcomes in section 2 and characteristics in section 4, along with clear assessment methods for each indicator. Students are informed of the assessments that the program uses so they know what is expected of them.

- The program committee regularly reviews student performance indicators in addition to instructor's grade evaluation reports. The Faculty of ICT and the Faculty of Graduate Studies also monitor student progress and the assessment methods of the program every semester through the student information system in order to ensure effectiveness.
- The program assigns an academic advisor for each student to help students improve their learning ability and achieve their learning outcomes effectively.

The program committee will make adjustment in the management of the program, including teaching strategies, expected learning outcomes, facilities, and staff in order to ensure that students achieve expected learning outcomes.

4. Academic Staff

The program ensures that the instructors effectively deliver program content which leads to students' achievement of the expected learning outcomes with good performance by regularly monitoring instructors' performance and encouraging instructors to participate career development programs. The management of academic staff follows the regulations of Thailand's Ministry of Education relevant to the development and management of postgraduate academic programs such as

- Office of the Higher Education Commission's Postgraduate Curriculum Standard Criterion B.E. 2558.
- Office of the Higher Education Commission's Guidelines for Managing Postgraduate Curriculum Standard Criterion B.E. 2558.
- Mahidol University Regulations for Postgraduate Studies B.E. 2556.
- Office of the Higher Education Commission's Thai Qualifications Framework for Higher Education B.E. 2552 and related guidelines (B.E. 2552, 2554, 2558).
- Office of the Higher Education Commission's Internal Quality Assurance B.E. 2557
- Baldrige's Educational Performance Excellence (EdPEx)
- ASEAN University Network-Quality Assurance (AUN-QA).

a. Intake and selection of academic staff

Both short-term and long-term planning for academic staff including recruitment, career development and contingency planning (including succession, promotion, re-deployment, termination, and retirement plans) are carried out to ensure that the quality and quantity of academic staff fulfil the needs for education, research and service required by Mahidol University. The staff-to-student ratio and workload are properly planned, measured and monitored in order to improve the quality of education, research and service.

b. The development of academic staff

Training and development needs for academic staff are systematically identified, and appropriate training and development activities are promoted to fulfil the identified needs. New faculty members will be provided teacher orientation programs. While all faculty members usually conduct self-study to keep up with new knowledge and technology, they are encouraged to participate in academic development programs annually including participating in conferences, workshops and seminars.

Competences of academic staff are identified and evaluated. A competent academic staff member will be able to:

- Design and deliver a coherent teaching and learning curriculum, and have the ability to express it in teaching documents, according to the requirements of the Ministry of Education including but not limited to TQF3, TQF5 and TQF7.
- Apply a range of teaching and learning methods and select the most appropriate assessment methods to achieve the expected learning outcomes.
- Develop and use a variety of instructional media.
- Monitor and evaluate their own teaching performance and evaluate the courses they deliver.
- Reflect upon their own teaching practices.
- Conduct research and provide services to benefit stakeholders

c. Support for the Production of Academic Outputs

The program supports research activities conducted by academic staff. The academic outputs are established, monitored and benchmarked for improvement. Faculty members are encouraged to use some of the findings of their research to improve and update course content and student research activities. Performance appraisal strategies such as rewards and recognition are implemented to motivate and support academic, research and service activities.

d. Career development

Mahidol University and the Faculty of ICT support career development of academic staff by providing academic promotion ladders, research grants, conference travel grants, academic training, and curriculum management.

e. Engagement Development

Mahidol University and Faculty of ICT encourage academic staff to participate in university and faculty activities in order to engage academic staff in university mission and plan.

f. Special Faculty Appointment

The program recognizes the importance of education diversification especially from private industry and researchers from other areas. Occasionally, the program invites experts and technicians from public and private sectors to provide knowledge and skills used in industry and other areas. The qualifications of the external experts follow the aforementioned regulations.

5. Curriculum, Teaching and Learning, and Learner's evaluation

5.1. Curriculum

The program designs the curriculum based on the Outcome Based Education (OBE) principles which focuses on the development of graduates to meet the demands of employers according to the present and future market based on stakeholder surveys and trends of technology, economy, social, and culture. The stakeholders include faculty members, employers, alumni, current students, and recent graduates. The demand of employers is converted into expected learning outcomes that graduates must achieve.

5.2. Teaching and Learning

The program director designs the study plans of students in each academic year and plans the courses that will be offered, including course instructors and facilities, in order to ensure students achieve the expected learning outcomes. Students can freely choose elective courses under the guidance of an academic advisor and the program director in order to purse individual academic interests. The teaching methods and learning facility are regularly reviewed in program committee meetings.

5.3. Learner's Evaluation

Students' performance in courses is measured as grades. Students' academic advisors and the program committee regularly review students' performance every semester and advise students to achieve expected learning outcomes and graduate within the plan of study. The program director reports the students' performance to the faculty committee and the Faculty of Graduate Studies for faculty-wide and university-wide review of students' performance.

6. Learning Support

The program, through the Faculty of ICT, offers quality learning spaces, classrooms, equipment, materials and information technology to support student learning and development, as well as teacher and research development. Environmental, health and safety standards and access for people are fundamental to running of the program. The supporting resources are regularly updated and monitored to ensure their availability and their relevance to the objective of the program.

Information technology systems including hardware, software and network are key to the quality learning of the program. Key systems such as the student information system, learning management system, computing and networking tools are provided to students in order to ensure that students effectively achieve the learning outcomes, and teachers can prepare and conduct teaching, research, services and administration effectively. Mahidol University provides access to information resources through the university library via both online and physical channels.

The quality of the learning support follows the Office of the Higher Education Commission's Thai Qualifications Framework for Higher Education B.E. 2552 and its related guidelines (B.E. 2552, 2554, 2558), Internal Quality Assurance B.E. 2557, and ASEAN University Network-Quality Assurance (AUN-QA).

7. Key Performance Indicators

The Master of Science in Computer Science program, Faculty of Information and Communication Technology, uses key performance indicators based for the curriculum according to the standards of the Thai Qualifications Framework. These are subject to the following conditions: (1) the compulsory performance indicators (numbers 1-5) must meet or exceed expectations for at least two consecutive years, and (2) at least 80% of all performance indicators must meet expectations or exceed each year. The Key Performance Indicators are as follows:

Key Performance Indicators	Academic Year				
	2020	2021	2022	2023	2024
1. At least 50% of faculty members responsible for the curriculum participate in a curriculum meeting in order to plan, follow-up and review the operation of the curriculum.	✓	✓	✓	✓	✓
2. The program has the details of the curriculum according to TQF2, which is associated with the Thai Qualifications Framework.	✓	✓	✓	✓	✓
3. The program has course specifications and field experience specifications (if any) according to TQF3 and TQF4 before the beginning of each trimester.	✓	✓	✓	✓	✓
4. Instructors must produce course reports and file experience reports (if any) according to TQF5 and TQF6 within 30 days after the end of each semester.	✓	✓	✓	✓	✓
5. Instructors must produce program reports according to TQF7 within 60 days after the end of each academic year.	✓	✓	✓	✓	✓

Key Performance Indicators	Academic Year				
	2020	2021	2022	2023	2024
6. Instructors revise the grading of students according to the learning standards indicated in TQF3 and TQF4 (if any) for at least 25 percent of courses that are offered each academic year.	✓	✓	✓	✓	✓
7. Instructors must assess the development and/or improvement of teaching methods, teaching techniques or the grading system from the evaluation results in TQF 7 of the previous year.	–	✓	✓	✓	✓
8. Every new instructor (if any) participates in orientation or otherwise receives adequate information on the college's teaching requirements.	✓	✓	✓	✓	✓
9. Full-time instructors in the curriculum receive academic and/or profession development at least once a year.	✓	✓	✓	✓	✓
10. At least 50 percent of supporting staff (if any) receive academic and/or professional development each year.	✓	✓	✓	✓	✓
11. The average satisfaction score for curriculum quality from the previous year's students and new graduates is at least 3.5 out of 5.	–	✓	✓	✓	✓
12. The average satisfaction score from employers of new graduates is at least 3.5 out of 5.	–	–	✓	✓	✓

Section 8 Evaluation and Improvement of the Curriculum Implementation

1. Evaluation on the Teaching Efficiency

1.1 Evaluation of Teaching Strategies

1.1.1 Analysis of students' evaluation of courses and instructors.

1.1.2 Analysis of TQF5 evaluated by course instructors.

1.2 Evaluation of Instructors' Skills in Using Teaching Strategies

1.2.1 Analysis of students' evaluation of courses and instructors.

1.2.2 Analysis of TQF5 evaluated by course instructors.

2. Overall Evaluation of the Curriculum

2.1 Survey instructors' opinions toward students and vice versa.

2.2 Survey on jobs of graduates from graduates and employers.

2.3 Curriculum evaluation from internal and external experts according to the Office of the Higher Education Commission's Internal Quality Assurance B.E. 2557, and ASEAN University Network-Quality Assurance (AUN-QA).

2.4 Survey on employer satisfaction with graduates.

3. Evaluation of Curriculum Implementation in Accordance with the Curriculum

Evaluation is made annually by the program chair according to the key performance indicators of section 7, item 7. The criteria of curriculum evaluation are

- "Fair" means the first 10 key performance indicators were not achieved.
- "Good" means the first 10 key performance indicators were achieved but not all key performance indicators are achieved.
- "Excellent" means the program satisfies achieves all key performance indicators

4. Review of the Evaluation and Plans for Improvement

4.1 Collecting all information, advice, and evaluations from new graduates, users/stakeholders, and experts.

4.2 Review and analysis of the above information by the program committee.

4.3 Presenting the evaluation report and improvement plan for the program as TQF7 and AUN-QA documents.

APPENDIX A

Course Description

Appendix A
Course Description

1. Required Courses

Credits (lecture – practice – self-study)

ITCS 509 Research Methodology in Computer Science 2 (2-0-4)

ทสคพ 509 วิทยาระเบียบวิธีวิจัยด้านวิทยาการคอมพิวเตอร์

Research development process and methodology; research design and planning; experimental design; data gathering; sampling; data management; statistical data analysis; reviewing research works; writing research proposals; qualitative and quantitative research methodology; writing conclusions and reports of research in computer science; research ethics

กระบวนการพัฒนางานวิจัยและระเบียบวิธีวิจัย การวางแผนและออกแบบงานวิจัย การออกแบบการทดลอง การรวบรวมข้อมูล การสุ่มตัวอย่าง การจัดการข้อมูล การวิเคราะห์ข้อมูลเชิงสถิติ การทบทวนงานวิจัย การเขียนโครงร่างงานวิจัย วิธีวิจัยเชิงปริมาณและเชิงคุณภาพ การเขียนสรุปและรายงานงานวิจัยทางวิทยาการคอมพิวเตอร์ จริยธรรมในการวิจัย

ITCS 521 Agile Software Product Management 3 (3-0-6)

ทสคพ 521 การจัดการผลิตภัณฑ์ซอฟต์แวร์แบบอไจล์

Agile values, principles and practices; managing an agile team: roles and responsibilities; product discovery; agile planning for software products; agile development process; testing with agile; agile metrics; concept of continuous integration and delivery; practice of agile development to a real-world software development project

คุณค่า หลักการ และการปฏิบัติแบบอไจล์ การจัดการทีมอไจล์ บทบาทและความรับผิดชอบ การค้นพบผลิตภัณฑ์ การวางแผนแบบอไจล์สำหรับผลิตภัณฑ์ซอฟต์แวร์ กระบวนการการพัฒนาแบบอไจล์ การทดสอบแบบอไจล์ มาตรวัดแบบอไจล์ แนวคิดของการรวมและการส่งมอบอย่างต่อเนื่อง การฝึกปฏิบัติการพัฒนาแบบอไจล์กับโครงการพัฒนาซอฟต์แวร์ในโลกแห่งความจริง

ITCS 522 Edge Computing and Internet of Things 3 (3-0-6)

ทสคพ 522 การประมวลผลใกล้แหล่งข้อมูลและอินเทอร์เน็ตของสรรพสิ่ง

Principles of the Internet of Things (Internet of Things) and edge computing; Internet of Things communication and protocol; the embedded and autonomous systems; sensors and actuators; wireless sensor networks; Internet of Things data streaming and management; short-range and long-range wireless protocols; Internet of Things and cloud infrastructure; applications of Internet of Things

หลักการของอินเทอร์เน็ตของสรรพสิ่ง และการประมวลผลใกล้แหล่งข้อมูล การสื่อสารและข้อตกลงของอินเทอร์เน็ตของสรรพสิ่ง ระบบฝังตัวและอัตโนมัติ ตัวจับสัญญาณและตัวกระตุ้นให้ทำงาน เครือข่ายตัวจับสัญญาณไร้สาย การส่งและจัดการข้อมูลอินเทอร์เน็ตของสรรพสิ่ง ข้อตกลงการสื่อสารแบบไร้สายทั้งระยะใกล้และไกล โครงสร้างพื้นฐานของอินเทอร์เน็ตของสรรพสิ่งและระบบคลาวด์ โปรแกรมประยุกต์อินเทอร์เน็ตของสรรพสิ่ง

ITCS 523 Data Sciences Essentials 3 (3-0-6)

ทสคพ 523 ส่วนสำคัญของวิทยาการข้อมูล

An overview of data science principles; data science applications and tools; foundation of mathematics for data science; foundation of computer algorithms for data science; artificial intelligence and machine learning techniques for data science; fundamentals of databases and big data; understanding of big data and domain knowledge; extract/transform/load (ETL) for big data; exploratory data analysis and data visualization; research challenges associated with data science

หลักการของวิทยาการข้อมูล การประยุกต์วิทยาการข้อมูลและเครื่องมือทางวิทยาการข้อมูล รากฐานทางคณิตศาสตร์สำหรับวิทยาการข้อมูล รากฐานระเบียบวิธีทางคอมพิวเตอร์สำหรับวิทยาการข้อมูล เทคนิคทางปัญญาประดิษฐ์และการเรียนรู้เชิงเครื่องจักรสำหรับวิทยาการข้อมูล พื้นฐานของระบบฐานข้อมูลและข้อมูลขนาดใหญ่ การทำความเข้าใจความหมายของข้อมูลขนาดใหญ่และความรู้ในแต่ละสาขา การสกัดข้อมูล การแปลงข้อมูล และการดึงข้อมูลสำหรับข้อมูลขนาดใหญ่ การวิเคราะห์ข้อมูลเชิงสำรวจ การนำเสนอข้อมูลในรูปแบบของภาพ ความท้าทายเชิงวิจัยที่เกี่ยวข้องกับวิทยาการข้อมูล

ITCS 603 Seminar in Computer Science 1 (1-0-2)

ทสคพ 603 การสัมมนาทางวิทยาการคอมพิวเตอร์

Seminar on current research in computer science; in-depth analysis and application of scientific methods in computer science; presentation of research findings for the computer science community; professional ethics of computer scientists

การสัมมนาบทความวิจัยปัจจุบันทางวิทยาการคอมพิวเตอร์ วิธีการวิเคราะห์เชิงลึกและการประยุกต์ใช้วิธีทางวิทยาศาสตร์สำหรับวิทยาการคอมพิวเตอร์ การนำเสนอผลงานวิจัยในกลุ่มประชาคมด้านวิทยาการคอมพิวเตอร์ จริยธรรมวิชาชีพของนักวิทยาการคอมพิวเตอร์

ITCS 659 Multimedia Technologies and Applications 3 (3-0-6)

ทสคพ 659 เทคโนโลยีและการประยุกต์งานสื่อผสม

Multimedia data, systems, technologies; multimedia design and development; digital media delivery; multimedia programming; programming tools and environments; software libraries related to image and video processing; computer vision and computer graphics libraries; research issues in multimedia technologies

ข้อมูลสื่อผสม ระบบสื่อผสม เทคโนโลยีสื่อผสม การออกแบบและพัฒนาสื่อผสม การส่งข้อมูลสื่อในระบบดิจิตอล การเขียนโปรแกรมสื่อผสม เครื่องมือและสภาพแวดล้อมในการเขียนโปรแกรม ห้องสมุดซอฟต์แวร์ที่เกี่ยวข้องกับการประมวลผลภาพและวิดีทัศน์ ห้องสมุดโปรแกรมเกี่ยวกับคอมพิวเตอร์วิทัศน์และคอมพิวเตอร์กราฟิกส์ ประเด็นงานวิจัยด้านเทคโนโลยีและการประยุกต์ใช้สื่อผสม

ITCS 661 Advanced Artificial Intelligence 3 (3-0-6)

ทสคพ 661 ปัญญาประดิษฐ์ขั้นสูง

Principles, methodology and applications of artificial intelligence; ai agents; problem solving and search; heuristic strategies; constrained satisfaction problems; knowledge representation and reasoning; probabilistic and statistical inference; expert systems; fuzzy logic; evolutionary computing; artificial neural networks; learning theory and practice; ai technologies and applications

หลักการ ระเบียบวิธี และการประยุกต์ใช้ปัญญาประดิษฐ์ ระบบตัวแทนทางปัญญาประดิษฐ์ การแก้ปัญหาและการค้นหา กลยุทธการแก้ปัญหา ปัญหาเชิงความพึงพอใจโดยมีข้อจำกัด การแสดงความรู้และการใช้เหตุผล การอนุมานทางความน่าจะเป็นและสถิติ ระบบผู้เชี่ยวชาญ ตรรกะคลุมเครือ การคำนวณเชิงวิวัฒนาการ โครงข่ายประสาทเทียม ทฤษฎีการเรียนรู้และการฝึกหัด เทคโนโลยีและการประยุกต์ใช้ปัญญาประดิษฐ์

2. Elective Courses

Credits (lecture – practice – self-study)

ITCS 503 Design and Analysis of Algorithms 3 (3-0-6)

ทสคพ 503 การออกแบบและวิเคราะห์ขั้นตอนวิธี

Basic data structures: sets, arrays, strings, queues, stacks, trees, graphs; design and evaluation of algorithms; searching; sorting; hashing; brute-force algorithms; greedy algorithms; divide-and-conquer; backtracking; heuristics; graph algorithms; string matching algorithms; arithmetic algorithms; geometric algorithms; parallel algorithms

โครงสร้างข้อมูลพื้นฐาน เซท แถวลำดับ สายอักขระ คิว กองซ้อน ต้นไม้ กราฟ การออกแบบและการประเมินผลของขั้นตอนวิธี การค้นหา การจัดเรียงลำดับ การทำแฮช ขั้นตอนวิธีเชิงการใช้กำลังบังคับ ขั้นตอนวิธีเชิงตะกละ การแบ่งและชนะ การย้อนถอยหลัง วิทยาการศึกษาสำนึก ขั้นตอนวิธีเชิงกราฟ ขั้นตอนวิธีสำหรับการจับคู่สายอักขระ ขั้นตอนวิธีเชิงเลข ขั้นตอนวิธีเชิงเรขาคณิต ขั้นตอนวิธีเชิงขนาน

ITCS 504 Computer System Organization and Architecture 3 (3-0-6)

ทสคพ 504 สถาปัตยกรรมและการจัดระบบคอมพิวเตอร์

Architecture and organization of the computer systems; basic components of computers; memory system organization; memory components; memory hierarchy and interleaving; cache memory; virtual memory; input and output systems; storage systems; processor design; multiprocessors; graphic processing units; parallel architecture

สถาปัตยกรรมและการจัดระบบคอมพิวเตอร์ ส่วนประกอบพื้นฐานของเครื่อง คอมพิวเตอร์ การจัดระบบหน่วยความจำ องค์ประกอบหน่วยความจำ การจัดลำดับชั้นและการแทรกสลับของหน่วยความจำ หน่วยความจำแคช หน่วยความจำเสมือน ระบบการรับเข้าและส่งออกข้อมูล ระบบการเก็บข้อมูล การออกแบบหน่วยประมวลผล หน่วยประมวลผลหลายหน่วย หน่วยประมวลผลข้อมูลกราฟฟิกส์ สถาปัตยกรรมเชิงขนาน

ITCS 507 Mathematical Foundations for Computer Science 3 (3-0-6)
ทสคพ 507 พื้นฐานทางคณิตศาสตร์สำหรับวิทยาการคอมพิวเตอร์

Sets, functions, relations, numbers, inequalities; polynomials and basic algebra; trigonometry; exponentials and logarithms; induction and recursion; counting techniques; probability; sequences, series and limits; fundamental calculus

พื้นฐานเซ็ท ฟังก์ชั่น ความสัมพันธ์ จำนวน ความไม่เท่ากัน พหุนามและพีชคณิตพื้นฐาน ตรีโกณมิติ เอกโปเนนเชียลและลอการิทึม อุปนัยและการเรียกซ้ำ เทคนิคการนับ ความน่าจะเป็น ลำดับ ชุดจำนวนและขีดจำกัด แคลคูลัสพื้นฐาน

ITCS 513 Project Management 3 (3-0-6)
ทสคพ 513 การจัดการโครงการ

Planning, staffing, implementation, control and evaluation of a project; choices of process models; project scheduling and processes; working team organization; quality assurance; resource allocation; scheduling presentations and tools; project documentation; management of computer-based projects; computerized techniques and software used for project management; ethics in project management; research issues in project management

การวางแผน การจัดกำลังบุคลากร การดำเนินการ การควบคุมและการประเมินโครงการ ตัวเลือกแบบจำลองกระบวนการ การจัดตารางการทำงานและขั้นตอนการดำเนินงาน โครงสร้างของคณะทำงาน การประกันคุณภาพ การจัดสรรทรัพยากร เครื่องมือและรูปแบบของตารางการทำงาน การจัดทำเอกสารโครงการ การจัดการโครงการคอมพิวเตอร์ เทคนิคทางคอมพิวเตอร์และซอฟต์แวร์ที่ใช้สำหรับการจัดการโครงการ จรรยาบรรณในการจัดการโครงการ ประเด็นงานวิจัยด้านการจัดการโครงการ

ITCS 517 Machine Learning 3 (3-0-6)
ทสคพ 517 การเรียนรู้เชิงเครื่องจักร

Supervised learning for classification and regression; unsupervised learning such as clustering and kernel methods; reinforcement learning and adaptive control; mathematical and statistical analysis concepts underlying machine learning algorithms; numerical methods and optimization related to performance of machine learning algorithms and systems

การเรียนรู้แบบดูแลสำหรับการจำแนกกลุ่มและการวิเคราะห์การถดถอย การเรียนรู้แบบไม่ดูแล เช่น การจัดกลุ่ม วิธีการเคอร์เนล การเรียนรู้แบบเสริมและการควบคุมการปรับ แนวคิดการวิเคราะห์เชิงคณิตศาสตร์และสถิติที่สนับสนุนระเบียบวิธีการเรียนรู้เชิงเครื่องจักร ระเบียบวิธีและการเพิ่มประสิทธิภาพเชิงตัวเลขที่เกี่ยวข้องกับประสิทธิภาพของขั้นตอนวิธีและระบบการเรียนรู้เชิงเครื่องจักร

ITCS 518 Image Analysis and Understanding 3 (3-0-6)

ทสคพ 518 วิเคราะห์และความเข้าใจภาพ

Image formation and acquisition; pixels and cameras; light and colors; interpolation and convolution; filtering in spatial and frequency domain; image de-noising and restoration; edge and corner detection; shape and texture; morphology and transformation; projective geometry for image analysis; depth recovery; surface reconstruction; perceptual grouping and scene understanding

การสร้างและการได้มาของภาพ พิกเซลและกล้อง แสงและสี การแทรกและการบิดภาพ การกรองภาพเชิงพื้นที่และเชิงความถี่ การลดสัญญาณรบกวนในภาพและการบูรณะภาพ การตรวจจับขอบและมุมในภาพ ลักษณะเชิงรูปร่างและแก่นสารของภาพ ลักษณะทางสัณฐานวิทยาของภาพและการเปลี่ยนแปลงภาพ การคาดการณ์ลักษณะทางเรขาคณิตของภาพเพื่อวิเคราะห์เชิงภาพฉาย การฟื้นฟูความลึกของภาพ การบูรณะพื้นผิว การจัดกลุ่มเชิงความหมายและความเข้าใจทัศนียภาพ

ITCS 551 Service Oriented and Cloud Computing 3 (3-0-6)

ทสคพ 551 การคำนวณเชิงบริการและคลาวด์

Concepts, theories, and techniques for service-oriented computing; web services and service-oriented architecture (soa); web service composition; description, discovery, and engagement of web services; cloud computing; cloud architecture and components; system virtualization; cloud services; cloud characteristics such as elasticity, self-service provisioning, standards based interfaces and pricing models; cloud security, threats, and privacy

หลักการ ทฤษฎี และเทคนิคสำหรับการคำนวณเชิงบริการ การบริการทางเว็บและสถาปัตยกรรมเชิงบริการ องค์ประกอบการบริการทางเว็บ การบรรยาย การค้นพบ และการมีส่วนร่วมของการบริการทางเว็บ การคำนวณแบบคลาวด์ สถาปัตยกรรมและส่วนประกอบของคลาวด์ ระบบเสมือนจริง การบริการของคลาวด์ คุณลักษณะของคลาวด์ เช่น ความยืดหยุ่น การให้บริการตนเอง รูปแบบการติดต่อมาตรฐานและรูปแบบการคิดราคา ความมั่นคงแบบคลาวด์ ภัยคุกคาม และความเป็นส่วนตัว

ITCS 552 Mobile and Pervasive Computing 3 (3-0-6)

ทสคพ 552 การคำนวณแบบเคลื่อนที่และทุกที่

Mobile networks; adhoc networks; wireless networks; mobile and pervasive applications; mobile data access; naming and service discovery; adaptive applications; consistency management; energy-aware systems and energy management; location and context awareness; personalized context aware services; sensor networks; sensor-based and context-aware systems; invisibility; localized scalability; uneven conditioning; social networking; mobile computing on clouds; security and privacy

เครือข่ายเคลื่อนที่ เครือข่ายไม่มีระเบียบ เครือข่ายไร้สาย การประยุกต์งานเชิงเคลื่อนที่และทุกที่ การเข้าถึงข้อมูลแบบเคลื่อนที่ การค้นพบชื่อและการบริการ การประยุกต์งานเชิงปรับเปลี่ยน การจัดการความสม่ำเสมอระบบที่ตระหนักถึงพลังงานและการจัดการพลังงาน ความตระหนักถึงเนื้อหาและตำแหน่ง การบริการที่ตระหนักถึงเนื้อหาส่วนบุคคล เครือข่ายอุปกรณ์รับรู้ ระบบที่ตระหนักถึงเนื้อหาและการรับรู้ การมองไม่เห็น การขยายตัวในพื้นที่ เงื่อนไขที่ไม่เท่ากัน เครือข่ายสังคม การคำนวณแบบเคลื่อนที่บนคลาวด์ ความมั่นคงและความเป็นส่วนตัว

ITCS 554 Information Security Management 3 (3-0-6)

ทสคพ 554 การจัดการความมั่นคงของสารสนเทศ

Access control principles, policies, issues, and administration; communication security on telecommunication networks; network security and internet security; risk management and business continuity planning; security policy, standards and organization; computer architecture and system security; law; investigation and ethics; application program security; cryptography; computer operations security; physical security; disaster recovery plans and management; information technology auditing

หลักการและนโยบายควบคุมการเข้าถึง ประเด็นและการบริหาร ความมั่นคงของเครือข่ายบนเครือข่ายสื่อสารระยะไกล ความมั่นคงของเครือข่ายและความมั่นคงของอินเทอร์เน็ต การจัดการความเสี่ยงและการวางแผนธุรกิจแบบต่อเนื่อง นโยบาย มาตรฐาน และองค์ประกอบของความมั่นคง สถาปัตยกรรมคอมพิวเตอร์และความมั่นคงของระบบ กฎหมาย การสอบสวนและจริยธรรม ความมั่นคงของโปรแกรมประยุกต์ ทฤษฎีการเข้ารหัส ความมั่นคงของการปฏิบัติงานคอมพิวเตอร์ ความมั่นคงทางกายภาพ แผนการและการจัดการกู้คืนภัยพิบัติ การตรวจสอบด้านเทคโนโลยีสารสนเทศ

ITCS 612 Network Programming 3 (3-0-6)

ทสคพ 612 การโปรแกรมเครือข่าย

Principles of network application and implementation; process-to-process communications; distributed architectures; implementation of web applications and services; implementation of mobile applications

หลักการของการประยุกต์ใช้และการพัฒนาแอปพลิเคชั่นทางระบบเครือข่าย การสื่อสารระหว่างหน่วยประมวลผล สถาปัตยกรรมแบบกระจาย การพัฒนาระบบเว็บและการให้บริการ การพัฒนาระบบสำหรับอุปกรณ์สื่อสารเคลื่อนที่

ITCS 613 Tools and Environments for Software Development 3 (3-0-6)

ทสคพ 613 เครื่องมือและสภาพแวดล้อมสำหรับการพัฒนาซอฟต์แวร์

Tools and environments for software engineering tasks; version and configuration management; build and testing tools; continuous integration and continuous delivery tools; debugging and profiling tools; software analysis; code auditing

เครื่องมือและสภาพแวดล้อมสำหรับงานวิศวกรรมซอฟต์แวร์ การจัดการเวอร์ชันและองค์ประกอบ เครื่องมือสำหรับการสร้างและการทดสอบ เครื่องมือสำหรับการรวมและการส่งมอบอย่างต่อเนื่อง เครื่องมือในการแก้จุดบกพร่องและโปรไฟล์ การวิเคราะห์ซอฟต์แวร์ การตรวจสอบรหัส

ITCS 615 Empirical Software Engineering 3 (3-0-6)
ทสคพ 615 วิศวกรรมซอฟต์แวร์เชิงประจักษ์

Empirical methods applied to the field of software engineering; quantitative and qualitative evaluation methods in software engineering; applications of machine learning and data analysis to mining software repositories

วิธีเชิงประจักษ์ที่ประยุกต์ใช้กับสาขาวิชาวิศวกรรมซอฟต์แวร์ วิธีการประเมินเชิงปริมาณและเชิงคุณภาพในวิศวกรรมซอฟต์แวร์ การประยุกต์ใช้การเรียนรู้เชิงเครื่องจักรและการวิเคราะห์ข้อมูลเพื่อขุดค้นที่เก็บซอฟต์แวร์

ITCS 621 Database Design and Administration 3 (3-0-6)
ทสคพ 621 การออกแบบและการบริหารฐานข้อมูล

Principles of database design; relational model; data semantics; logical and physical design; database administration; transaction processing; query processing and optimization; data storage management; advanced indexing techniques; database recovery and backup; database performance evaluation; object oriented databases; modern database models; column-based databases; database security and privacy; ethics and legal issues; research issues in database design

หลักการการออกแบบฐานข้อมูล ตัวแบบความสัมพันธ์ ความหมายของข้อมูล การออกแบบเชิงตรรกะและเชิงกายภาพ การบริหารฐานข้อมูล การประมวลผลรายการที่เปลี่ยนแปลง การประมวลผลข้อคำถามและการหาค่าเหมาะที่สุด การจัดการที่เก็บข้อมูล เทคนิคการทำดัชนีขั้นสูง การกู้และการสำรองฐานข้อมูล การประเมินประสิทธิภาพของฐานข้อมูล ฐานข้อมูลเชิงวัตถุ ตัวแบบฐานข้อมูลที่ทันสมัย ฐานข้อมูลเชิงคอลัมน์ ความมั่นคงและความเป็นส่วนตัวของฐานข้อมูล ประเด็นทางจริยธรรมและกฎหมาย ประเด็นงานวิจัยด้านการออกแบบฐานข้อมูล

ITCS 628 Data Mining and Knowledge Discovery 3 (3-0-6)
ทสคพ 628 เหมืองข้อมูลและการค้นพบความรู้

Data mining concepts; knowledge discovery processes; data preparation; data mining techniques and algorithms; frequent patterns and association; classification; cluster analysis; case studies of data mining applications; advanced techniques of data mining; web mining; text mining; stream data mining; sequence data mining; data mining visualization

แนวคิดการทำเหมืองข้อมูล กระบวนการค้นพบองค์ความรู้ การเตรียมข้อมูล เทคนิคและวิธีการการทำเหมืองข้อมูล การเชื่อมโยงและรูปแบบที่พบบ่อย การแบ่งประเภท การวิเคราะห์กลุ่มข้อมูล กรณีศึกษาของการประยุกต์เหมืองข้อมูล เทคนิคขั้นสูงของการทำเหมืองข้อมูล การทำเหมืองข้อมูลเว็บ การทำเหมืองข้อความ การทำเหมืองข้อมูลเชิงสาย การทำเหมืองข้อมูลเชิงต่อเนื่อง การทำให้เห็นภาพเหมืองข้อมูล

ITCS 631 Computer Communications and Networks 3 (3-0-6)

ทสคพ 631 เครือข่ายสื่อสารคอมพิวเตอร์

Computer networks models; network components; network architectures; local area and wide area networks; network topologies; data link, network, and transport protocols; point-to-point networks; wireless networks; broadband networks; routing and congestion control; application layer protocols; naming; internetworking; network programming and applications; research issues in computer communications and networks

ตัวแบบของเครือข่ายคอมพิวเตอร์ ส่วนประกอบของเครือข่าย สถาปัตยกรรมของเครือข่าย เครือข่ายระยะใกล้และระยะไกล รูปแบบเครือข่าย ข้อตกลงในระดับเชื่อมโยงข้อมูล ระดับเครือข่ายและระดับส่งผ่านข้อมูล เครือข่ายแบบจุดต่อจุด เครือข่ายไร้สาย เครือข่ายความเร็วสูง การควบคุมการจัดเส้นทางและการอัดแน่น กติการะดับการใช้งาน การตั้งชื่อ การเชื่อมระหว่างเครือข่าย โปรแกรมประยุกต์และการเขียนโปรแกรมด้านเครือข่าย ประเด็นงานวิจัยด้านเครือข่ายสื่อสารข้อมูลคอมพิวเตอร์

ITCS 643 Software Engineering 3 (3-0-6)

ทสคพ 643 วิศวกรรมซอฟต์แวร์

Principles and practice of software engineering; software requirements; software process models; software specification; formal specification; software design and implementation; software cost estimation; software verification and validation; software configuration management; software testing; software quality assurance; ethics and research issues in software engineering

หลักการและวิธีปฏิบัติทางวิศวกรรมซอฟต์แวร์ ความต้องการของซอฟต์แวร์ ตัวแบบของกระบวนการซอฟต์แวร์ การระบุข้อกำหนดของซอฟต์แวร์ การระบุข้อกำหนดอย่างเป็นแบบแผน การออกแบบและพัฒนาซอฟต์แวร์ การประมาณต้นทุนซอฟต์แวร์ การทวนสอบและการตรวจสอบความสมจริงของซอฟต์แวร์ การจัดการโครงแบบของซอฟต์แวร์ การทดสอบซอฟต์แวร์ การประกันคุณภาพของซอฟต์แวร์ จริยธรรมและประเด็นงานวิจัยด้านวิศวกรรมซอฟต์แวร์

ITCS 644 Software Quality Assurance 3 (3-0-6)

ทสคพ 644 การประกันคุณภาพซอฟต์แวร์

Roles, functions, and responsibilities of a quality assurance group; quality assurance work plan in software development; quality assurance methods; software testing techniques; verification techniques; software reuse; metrics and models in software quality engineering; ethics in software quality assurance

บทบาท หน้าที่ และความรับผิดชอบของกลุ่มประกันคุณภาพ แผนงานของการประกัน คุณภาพในการพัฒนาซอฟต์แวร์ วิธีการประกันคุณภาพ เทคนิคในการทดสอบซอฟต์แวร์ เทคนิคในการสอบทาน การนำซอฟต์แวร์มาใช้อีกครั้ง การวัดและตัวแบบในด้านวิศวกรรมคุณภาพของซอฟต์แวร์ จริยธรรมด้านการประกันคุณภาพซอฟต์แวร์

ITCS 655 Computer Graphics 3 (3-0-6)

ทสคพ 655 คอมพิวเตอร์กราฟิกส์

Basic principles for computer graphics; 2d and 3d graphical image synthesis; principles of displaying objects in 3d; computation of visualized surfaces; light and shades; light and color in image synthesis; synthesis of surface mapping, shadows, curves, and areas; geometric transformation; interactive techniques; hidden surface elimination; writing graphics software on video display interfaces; research issues in computer graphics

หลักการพื้นฐานของคอมพิวเตอร์กราฟฟิกส์ การสร้างภาพกราฟฟิกส์แบบ 2 มิติ และแบบ 3 มิติ หลักการแสดงวัตถุใน 3 มิติ การคำนวณพื้นผิวที่มองเห็น แสงและการไล่เฉด แสงและสีในการสร้างภาพ การสร้างแผนที่ผิว เงา เส้นโค้งและพื้นผิว การเปลี่ยนรูปทรงทางเรขาคณิต เทคนิคการโต้ตอบแบบทันที การลบพื้นผิวซ่อน การเขียนโปรแกรมที่ทำงานบนการ์ดแสดงผล ประเด็นงานวิจัยด้านคอมพิวเตอร์กราฟิกส์

ITCS 658 Human Computer Interaction 3 (3-0-6)

ทสคพ 658 ปฏิสัมพันธ์ของคอมพิวเตอร์และมนุษย์

Usability principles; human information processing limitations; human cognitive and sensory limits; user interface design paradigms and guidelines; process of interaction design; design languages; principles of graphical user interfaces; interaction styles and techniques including screen design, layout, color, fonts, labeling and visual programming; hci tools; multimedia and web communication; human-centered development and evaluation; user modeling and the user profile; adaptive interfaces; usability tests; predictive and interpretive evaluation; human performance models: perception, movement, cognition, culture, communication, and organization; 3d user interfaces; augmented reality; conversational interfaces; multimodal interfaces; perceptual interfaces; research issues in human computer interaction

หลักการของการใช้งาน ข้อจำกัดของมนุษย์ในการประมวลผลข้อมูล ข้อจำกัดของมนุษย์ในการจำและรับรู้ แนวทางและเกณฑ์การออกแบบตัวต่อประสานกับผู้ใช้ กระบวนการของการออกแบบการปฏิสัมพันธ์ ภาษาที่ใช้ออกแบบ หลักการของตัวต่อประสานเชิงกราฟฟิกส์กับผู้ใช้ รูปแบบและเทคนิคการโต้ตอบ การออกแบบหน้าจอ แบบแผน สี ชุดตัวอักษร การติดป้าย การเขียนโปรแกรมแบบเห็นภาพ เครื่องมือการต่อประสาน การสื่อสารทางเว็บและสื่อผสม การพัฒนาและการประเมินที่ใช้คนเป็นศูนย์กลาง ตัวแบบและลักษณะการใช้งานของผู้ใช้ การต่อประสานเชิงปรับตัว การทดสอบการใช้งาน การประเมินแบบคาดการณ์และแบบแปล ตัวแบบการประเมินคน การรับรู้ การเคลื่อนไหว การจำได้ วัฒนธรรม การสื่อสารและการจัดองค์กร ตัวต่อประสานผู้ใช้แบบสามมิติ ความเป็นจริงเสริม การต่อประสานทางการสนทนา การต่อประสานหลายลักษณะ การต่อประสานทางการรับรู้ ประเด็นงานวิจัยด้านปฏิสัมพันธ์ของคอมพิวเตอร์และมนุษย์

ITCS 665 Natural Language Processing 3 (3-0-6)

ทสคพ 665 การประมวลผลภาษาธรรมชาติ

The role of knowledge in language processing; models and algorithms; languages; thought and understanding; regular expressions and automata; morphology and finite-state transducers; n-gram models of syntax; word classes and part-of-speech tagging; context-free grammars; parsing with context-free grammar; features and unification; language and complexity; representing meaning; semantic analysis; lexical semantics; word sense disambiguation and information retrieval; discourse; dialog; conversational agents; natural language generation; machine translation

บทบาทของความรู้ในการประมวลผลภาษา ตัวแบบ และขั้นตอนวิธี ภาษา ความคิดและความเข้าใจ การแสดงแบบปกติและอัตโนมัติ โครงสร้างของคำ และตัวเปลี่ยนแปร แบบสถานะจำกัด ตัวแบบเอ็น-แกรมของไวยากรณ์ ป้ายระบุชั้นคำและส่วนของคำพูด ไวยากรณ์ที่ไม่ขึ้นกับบริบท การตัดคำด้วยไวยากรณ์ที่ไม่ขึ้นกับบริบท ลักษณะและการรวมกัน ภาษาและความซับซ้อน การแทนความหมาย การวิเคราะห์ความหมาย อรรถศาสตร์เชิงศัพท์ ความกำกวมของคำและการค้นคืน วจนิพนธ์ การสนทนา เอเจนต์ของการพูดโต้ตอบ การสร้างภาษาธรรมชาติ เครื่องแปลภาษา

ITCS 667 Advanced Computer Vision 3 (3-0-6)

ทสคพ 667 คอมพิวเตอร์วิทัศน์ขั้นสูง

Artificial and biological vision systems; computational algorithms for visual perception; feature extraction and feature engineering; semantic segmentation; image retrieval; object detection and classification; activity recognition; stereo and motion analysis; tracking; image interpretation and inference using convolutional neural networks; geometry-based techniques and graph-based methods

ระบบวิทัศน์เทียมและระบบวิทัศน์เชิงชีววิทยา ระเบียบวิธีทางคำนวณสำหรับความเข้าใจเชิงวิทัศน์ การสกัดลักษณะและวิศวกรรมเชิงลักษณะ การแบ่งส่วนของความหมาย การกู้ข้อมูลภาพ การตรวจจับและการแบ่งประเภทวัตถุ การเรียนรู้จำกิจกรรม การวิเคราะห์ภาพเคลื่อนไหวและการวิเคราะห์แบบสเตอริโอ การติดตามวัตถุในภาพ การแปลความหมายภาพและการอนุมานความหมายของภาพโดยใช้เครือข่ายประสาทเทียบเชิงสับสน เทคนิคเชิงเรขาคณิต และระเบียบวิธีเชิงกราฟ

ITCS 668 Cloud Database and Big Data Technology 3 (3-0-6)

ทสคพ 668 ฐานข้อมูลระบบคลาวด์และเทคโนโลยีข้อมูลขนาดใหญ่

Principles of big data management; applications, tools and techniques used with cloud database and big data; cloud database infrastructure and architectural models; distributed storage technologies; cloud storage performance, resource management of cloud environments; applications of data mining and machine learning methods in big data

หลักการของการบริหารข้อมูลขนาดใหญ่ การประยุกต์ใช้ เครื่องมือ และเทคนิคที่เกี่ยวข้องกับฐานข้อมูลแบบคลาวด์และข้อมูลขนาดใหญ่ ระบบพื้นฐานและระบบจำลองทางโครงสร้างของฐานข้อมูลแบบคลาวด์ เทคโนโลยีการเก็บข้อมูลแบบกระจาย ประสิทธิภาพของฐานข้อมูลระบบคลาวด์ การบริหารจัดการทรัพยากรสำหรับสภาพแวดล้อมของระบบคลาวด์ การประยุกต์ใช้วิธีการทำเหมืองข้อมูลและการเรียนรู้เชิงเครื่องจักรกับข้อมูลขนาดใหญ่

ITCS 669 System Performance Modeling 3 (3-0-6)

ทสคพ 669 แบบจำลองประสิทธิภาพของระบบ

Analysis of computer system operation including process scheduling, virtual memory management, and storage device management; models of program behavior; fundamentals of performance evaluation; system performance measurement techniques and tools; workloads; capacity planning and benchmarking; queueing systems; simulation; research issues in computer system performance analysis and evaluation

การวิเคราะห์การปฏิบัติการของระบบเครื่องคอมพิวเตอร์ที่รวมถึงการกำหนดลำดับของกระบวนงาน การจัดการหน่วยความจำแบบเสมือน และการจัดการอุปกรณ์เก็บข้อมูล ตัวแบบของพฤติกรรมของโปรแกรม พื้นฐานการประเมินประสิทธิภาพ ภาระงาน การวางแผนพละกำลังและการเปรียบเทียบมาตรฐาน ระบบการจัดลำดับ การจำลอง ประเด็นของงานวิจัยด้านการวิเคราะห์และประเมินผลประสิทธิภาพของระบบคอมพิวเตอร์

ITCS 682 Advanced Database Systems 3 (3-0-6)

ทสคพ 682 ระบบฐานข้อมูลขั้นสูง

Advanced database management systems, object-oriented, object-relational, semi-structured and streaming databases; replicated database management; advanced query processing; parallel and distributed databases; data warehousing; online analytical processing; distributed information integration; xml query engines; web and semi-structured data management; multimedia databases; heterogeneous and peer-to-peer systems

ระบบจัดการฐานข้อมูลขั้นสูง ฐานข้อมูลเชิงวัตถุ ฐานข้อมูลเชิงวัตถุสัมพันธ์ ฐานข้อมูลเชิงกึ่งโครงสร้าง ฐานข้อมูลเชิงสาย การจัดการฐานข้อมูลแบบซ้ำซ้อน การประมวลผลข้อคำถามขั้นสูง ระบบฐานข้อมูลเชิงขนานและเชิงกระจาย คลังข้อมูล การประมวลผลเชิงวิเคราะห์แบบออนไลน์ การบูรณาการข้อมูลเชิงกระจาย เครื่องมือค้นหาของเอ็กเอ็มแอล การจัดการข้อมูลเว็บและกึ่งโครงสร้าง ฐานข้อมูลสื่อผสม ระบบที่แตกต่างกันและระบบเชิงเท่าเทียมกัน

ITCS 696 Advanced Topics in Computer Science 3 (0-6-3)

ทสคพ 696 หัวข้อขั้นสูงด้านวิทยาการคอมพิวเตอร์

Advanced and contemporary research topics in computer science; in-depth analysis of computer science topics

หัวข้อวิจัยชั้นสูงและที่เป็นปัจจุบันด้านวิทยาการคอมพิวเตอร์ การวิเคราะห์เชิงลึกของหัวข้อด้านวิทยาการคอมพิวเตอร์

3. Thesis

Credits (lecture – practice – self-study)

ITCS 698 Thesis 12 (0-36-0)

ทสคพ 698 วิทยานิพนธ์

In-depth research in computer science using scientific methods; reporting of research findings; research ethics

การวิจัยเชิงลึกด้านวิทยาการคอมพิวเตอร์โดยใช้วิธีทางวิทยาศาสตร์ การรายงานผลการวิจัย

4. Thematic Paper

Credits (lecture – practice – self-study)

ITCS 697 Research Project in Computer Science 6 (0-18-0)

ทสคพ 697 โครงงานวิจัยทางวิทยาการคอมพิวเตอร์

Identifying research project titles; submitting research proposals; conducting ethical research studies; information collection; analysis, synthesis, and critique of research results; reporting research results in terms of a thematic paper; thematic paper presentations

การกำหนดหัวข้อสารนิพนธ์ การเสนอโครงร่าง การดำเนินการวิจัยอย่างมีจริยธรรม การรวบรวมข้อมูล การวิเคราะห์ สังเคราะห์และวิพากษ์ผลการวิจัย การนำผลงานวิจัยมาเรียบเรียงเป็นสารนิพนธ์ การนำเสนอสารนิพนธ์

APPENDIX B

Curriculum Vitae of the Faculty

Appendix B
Curriculum Vitae of the Faculty

Full time instructors of the curriculum

1. Name Professor Dr. Peter Fereed Haddawy

Education

Degree	Degree Name	Institute	Year of Graduation
Ph.D.	Computer Science	University of Illinois at Urbana-Champaign, USA	1991
M.Sc.	Computer Science	University of Illinois at Urbana-Champaign, USA	1987
B.A.	Mathematics	Pomona College, Claremont, California, USA	1981

Affiliation: Faculty of Information and Communication Technology, Mahidol University

Interesting Research Topics or Specialties

Artificial Intelligence, Intelligence Medical Training Systems, Scientometrics

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Sararit N, **Haddawy P**, Suebnukarn S. Effectiveness of a low-cost VR simulator for emergency management training in dental surgery. In: the 15th International Joint Conference on Computer Science and Software Engineering (JCSSE); 2018 Jul 11-13; Nakhon Pathom, Thailand; 2018.	0.4	2018

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Sa-ngamuang C, **Haddawy P**, Luvira V, and et al. Accuracy of dengue clinical diagnosis with and without NS1 antigen rapid test: comparison between human and Bayesian network model decision. PLoS Neglected Tropical Diseases 2018 Jun;12(6):e0006573.	1	2018
Published research work	Dwisaptarini A, Suebnukarn S, Rhienmora P, Koontongkaew S, **Haddawy P**. Effectiveness of the Multilayeared Caries Model and Visuo-tactile Virtual Reality Simulator for Minimally Invasive Caries Removal: A Randomized Controlled Trial. Operative Dentistry May 2018;43(3):E110-8.	1	2018
Published research work	**Haddawy P**, Hasan I, Kasantikul R, Lawpoolsri S, Sa-angchai P. Kaewkungwal J, Singhasivanon P. SpatInternet of Thingsemporal Bayesian Networks for Malaria Prediction. Artificial Intelligence in Medicine 2018 Jan;84:127-38.	1	2018
Published research work	Su Yin M, **Haddawy P**, Suebnukarn S, Rhienmora P. Automated outcome scoring in a virtual reality simulator for endodontic surgery. Computer Methods and Programs in Biomedicine 2018;153:53-9.	1	2018
Published research work	Hasan I, **Haddawy P**, Lawpoolsri S. A comparative analysis of bayesian network and ARIMA approaches to malaria outbreak prediction. In: the 13th International Conference on Computing and Information Technology (IC2IT); 2017 Jul 6-7; Bangkok, Thailand; 2017.	0.4	2018

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Vannaprathip N, **Haddawy P**, Schultheis H, Suebnukarn S. Generating tutorial interventions for teaching situation awareness in dental surgery – Preliminary report. In: the 11th Multi-disciplinary International Workshop on Artificial Intelligence (MIWAI); 2017 Nov 20-22; Gadong, Brunei Darussalam; 2017.	0.4	2017
Published research work	Hassan S-U, Akram A, **Haddawy P**. Identifying important citations using contextual information from full text. In: the 17th ACM/IEEE Joint Conference on Digital Libraries (JCDL); 2017 Jun 19-23; Toronto, Canada; 2017.	0.4	2017
Published research work	Bonaccorsi A, **Haddawy P**, Cicero T, Hassan S.-U. The solitude of stars. An analysis of the distributed excellence model of European universities. Journal of Informetrics 2017 May;11(2):435-54.	1	2017
Published research work	**Haddawy P**, Hassan S.-U, Abbey C.W, Lee I.B. Uncovering fine-grained research excellence: the global research benchmarking system. Journal of Informetrics 2017 May;11(2):389-406.	1	2017
Published research work	Sararit N, **Haddawy P**, Suebnukarn S. A VR simulator for emergency management in endodontic surgery. In: the 22nd International Conference on Intelligent User Interfaces (IUI); 2017 Mar 13-16; Limassol, Cyprus; 2017.	0.4	2017

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Su Yin M, **Haddawy P**, Suebnukarn S, Schultheis H, Rhienmora P. Use of haptic feedback to train correct application of force in endodontic surgery. In: the 22nd International Conference on Intelligent User Interfaces (IUI); 2017 Mar 13-16; Limassol, Cyprus; 2017.	0.4	2017
Published research work	Bonaccorsi A, Cicero T, **Haddawy P**, Hassan S.-U.L. Explaining the transatlantic gap in research excellence. Scientometrics 2017 Jan;110(1):217-41.	1	2017
Published research work	Hasan I, **Haddawy P**. Integrating ARIMA and spatInternet of Thingsemporal bayesian networks for high resolution Malaria prediction. In: the 22nd European Conference on Artificial Intelligence (ECAI); 2016 Aug 29 - Sep 2; The Hague, Netherlands; 2016.	0.4	2016
Published research work	Su Yin M, **Haddawy P**, Suebnukarn S, Rhienmora P. Toward intelligent tutorial feedback in surgical simulation: robust outcome scoring for endodontic surgery. In: the 21st International Conference on Intelligent User Interfaces (IUI); 2016 Mar 7-10; California, USA; 2016.	0.4	2016
Published research work	Vannaprathip N, **Haddawy P**, Suebnukarn S, Sangsartra P, Sasikhant N, Sangutai S. Desitra: a simulator for teaching situated decision making in dental surgery . In: the 21st International Conference on Intelligent User Interfaces (IUI); 2016 Mar 7-10; California, USA; 2016.	0.4	2016

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	**Haddawy P**, Hassan S, Asghar A, Amin S. A comprehensive examination of the relation of three citation-based journal metrics to expert judgment of journal quality. Journal of Informetrics 2016 Feb;10(1):162-173.	1	2016

Current Teaching Load

ITCS	628	Data Mining and Knowledge Discovery	3 (3-0-6)
ITCS	661	Advanced Artificial Intelligence	3 (3-0-6)
ITCS	697	Research Project in Computer Science	6 (0-18-0)
ITCS	698	Thesis	12 (0-36-0)

Assigned Teaching Load for the Proposed Program

ITCS	517	Machine Learning	3 (3-0-6)
ITCS	523	Data Sciences Essentials	3 (3-0-6)
ITCS	628	Data Mining and Knowledge Discovery	3 (3-0-6)
ITCS	661	Advanced Artificial Intelligence	3 (3-0-6)
ITCS	665	Natural Language Processing	3 (3-0-6)
ITCS	697	Research Project in Computer Science	6 (0-18-0)
ITCS	698	Thesis	12 (0-36-0)

2. Name Associate Professor Dr. Chomtip Pornpanomchai

Education

Degree	Degree Name	Institute	Year of Graduation
Ph.D.	Computer Science	Asian Institute of Technology	2000
M.Sc.	Computer Science	Chulalongkorn University	1986
B.Sc.	General Science	Kasetsart University	1981

Affiliation: Faculty of Information and Communication Technology, Mahidol University

Interesting Research Topics or Specialties

Pattern Recognition, Image Processing, Artificial Intelligence

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	**Pornpanomchai C**, Sukklay P. Image processing based on color, texture and histogram for pineapple sweetness measurement. In: ANIMH International Conference on Telecommunications, Applied Sciences & Engineering Management (TAEM-March-2018); 2018 Mar 15-16; Seoul, South Korea; 2018.	0.4	2018
Published research work	Lurstwut B, **Pornpanomchai C**. Image analysis based on color, shape and texture for rice seed (Oryza sativa L.) germination evaluation. Agriculture and Natural Resources (Open Access), 2017 Oct;51(5):383-9.	1	2017

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	**Pornpanomchai C**, Somsiri J, Toadithep A, Promdeerach A. Rock-paper-scissors game between human and computer. International Journal of Design, Analysis and Tools for Integrated Circuits and Systems 2017 Oct;6(1):1-6.	1	2017
Published research work	**Pornpanomchai C**, Jantapalaboon K, Pankanoon R, Hansapinyo A. Display food calorie by using image processing method. In: the 5th Annual conference on Engineering and Information Technology (ACEAIT); 2017 Mar 29-31; Nagoya, Japan; 2017. p. 152-61.	0.4	2017
Published research work	**Pornpanomchai C**, Tse A, Supayanant K. Pineapple sweetness measurement by digital image processing. In: the 20th International Computer Science and Engineering Conference (ICSEC); 2016 Dec 14-17; Chiang Mai, Thailand; 2016.	0.4	2016
Published research work	Ittatirut T, Lekhalawan A, Tangjitwattanakorn W, **Pornpanomchai C**. Apple sweetness measurement by image processing technique. In: the 2016 Sixth International Student Projects Conference (ICT-ISPC); 2016 May 27-28; Nakhon Pathom, Thailand; 2016.	0.4	2016

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Tse A, Saegnwiparat J, Supayanant K, **Pornpanomchai C**. Controlling children-toy tank by using image processing technique. In: the 2016 Sixth International Student Projects Conference (ICT-ISPC); 2016 May 27-28; Nakhon Pathom, Thailand; 2016.	0.4	2016
Published research work	**Pornpanomchai C**, Lurstwut B. Fruit seed image recognition system (FSIRS). In: the 4th Annual conference on Engineering and Information Technology (ACEAIT); 2016 Mar 29-31; Kyoto, Japan; 2016. p. 152-61.	0.4	2016
Published research work	Lurstwut B, **Pornpanomchai C**. Application of image processing and computer vision on rice seed germination analysis. International Journal of Applied Engineering Research 2016;11(9):6800-7.	1	2016
Published research work	Lurstwut B, **Pornpanomchai C**. Rice seed germination analysis. International Journal of Computer Applications Technology and Research 2016;4:176-82.	1	2016

Current Teaching Load

ITCS	697	Research Project in Computer Science	6 (0-18-0)
ITCS	698	Thesis	12 (0-36-0)

Assigned Teaching Load for the Proposed Program

ITCS	503	Design and Analysis of Algorithms	3 (3-0-6)
ITCS	509	Research Methodology in Computer Science	2 (2-0-4)
ITCS	696	Advanced Topics in Computer Science	3 (0-6-3)
ITCS	697	Research Project in Computer Science	6 (0-18-0)
ITCS	698	Thesis	12 (0-36-0)

3. Name Associate Professor Dr. Damras Wongsawang

Education

Degree	Degree Name	Institute	Year of Graduation
Ph.D.	Information Engineering	Shinshu University, Japan	1994
M.Sc.	Applied Mathematics	Mahidol University	1980
B.Ed. (1^{st} Class Honor)	Mathematics	Srinakharinwirot University Prasarnmit	1978

Affiliation: Faculty of Information and Communication Technology, Mahidol University

Interesting Research Topics or Specialties

Information Theory, Information Retrieval, Computer Security, Numerical Methods

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Chaisewikul T, Wattanapanich P, Komgris S and **Wongsawang D.** Memory skill games for elderly people to prevent dementia. In: the 2018 Seventh ICT International Student Project Conference (ICT-ISPC); 2018 Jul 11-13; Nakhon Pathom, Thailand; 2018.	0.4	2018
Published research work	Limpanadusadee J, Kesawattana P, Wongsawat T and **Wongsawang D.** EldTec: improvement on wearable sensor for elderly fall detection. In: the 2018 Seventh ICT International Student Project Conference (ICT-ISPC); 2018 Jul 11-13; Nakhon Pathom, Thailand; 2018.	0.4	2018

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Rattanabunsakul N, Srisittichaikul A, Sriprasert A, **Wongsawang D**. DID: auto document censorship. In: the 2017 Sixth International Student Projects Conference (ICT-ISPC); 2017 May 23-24; Skudai, Malaysia; 2017.	0.4	2017
Published research work	Plungsombat K, Jearapan P, Pittayanukit T, **Wongsawang D**. Pelement: a periodic table game for elements learning. In: the 2017 Sixth International Student Projects Conference (ICT-ISPC); 2017 May 23-24; Skudai, Malaysia; 2017.	0.4	2017
Published research work	Chareonsuk W, Kanhaun S, Khawkam K, **Wongsawang D.** Face and Eyes mouse for ALS Patients**.** In: the 2016 Sixth International Student Projects Conference (ICT-ISPC); 2016 May 27-28; Nakhon Pathom, Thailand; 2016.	0.4	2016
Published research work	Kulsiriruangyos J, Rattanawutikul V, Sandsartra P, **Wongsawang D.** Home security system for alone elderly people**.** In: the 2016 Sixth International Student Projects Conference (ICT-ISPC); 2016 May 27-28; Nakhon Pathom, Thailand; 2016.	0.4	2016

Current Teaching Load

ITCS	697	Research Project in Computer Science	6 (0-18-0)
ITCS	698	Thesis	12 (0-36-0)

Assigned Teaching Load for the Proposed Program

ITCS	507	Mathematical Foundations for Computer Science	3 (3-0-6)
ITCS	696	Advanced Topics in Computer Science	3 (0-6-3)
ITCS	697	Research Project in Computer Science	6 (0-18-0)
ITCS	698	Thesis	12 (0-36-0)

4. Name Associate Professor Dr. Jarernsri Mitrpanont

Education

Degree	Degree Name	Institute	Year of Graduation
Ph.D.	Computer Science	Oklahoma State University, USA	1994
M.Sc.	Applied Mathematics	Mahidol University	1983
B.Sc.	Physics	Mahidol University	1980

Affiliation: Faculty of Information and Communication Technology, Mahidol University

Interesting Research Topics or Specialties

Database Systems, Artificial Intelligence, Knowledge-based Systems, Decision Support Systems, Business Intelligence, Data Analytics, Health Informatics

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	**Mitrpanont J**, Bousai B, Soonthornchart N, Tuanghirunvimon K, Mitrpanont T. iCare-ADHD: a mobile application prototype for early child attention deficit hyperactivity disorder. In: the 2018 Seventh ICT International Student Project Conference (ICT-ISPC); 2018 Jul 11-13; Nakhon Pathom, Thailand; 2018.	0.4	2018

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	**Mitrpanont J**, Sawangphol W, Chankong C, Jitsuphap A, Wongkhumsin N. I WISH: integrated well-being Internet of Things system for healthiness. In: the 15th International Joint Conference on Computer Science and Software Engineering (JCSSE); 2018 Jul 11-13; Nakhon Pathom, Thailand; 2018.	0.4	2018
Published research work	**Mitrpanont J**, Sawangphol W, Roungsuriyaviboon J, Sathapornwatanakul T, Pillavas T, Sangaroonsilp P. MedThaiSAGE: decision support system to suggest healthcare policies using rule findings technique. In: the 15th International Joint Conference on Computer Science and Software Engineering (JCSSE); 2018 Jul 11-13; Nakhon Pathom, Thailand; 2018.	0.4	2018
Published research work	**Mitrpanont J**, Sawangphol W, Vithantirawat T, Paengkaew S, Suwannasing P. K4ThaiHealth: a prototype for Thai routine medical research knowledge extraction & sharing. In: the 2018 Seventh ICT International Student Project Conference (ICT-ISPC); 2018 Jul 11-13; Nakhon Pathom, Thailand; 2018.	0.4	2018

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	**Mitrpanont J**, Roungsuriyaviboon J, Sathapornwatanakul T, Sawangphol W, Kobayashi D, Haga J. Extending MedThaiVis-Thai medical research visualization to SAGE2 display walls. In: the 2nd International Conference on Information Technology (InCIT), 2017 Nov 2-3; Nakhon Pathom, Thailand; 2017. [Best Paper Award].	0.4	2018
Published research work	**Mitrpanont J**, Sawangphol W, Vithantirawat T, Paengkaew S, Suwannasing P, Daramas A, Chen Y. A study on using python vs weka on dialysis data analysis. In: the 2nd International Conference on Information Technology (InCIT), 2017 Nov 2-3; Nakhon Pathom, Thailand; 2017.	0.4	2018
Published research work	ดวงหทัย แพงจิกรี, ภูวเดช อินทร์ตะโคตร, **เจริญศรี มิตรภานนท์**, ฐิตินันท์ ตันติธรรม, ศุจิกา ศรีนันทกุล. การพัฒนาระบบเซ็นเซอร์ต้นแบบ ด้วย IR Proximity Sensor เพื่อตรวจจับระยะห่างที่ปลอดภัยในการมองจอคอมพิวเตอร์. ใน: เอกสารการประชุมวิชาการระดับประเทศด้านเทคโนโลยีสารสนเทศ (National Conference on Information Technology: NCIT) ครั้งที่ ๙; ๑-๒ พฤศจิกายน ๒๕๖๐. นครปฐม; ๒๕๖๐.	0.4	2018
Published research work	Tuarob S, **Mitrpanont JL.** Automatic discovery of abusive Thai language usages in social networks. In: the 19th International Conference on Asia-Pacific Digital Libraries (ICADL); 2017 Nov 13-15; Bangkok, Thailand; 2017.	0.4	2017

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Haga J, **Mitrpanont J**, Roungsuriyaviboon J, Sathapornwatanakul T, Sawangphol W, Kobayashi D, MedThaiSAGE: visualization of Thai medical research data on large tiled display walls. In: the Pacific Rim Application and Grid Middleware Assembly (PRAGMA33); 2017 Oct 16; Brisbane, Australia; 2017.	0.4	2017
Published research work	**Mitrpanont J**, Atchaphan A, Rattanajung S, Chaiphadung S. Herbe-Herb database management system. In: the 2017 Sixth International Student Projects Conference (ICT-ISPC); 2017 May 23-24; Skudai, Malaysia; 2017.	0.4	2017
Published research work	**Mitrpanont J**, Janekitiworapong N, Ongsritrakul S, Varasai S. MedThaiVis: an approach for Thai biomedical data visualization. In: the 2017 Sixth International Student Projects Conference (ICT-ISPC); 2017 May 23-24; Skudai, Malaysia; 2017.	0.4	2017
Published research work	**Mitrpanont J**, Phandhu-Fung J, Klubdee N, Ratanalaor S, Pratiphakorn P, Damrongvanakul K, Chuanvaree P, Mitrpanont T. iCare-Stress: an integrated mental health software. In: the 2017 Sixth International Student Projects Conference (ICT-ISPC); 2017 May 23-24; Skudai, Malaysia; 2017.	0.4	2017

Current Teaching Load

ITCS	697	Research Project in Computer Science	6 (0-18-0)
ITCS	698	Thesis	12 (0-36-0)

Assigned Teaching Load for the Proposed Program

ITCS	621	Database Design and Administration	3 (3-0-6)
ITCS	682	Advanced Database Systems	3 (3-0-6)
ITCS	696	Advanced Topics in Computer Science	3 (0-6-3)
ITCS	697	Research Project in Computer Science	6 (0-18-0)
ITCS	698	Thesis	12 (0-36-0)

5. Name Associate Professor Dr. Sudsanguan Ngamsuriyaroj

Education

Degree	Degree Name	Institute	Year of Graduation
Ph.D.	Computer Science and Engineering	The Pennsylvania State University, USA	2002
M.Sc.	Physical Chemistry	Mahidol University	1981
B.Sc. (2nd Class Honor)	Chemistry	Mahidol University	1979

Affiliation: Faculty of Information and Communication Technology, Mahidol University

Interesting Research Topics or Specialties

Network and Cloud Security, High Performance Computing, Healthcare Applications

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Pramkaew C, **Ngamsuriyaroj S**. Lightweight scheme of secure outsourcing SVD of a large matrix on cloud. Journal of Information Security and Applications. 2018 Aug; 41: 92-102.	1	2018
Published research work	Harnmetta S, **Ngamsuriyaroj S**. Classification of Exploit-Kit behaviors via machine learning approach. In: the 20th IEEE International Conference on Advanced Communication Technology (ICAT); 2018 Feb 11-14; South Korea; 2018. p. 468-73.	0.4	2018

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Tantidham T, **Ngamsuriyaroj S**, Tungamnuayrith N, Nildam T, Banthao K, Intakot P. Energy consumption collection design for smart building. In: the Ninth IntNULLl Conference on Information and Communication Technology for Embedded Systems and the 11th IntNULLl Conference on Embedded Systems and Intelligent Technology (ICESIT-ICICTES); 2018.	0.4	2018
Published research work	**Ngamsuriyaroj S,** Thepsutum K. Identifying dominant amino acid pairs of known protein-protein interactions via K-Means clustering. In: IEEE 3rd International Conference on Data Science and Systems (DSS); 2017 Dec 18-20; Bangkok, Thailand; 2017.	0.4	2018
Published research work	Chaiphet C, **Ngamsuriyaroj S**, Awad A, Jacob B, Gakos I, Grajkowski W. Secure enclave for TLS web server on untrusted environment**.** In**:** ACM 7th International Conference on Communication and Network Security (ICCNS); 2017 Nov 24-26; Tokyo, Japan; 2017.	0.4	2017
Published research work	Noosrikong C, **Ngamsuriyaroj S**, Palakvangsa Na Ayudhya S. Identifying focus research areas of Computer Science researchers from publications. In: IEEE International Conference of Region 10 (TENCON); 2017 Nov 5-8; Penang, Malaysia; 2017.	0.4	2017

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Kiatkumjounwong N, **Ngamsuriyaroj S**, Plangprasopchok A. Web proxy logs classification for burst behavior. In: IEEE International Conference of Region 10 (TENCON); 2016 Nov 22-25; Singapore; 2016. p. 472-7.	0.4	2017
Published research work	Wongpipathpong W, Kuekulpipat C, Phaisarnanuntakit J, **Ngamsuriyaroj S**. LongTalk2: conversation helper for multi-languages. In: the 2016 Sixth International Student Projects Conference (ICT-ISPC); 2016 May 27-28; Nakhon Pathom, Thailand; 2016.	0.4	2016
Published research work	Thongthua A, **Ngamsuriyaroj S**. Assessment of hypervisor vulnerabilities. In: International Conference on Cloud Computing Research and Innovations (ICCCRI); 2016 May 4-5; Singapore; 2016. p. 71-7.	0.4	2016

Current Teaching Load

ITCS	697	Research Project in Computer Science	6 (0-18-0)
ITCS	698	Thesis	12 (0-36-0)

Assigned Teaching Load for the Proposed Program

ITCS	522	Edge Computing and Internet of Things	3 (3-0-6)
ITCS	552	Mobile and Pervasive Computing	3 (3-0-6)
ITCS	612	Network Programming	3 (3-0-6)
ITCS	631	Computer Communications and Networks	3 (3-0-6)
ITCS	697	Research Project in Computer Science	6 (0-18-0)
ITCS	698	Thesis	12 (0-36-0)

6. Name Associate Professor Dr. Vasaka Visoottiviseth

Education

Degree	Degree Name	Institute	Year of Graduation
Ph.D.	Computer Engineering	Nara Institute of Science and Technology, Japan	2003
M.Eng.	Computer Engineering	Tokyo University of Agriculture and Technology, Japan	1999
B.Eng.	Computer Engineering	Tokyo University of Agriculture and Technology, Japan	1997

Affiliation: Faculty of Information and Communication Technology, Mahidol University

Interesting Research Topics or Specialties

Multicast, Routing, IPv6, Traffic Measurement and Network Monitoring, Network Security, Internet Architecture

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Boonnak T, **Visoottiviseth V**, Haga J, Kobayashi D, Leigh J. Integration of gesture control with large display environments using SAGE2. In: the 15th International Joint Conference on Computer Science and Software Engineering (JCSSE); 2018 Jul 11-13; Nakhon Pathom, Thailand; 2018	0.4	2018

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Kosolyudhthasarn P, **Visoottiviseth V**, Fall D, Kashihara S. Drone detection and identification by using packet length signature. In: the 15th International Joint Conference on Computer Science and Software Engineering (JCSSE); 2018 Jul 11-13; Nakhon Pathom, Thailand; 2018	0.4	2018
Published research work	Phumkaew N, **Visoottiviseth V**. Android forensic and security assessment for hospital and stock-and-trade applications in Thailand. In: the 15th International Joint Conference on Computer Science and Software Engineering (JCSSE); 2018 Jul 11-13; Nakhon Pathom, Thailand; 2018	0.4	2018
Published research work	Pongchanchai N, **Visoottiviseth V**, Ou K, Yamai N, Kitagawa N. Countermeasure against spoofed e-mails using display name as a user authenticator. In: the 2018 Seventh ICT International Student Project Conference (ICT-ISPC); 2018 Jul 11-13; Nakhon Pathom, Thailand; 2018	0.4	2018
Published research work	Puttawong N, Phungphat A, Chantaraaumporn P, **Visoottiviseth V**, Haga J. Lord of Secure: the virtual reality game for educating network security. In: the 2018 Seventh ICT International Student Project Conference (ICT-ISPC); 2018 Jul 11-13; Nakhon Pathom, Thailand; 2018	0.4	2018

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	**Visoottiviseth V**, Jutadhammakorn P, Pongchanchai N, Kosolyudhthasarn P. Firmaster: analysis tool for home router firmware. In: the 15th International Joint Conference on Computer Science and Software Engineering (JCSSE); 2018 Jul 11-13; Nakhon Pathom, Thailand; 2018.	0.4	2018
Published research work	**Visoottiviseth V**, Sainont R, Boonnak T, Thammakulkrajang V. POMEGA: security game for building security awareness. In: the 2018 Seventh ICT International Student Project Conference (ICT-ISPC); 2018 Jul 11-13; Nakhon Pathom, Thailand; 2018.	0.4	2018
Published research work	Jutadhamakorn P, Pillavas T, **Visoottiviseth V**, and et al. A scalable and low-cost MQTT broker clustering system. In: the 2nd International Conference on Information Technology (InCIT), 2017 Nov 2-3; Nakhon Pathom, Thailand; 2017. p. 1-5.	0.4	2018
Published research work	Puttawong N, **Visoottiviseth V**, Haga J. VRFiWall virtual reality edutainment for firewall security concepts. In: the 2nd International Conference on Information Technology (InCIT), 2017 Nov 2-3; Nakhon Pathom, Thailand; 2017. p. 1-6.	0.4	2018

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Rungsuptaweekoon K, **Visoottiviseth V**, Takano R. Evaluating the power efficiency of deep learning inference on embedded GPU systems. In: the 2nd International Conference on Information Technology (InCIT), 2017 Nov 2-3; Nakhon Pathom, Thailand; 2017. p. 1-5.	0.4	2018
Published research work	**Visoottiviseth V**, Akarasiriwong P, Chaiyasart S, Chotivatunyu S. PENTOS: penetration testing tool for internet of thing devices. In: IEEE International Conference of Region 10 (TENCON); 2017 Nov 5-8; Penang, Malaysia; 2017. p. 2279-84.	0.4	2017
Published research work	**Visoottiviseth V**, Lertviriyasawat S, Suppiyatrakoon P, Chitkornkitsil P, Yamai N. REFLO: reactive firewall system with OpenFlow and flow monitoring system. In: IEEE International Conference of Region 10 (TENCON); 2017 Nov 5-8; Penang, Malaysia; 2017. p. 2273-8.	0.4	2017
Published research work	Kasemsuwan P, **Visoottiviseth V**. OSV: OSPF vulnerability checking tool, In: the 14th International Joint Conference on Computer Science and Software Engineering (JCSSE); 2017 Jul 12-14; Nakhon Sri Thammarat, Thailand; 2017.	0.4	2017

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Pipatsakulroj W, **Visoottiviseth V**, Takano R. MuMQ: A lightweight and scalable MQTT broker, In: the 23rd IEEE International Symposium on Local and Metropolitan Area Networks (LANMAN); 2017 Jun 12-14; Osaka, Japan; 2017.	0.4	2017
Published research work	Amornpornwiwat R, Piyachat P, Chawathaworncharoen V, **Visoottiviseth V**, Takano R. MATEMA6: Machine Tele-monitoring assistance with 6LoWPAN. In: the 2016 Sixth International Student Projects Conference (ICT-ISPC); 2016 May 27-28; Nakhon Pathom, Thailand; 2016.	0.4	2016
Published research work	Tangsettanakorn C, Thongprasit S, Thamkongka S, **Visoottiviseth V**. ABIS: a prototype of android botnet identification system. In: the 2016 Sixth International Student Projects Conference (ICT-ISPC); 2016 May 27-28; Nakhon Pathom, Thailand; 2016.	0.4	2016
Published research work	Mongkolluksamee S, **Visoottiviseth V**, Fukuda K. Combining communication patterns & traffic patterns to enhance mobile traffic identification performance. Journal of Information Processing 2016 Mar;24(2):247-54.	1	2016

Current Teaching Load

ITCS	602	Seminar in Computer Science II	1 (1-0-2)
ITCS	631	Computer Communications and Networks	3 (3-0-6)
ITCS	697	Research Project in Computer Science	6 (0-18-0)
ITCS	698	Thesis	12 (0-36-0)

Assigned Teaching Load for the Proposed Program

ITCS	522	Edge Computing and Internet of Things	3 (3-0-6)
ITCS	552	Mobile and Pervasive Computing	3 (3-0-6)
ITCS	602	Seminar in Computer Science II	1 (1-0-2)
ITCS	612	Network Programming	3 (3-0-6)
ITCS	631	Computer Communications and Networks	3 (3-0-6)
ITCS	697	Research Project in Computer Science	6 (0-18-0)
ITCS	698	Thesis	12 (0-36-0)

7. Name Assistant Professor Dr. Ananta Srisuphab

Education

Degree	Degree Name	Institute	Year of Graduation
Ph.D.	Computer Science	Mahidol University	2009
M.Sc.	Computer Science	Mahidol University	2002
B.Sc.	Computer Science	Mahidol University	1991

Affiliation: Faculty of Information and Communication Technology, Mahidol University

Interesting Research Topics or Specialties

Computational Intelligence, Connectionist Models and Convolution Networks, AI and Machine Learning, Image and Signal Processing, Embedded Systems, CS and Engineering Education

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Silapachote P, **Srisuphab A**, Banchongthanakit W. An Embedded System Device to Monitor Farrowing. In: the 5th International Conference on Advanced Informatics: Concepts Theory and Applications (ICAICTA); 2018 Aug 14-17; Krabi, Thailand; 2018.	0.4	2018

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Graven OH, **Srisuphab A**, Silapachote P, and et al. An Autonomous Indoor Exploration Robot Rover and 3D Modeling with Photogrammetry. In: the 2018 International ECTI Northern Section Conference on Electrical, Electronics, Computer and Telecommunications Engineering (ECTI-NCON); 2018 Feb 25-28; Chiang Rai, Thailand; 2018.	0.4	2018
Published research work	Tangkocharoen T, **Srisuphab A**. Vehicle detection on a pint-sized computer. In: the 9th International Conference on Knowledge and Smart Technology (KST); 2017 Feb 1-4; Chonburi, Thailand; 2017.	0.4	2017
Published research work	Silapachote P, **Srisuphab A**. Teaching and learning computational thinking through solving problems in artificial itelligence: on designing introductory engineering and computing courses. In: IEEE International Conference on Teaching, Assessment and Learning for Engineering (TALE). Bangkok, Thailand; 2016.	0.4	2017
Published research work	**Srisuphab A**, Silapachote P. Artificial neural networks for gesture classification with inertial motion sensing armbands. In: IEEE Region 10 Annual International Conference (TENCON). Marina Bay Sands, Singapore; 2016.	0.4	2017

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Silapachote P, **Srisuphab A**, Phongpawarit J, Visetpalitpol S, Jirapasitchai S. REDLE: a platform in the cloud for elderly fall detection and push response tracking. ECTI Transactions on Computer and Information Technology. 2016 Nov;10(2):185-195.	1	2016
Published research work	**Srisuphab A**, Silapachote P, Phongpawarit J, Visetpalitpol S, Jirapasitchai S. REDLE: elderly care on clouds. In: the 13th International Joint Conference on Computer Science and Software Engineering (JCSSE). Khon Kaen, Thailand; 2016.	0.4	2016

Current Teaching Load

ITCS	517	Machine Learning	3 (3-0-6)
ITCS	601	Seminar in Computer Science I	1 (1-0-2)
ITCS	661	Advanced Artificial Intelligence	3 (3-0-6)
ITCS	697	Research Project in Computer Science	6 (0-18-0)
ITCS	698	Thesis	12 (0-36-0)

Assigned Teaching Load for the Proposed Program

ITCS	517	Machine Learning	3 (3-0-6)
ITCS	523	Data Sciences Essentials	3 (3-0-6)
ITCS	603	Seminar in Computer Science	1 (1-0-2)
ITCS	661	Advanced Artificial Intelligence	3 (3-0-6)
ITCS	697	Research Project in Computer Science	6 (0-18-0)
ITCS	698	Thesis	12 (0-36-0)

8. Name Assistant Professor Dr. Boonsit Yimwadsana

Education

Degree	Degree Name	Institute	Year of Graduation
Ph.D.	Electrical Engineering	Columbia University, USA	2007
M.S.	Electrical Engineering	Columbia University, USA	2001
B.S.	Electrical Engineering	Columbia University, USA	2000

Affiliation: Faculty of Information and Communication Technology, Mahidol University

Interesting Research Topics or Specialties

Computer Communications and Networks, Computer Science

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	**Yimwadsana B**, Boonsiri P, Chaisri P, Suvarnakas K. CIRRUS: distributed cloud storage. In: the 2018 Seventh ICT International Student Project Conference (ICT-ISPC); 2018 Jul 11-13; Nakhon Pathom, Thailand; 2018.	0.4	2018
Published research work	**Yimwadsana B**, Chanthapeth P, Lertthanyaphan C, Pornvechamnuay A. An Internet of Things controlled system for plant growth. In: the 2018 Seventh ICT International Student Project Conference (ICT-ISPC); 2018 Jul 11-13; Nakhon Pathom, Thailand; 2018.	0.4	2018

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Narupiyakul L, Sanghlao S, **Yimwadsana B**. An indoor navigation system for the visually impaired based on RSS lateration and RF fingerprint. In: the 16th International Conference on Smart Homes, Assistive Technology and Health Telematics (ICOST); 2018 Jul 10-12; Singapore; 2018. pp. 225-35.	0.4	2018
Published research work	Hu CL, Chan TK, Wen YC, Tantidham T, Sanghlao S, **Yimwadsana B**, Mongkolwat P. Internet of Things-based LED lighting control in smart home. In: the 4th IEEE International Conference on Applied System Innovation (ICASI); 2018 Apr 13-17; Chiba, Japan; 2018. p.877-80.	0.4	2018

Current Teaching Load

ITCS	601	Seminar in Computer Science I	1 (1-0-2)
ITCS	602	Seminar in Computer Science II	1 (1-0-2)
ITCS	631	Computer Communications and Networks	3 (3-0-6)
ITCS	695	Independent Study	3 (0-6-3)
ITCS	697	Research Project in Computer Science	6 (0-18-0)
ITCS	698	Thesis	12 (0-36-0)

Assigned Teaching Load for the Proposed Program

ITCS	507	Mathematical Foundations for Computer Science	3 (3-0-6)
ITCS	513	Project Management	3 (3-0-6)
ITCS	552	Mobile and Pervasive Computing	3 (3-0-6)
ITCS	603	Seminar in Computer Science	1 (1-0-2)
ITCS	631	Computer Communications and Networks	3 (3-0-6)
ITCS	696	Advanced Topics in Computer Science	3 (0-6-3)
ITCS	697	Research Project in Computer Science	6 (0-18-0)
ITCS	698	Thesis	12 (0-36-0)

9. Name Assistant Professor Dr. Charnyote Pluempitiwiriyawej

Education

Degree	Degree Name	Institute	Year of Graduation
Ph.D.	Computer Engineering-CISE	University of Florida, USA	2001
M.S.	Computer Science	University of Maryland, USA	1997
B.Eng. (2nd Class Honor)	Computer Engineering	King Mongkut's institute of Technology Thonburi	1994

Affiliation: Faculty of Information and Communication Technology, Mahidol University

Interesting Research Topics or Specialties

Data and Knowledge Management, Data Warehousing, Data Mining, Data Engineering, Data Science, Natural Language Processing and Information Retrieval.

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Sangvat S, **Pluempitiwiriyawej C**. Khmer POS tagging using conditional random fields. Communications in Computer and Information Science. 2018; 781:169-78.	1	2018
Published research work	Thammasudjarit R, Plangprasopchok A, **Pluempitiwiriyawej C**. A novel label aggregation with attenuated scores for ground-truth identification of dataset annotation with crowdsourcing. IEICE Transactions on Information and Systems (E100D) 2017 apr;(4):750-7.	1	2017

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	**Pluempitiwiriyawej C**, Changsnit P, Chevapatr P, Na Ranong S. FING: Thai fingerspelling practice application. In: the 2017 Sixth International Student Projects Conference (ICT-ISPC); 2017 May 23-24; Skudai, Malaysia; 2017.	0.4	2017
Published research work	Srithonratkul B, Sintupetch P, Saysaman P, **Pluempitiwiriyawej C**, Chauksuvanit T. New2Thai. In: the 2016 Sixth International Student Projects Conference (ICT-ISPC); 2016 May 27-28; Nakhon Pathom, Thailand; 2016.	0.4	2016

Current Teaching Load

ITCS	621	Database Design and Administration	3 (3-0-6)
ITCS	697	Research Project in Computer Science	6 (0-18-0)
ITCS	698	Thesis	12 (0-36-0)

Assigned Teaching Load for the Proposed Program

ITCS	517	Machine Learning	3 (3-0-6)
ITCS	523	Data Sciences Essentials	3 (3-0-6)
ITCS	621	Database Design and Administration	3 (3-0-6)
ITCS	665	Natural Language Processing	3 (3-0-6)
ITCS	682	Advanced Database Systems	3 (3-0-6)
ITCS	697	Research Project in Computer Science	6 (0-18-0)
ITCS	698	Thesis	12 (0-36-0)

10. Name Assistant Professor Dr. Piyanuch Silapachote

Education

Degree	Degree Name	Institute	Year of Graduation
Ph.D.	Computer Science	University of Massachusetts Amherst, USA	2011
M.S.	Computer Science	University of Massachusetts Amherst, USA	2006
B.S.	Computer Science	Cornell University, USA	2001

Affiliation: Faculty of Information and Communication Technology, Mahidol University

Interesting Research Topics or Specialties

Computer Vision, Bio-Inspired Computing, Artificial Intelligence and Machine Learning, Pattern Analysis and Recognition, Image Understanding and Signal Processing, Computer Science and Engineering Education

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	**Silapachote P**, Srisuphab A, Banchongthanakit W. An Embedded System Device to Monitor Farrowing. In: the 5th International Conference on Advanced Informatics: Concepts Theory and Applications (ICAICTA); 2018 Aug 14-17; Krabi, Thailand; 2018.	0.4	2018

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Graven OH, Srisuphab A, **Silapachote P**, and et al. An Autonomous Indoor Exploration Robot Rover and 3D Modeling with Photogrammetry. In: the 2018 International ECTI Northern Section Conference on Electrical, Electronics, Computer and Telecommunications Engineering (ECTI-NCON); 2018 Feb 25-28; Chiang Rai, Thailand; 2018.	0.4	2018
Published research work	Boonyakiat P, **Silapachote P**. Segmentation of optic nerve head images. In: 14th International Joint Conference on Computer Science and Software Engineering (JCSSE). Nakhon Si Thammarat, Thailand; 2017. [Best Paper Award].	0.4	2017
Published research work	**Silapachote P**, Srisuphab A. Teaching and learning computational thinking through solving problems in artificial intelligence: on designing introductory Engineering and Computing courses. In: IEEE International Conference on Teaching, Assessment and Learning for Engineering (TALE). Bangkok, Thailand; 2016.	0.4	2017
Published research work	Srisuphab A, **Silapachote P**. Artificial neural networks for gesture classification with inertial motion sensing armbands. In: IEEE Region 10 Annual International Conference (TENCON). Marina Bay Sands, Singapore; 2016.	0.4	2017

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	**Silapachote P**, Srisuphab A, Phongpawarit J, Visetpalitpol S, Jirapasitchai S. REDLE: a platform in the cloud for elderly fall detection and push response tracking. ECTI Transactions on Computer and Information Technology. 2016 Nov;10(2):185-5.	1	2016
Published research work	Srisuphab A, **Silapachote P**, Phongpawarit J, Visetpalitpol S, Jirapasitchai S. REDLE: elderly care on clouds. In: the 13th International Joint Conference on Computer Science and Software Engineering (JCSSE). Khon Kaen, Thailand; 2016.	0.4	2016

Current Teaching Load

ITCS	508	Research Methodology in Computer Science	1 (1-0-2)
ITCS	517	Machine Learning	3 (3-0-6)
ITCS	661	Advanced Artificial Intelligence	3 (3-0-6)
ITCS	697	Research Project in Computer Science	6 (0-18-0)
ITCS	698	Thesis	12 (0-36-0)

Assigned Teaching Load for the Proposed Program

ITCS	509	Research Methodology in Computer Science	2 (2-0-4)
ITCS	517	Machine Learning	3 (3-0-6)
ITCS	661	Advanced Artificial Intelligence	3 (3-0-6)
ITCS	697	Research Project in Computer Science	6 (0-18-0)
ITCS	698	Thesis	12 (0-36-0)

11. Name Assistant Professor Dr. Robert Egrot

Education

Degree	Degree Name	Institute	Year of Graduation
Ph.D.	Computer Science	University College London, United Kingdom	2013
M.Sc.	Computing	Oxford Brookes University, United Kingdom	2008
B.A.	Mathematics	University of Oxford, United Kingdom	2007

Affiliation: Faculty of Information and Communication Technology, Mahidol University

Interesting Research Topics or Specialties

Mathematical logic and order theory.

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	**Egrot R**. No finite axiomatizations for posets embeddable into distributive lattices. Annals of Pure and Applied Logic. 2018 Mar; 169(3): 235-42.	1	2018
Published research work	**Egrot R.** Closure operators, frames and neatest representations**.** Bulletin of the Australian Mathematical Society 2017 Dec; 96**:** 361**-**73**.**	1	2017
Published research work	**Egrot R.** Non**-**elementary classes of representable posets**.** Proceedings of American Mathematical Society 2017 Nov;145**(**11**):**4675**-**85**.**	1	2017

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	**Egrot R.** Representable posets**.** Journal of Applied Logic 2016 Jul;16:60-71**.**	1	2016

Current Teaching Load

ITCS	601	Seminar in Computer Science I	1 (1-0-2)
ITCS	643	Software Engineering	3 (3-0-6)
ITCS	697	Research Project in Computer Science	6 (0-18-0)
ITCS	698	Thesis	12 (0-36-0)

Assigned Teaching Load for the Proposed Program

ITCS	507	Mathematical Foundations for Computer Science	3 (3-0-6)
ITCS	603	Seminar in Computer Science	1 (1-0-2)
ITCS	643	Software Engineering	3 (3-0-6)
ITCS	697	Research Project in Computer Science	6 (0-18-0)
ITCS	698	Thesis	12 (0-36-0)

12. Name Assistant Professor Dr. Songsri Tangsripairoj

Education

Degree	Degree Name	Institute	Year of Graduation
Ph.D.	Computer Science	Oklahoma State University, USA	2004
M.Sc.	Computer Science	Mahidol University	1996
B.Sc. (2^{nd} Class Honor)	Computer Science	Thammasat University	1994

Affiliation: Faculty of Information and Communication Technology, Mahidol University

Interesting Research Topics or Specialties

Database systems, Data Warehousing, Data Mining, Software Engineering

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	**Tangsripairoj S**, Kittirattanaviwat P, Koophirun K, Raksaithong L. Bokk Meow: A Mobile Application for Finding and Tracking Pets. In: the 15^{th} International Joint Conference on Computer Science and Software Engineering (JCSSE); 2018 Jul 11-13; Nakhon Pathom, Thailand; 2018.	0.4	2018
Published research work	**Tangsripairoj S**, Khongson K, Puangnak P, Boonserm Y. SkinProf: An Android Application for Smart Cosmetic and Skincare Users. In: the 15^{th} International Joint Conference on Computer Science and Software Engineering (JCSSE); 2018 Jul 11-13; Nakhon Pathom, Thailand; 2018.	0.4	2018

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	**Tangsripairoj S**, Natseevatana P. A business intelligence system for radio communication licensing: a case study of the National Broadcasting and Telecommunications Commission of Thailand. In: the 15th International Joint Conference on Computer Science and Software Engineering (JCSSE); 2018 Jul 11-13; Nakhon Pathom, Thailand; 2018.	0.4	2018
Published research work	Kongvitayanont V, Pipitrat P, Sathong K, **Tangsripairoj S.** Bloody buddy: a biology game-based learning application. In: the 2017 Sixth International Student Projects Conference (ICT-ISPC); 2017 May 23-24; Skudai, Malaysia; 2017.	0.4	2017
Published research work	Ghoshachandra P, Limkriengkrai C, Wimonsakcharoen P, **Tangsripairoj S.** oHealth: a self-care android application for senior citizens with hypertension. In: the 2017 Sixth International Student Projects Conference (ICT-ISPC); 2017 May 23-24; Skudai, Malaysia; 2017.	0.4	2017
Published research work	Rapeepisarn T, Tatiyanupanwong S, Kornvisitvatin B, **Tangsripairoj S**. iRelief: an android application for smartphone syndrome prevention and treatment. In: the 2016 Sixth International Student Projects Conference (ICT-ISPC); 2016 May 27-28; Nakhon Pathom, Thailand; 2016.	0.4	2016

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Suthumchai N, Thongsukh S, Yusuksataporn P, **Tangsripairoj S**. FoodForCare: an android application for self-care with healthy food. In: the 2016 Sixth International Student Projects Conference (ICT-ISPC); 2016 May 27-28; Nakhon Pathom, Thailand; 2016.	0.4	2016

Current Teaching Load

ITCS	601	Seminar in Computer Science I	1 (1-0-2)
ITCS	628	Data Mining and Knowledge Discovery	3 (3-0-6)
ITCS	697	Research Project in Computer Science	6 (0-18-0)
ITCS	698	Thesis	12 (0-36-0)

Assigned Teaching Load for the Proposed Program

ITCS	603	Seminar in Computer Science	1 (1-0-2)
ITCS	621	Database Design and Administration	3 (3-0-6)
ITCS	682	Advanced Database Systems	3 (3-0-6)
ITCS	697	Research Project in Computer Science	6 (0-18-0)
ITCS	698	Thesis	12 (0-36-0)

13. Name Assistant Professor Dr. Sukanya Pongsuphap

Education

Degree	Degree Name	Institute	Year of Graduation
Ph.D.	Intelligent System Science	Tokyo Institute of Technology, Japan	1999
M.Eng.	Intelligent System Science	Tokyo Institute of Technology, Japan	1996
B.S. (1st Class Honor)	Mathematics	Chiang Mai University	1984

Affiliation: Faculty of Information and Communication Technology, Mahidol University

Interesting Research Topics or Specialties

Artificial Intelligence, Pattern Recognition, Biomedical Image and Signal Processing

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Rojratanavijit J, Vichitthamaros P, **Phongsuphap S**. Acquiring sentiment from twitter using supervised learning and lexicon-based techniques. Walailak Journal of Science and Technology (Open Access). 2018 Jan; 15(1):63-80.	1	2018

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Charoensawan P, **Phongsuphap S**, Shimizu I. Comparison of fabric color naming using RGB and HSV color models. In: the 15th International Joint Conference on Computer Science and Software Engineering (JCSSE); 2018 Jul 11-13; Nakhon Pathom, Thailand; 2018.	0.4	2018
Published research work	Roty S, Waritkapun C, Tanawongsuwan R, **Phongsuphap S**. Analysis of microcalcification features for pathological classification of mammogrmas. In: the 10th Biomedical Engineering International Conference (BMEiCON 2017); 2017 Aug 31 – Sep 2; Hokkaido, Japan; 2017.	0.4	2017

Current Teaching Load

ITCS	601	Seminar in Computer Science I	1 (1-0-2)
ITCS	602	Seminar in Computer Science II	1 (1-0-2)
ITCS	663	Image and Signal Processing	3 (3-0-6)
ITCS	695	Independent Study	3 (0-6-3)
ITCS	697	Research Project in Computer Science	6 (0-18-0)
ITCS	698	Thesis	12 (0-36-0)

Assigned Teaching Load for the Proposed Program

ITCS	523	Data Sciences Essentials	3 (3-0-6)
ITCS	603	Seminar in Computer Science	1 (1-0-2)
ITCS	665	Natural Language Processing	3 (3-0-6)
ITCS	696	Advanced Topics in Computer Science	3 (0-6-3)
ITCS	697	Research Project in Computer Science	6 (0-18-0)
ITCS	698	Thesis	12 (0-36-0)

14. Name Assistant Professor Dr. Suppawong Tuarob

Education

Degree	Degree Name	Institute	Year of Graduation
Ph.D.	Computer Science and Engineering	Pennsylvania State University, USA	2015
M.S.	Industrial Engineering	Pennsylvania State University, USA	2015
M.SE.	Computer Science and Engineering	University of Michigan, Ann Arbor, USA	2010
B.SE.	Computer Science	University of Michigan, Ann Arbor, USA	2009

Affiliation: Faculty of Information and Communication Technology, Mahidol University

Interesting Research Topics or Specialties

Machine Learning Applications, Data Science and Engineering, Data and Social Media Mining, Natural Language Processing

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Wettayakorn P, Traivijitkhun S, Phetchai P, **Tuarob S**. A deep learning methodology for automatic assessment of portrait image aesthetic quality. In: the 15th International Joint Conference on Computer Science and Software Engineering (JCSSE); 2018 Jul 11-13; Nakhon Pathom, Thailand; 2018.	0.4	2018

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	**Tuarob S**, Lim S, Tucker CS. Automated Discovery of Product Feature Inferences Within Large-Scale Implicit Social Media Data. Journal of Computing and Information Science in Engineering. 2018 Jun; 18(2).	1	2018
Published research work	**Tuarob S**, Strong R, Chandra A, Tucker CS. Discovering discontinuity in big financial transaction data. ACM Transactions on Management Information Systems. 2018 Feb; 9(1).	1	2018
Published research work	**Tuarob S**, Mitrpanont JL. Automatic discovery of abusive Thai language ssages in social networks. In: the 19th International Conference on Asia-Pacific Digital Libraries (ICADL); 2017 Nov 13-15; Bangkok, Thailand; 2017.	0.4	2017
Published research work	Safder I, Sarfraz J, Hassan S-U, Ali M, **Tuarob S**. Detecting target text related to algorithmic efficiency in scholarly big data using recurrent convolutional neural network model. In: the 19th International Conference on Asia-Pacific Digital Libraries (ICADL); 2017 Nov 13-15; Bangkok, Thailand; 2017.	0.4	2017
Published research work	Thaipisutikul T, **Tuarob S**. MOOCs as an intelligent online learning platform in Thailand: Past, present, future challenges and opportunities. In: the 10th International Conference on Ubi-Media Computing and Workshops (Ubi-Media); 2017 Aug 1-4; Pattaya, Thailand; 2017.	0.4	2017

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Thaipisutikul T, Tuarob S. Beyond the tweets: Discovering factors that influence TV series preferences from ubiquitous social networks. In: the 10th International Conference on Ubi-Media Computing and Workshops (Ubi-Media); 2017 Aug 1-4; Pattaya, Thailand; 2017.	0.4	2017
Published research work	Tantothai P, Srisittimongkol C, Rukijkanpanich W, **Tuarob S**. mipMAP: A mobile application for proximate social network communication. In: the 2017 Sixth International Student Projects Conference (ICT-ISPC); 2017 May 23-24; Skudai, Malaysia; 2017.	0.4	2017
Published research work	Suppasert P, Pungprasert R, Putkhaw K, **Tuarob S**. Newsaday: A personalized Thai news recommendation system. In: the 2017 Sixth International Student Projects Conference (ICT-ISPC); 2017 May 23-24; Skudai, Malaysia; 2017.	0.4	2017
Published research work	**Tuarob S**, Tucker CS, Kumara S, Giles CL, Pincus AL, Conroy DE, Ram N. How are you feeling?: a personalized methodology for predicting mental states from temporally observable physical and behavioral information. Journal of Biomedical Informatics 2017 apr;68:1-19.	1	2017

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	**Tuarob S**. Improving pseudo-code detection in ubiquitous scholarly data using ensemble machine learning. In: the 20th International Computer Science and Engineering Conference: Smart Ubiquitos Computing and Knowledge (ICSEC); 2016 Dec 14-17; Chiang Mai, Thailand; 2016.	0.4	2017
Published research work	**Tuarob S**, Tucker CS. Automated discovery of product preferences in ubiquitous social media data: a case study of automobile market. In: the 20th International Computer Science and Engineering Conference: Smart Ubiquitos Computing and Knowledge (ICSEC); 2016 Dec 14-17; Chiang Mai, Thailand; 2016.	0.4	2017

Current Teaching Load

ITCS	628	Data Mining and Knowledge Discovery	3 (3-0-6)
ITCS	697	Research Project in Computer Science	6 (0-18-0)
ITCS	698	Thesis	12 (0-36-0)

Assigned Teaching Load for the Proposed Program

ITCS	523	Data Sciences Essentials	3 (3-0-6)
ITCS	628	Data Mining and Knowledge Discovery	3 (3-0-6)
ITCS	665	Natural Language Processing	3 (3-0-6)
ITCS	697	Research Project in Computer Science	6 (0-18-0)
ITCS	698	Thesis	12 (0-36-0)

15. Name Assistant Professor Dr. Thanwadee Sunetnanta

Education

Degree	Degree Name	Institute	Year of Graduation
Ph.D.	Distributed Software Engineering	Imperial College, United Kingdom	1999
M.Sc.	Foundation of Advanced Information Technology	Imperial College, United Kingdom	1993
B.Sc. (2^{nd} Class Honor)	Computer Science	Thammasat University	1991

Affiliation: Faculty of Information and Communication Technology, Mahidol University

Interesting Research Topics or Specialties

Software Engineering (in particular, requirement engineering, software process improvement, qualitative software quality), Knowledge Engineering, Internet Technology, Software Engineering Education

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Wattanakriengkrai S, Maipradit R, Hata H, Choetkiertikul M, **Sunetnanta T**, Matsumoto K. Identifying Design and Requirement Self-Admitted Technical Debt Using N-Gram IDF. In: the 9th IEEE International Workshop on Empirical Software Engineering in Practice (IWESEP2018), 2018 Dec 4; Nara, Japan, 2018. [Best Paper Award]	0.4	2018

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Junjoewong L, Sangnapachai S and **Sunetnanta T**. ProCircle: A promotion platform using crowdsourcing and web data scraping technique. In: the 7th ICT International Student Project Conference (ICT-ISPC2018), 2018 July 11-13; Nakorn Pathom, Thailand; 2018.	0.4	2018
Published research work	Roongsangjan S, **Sunetnanta T**, Mongkolwat P. Multi-level compliance measurements for software process appraisal. In: the 5th International Workshop on Quantitative Approaches to Software Quality (QuASoQ); 2017 Dec 4; Nanjing, China; 2017.	0.4	2018
Published research work	Roongsangjan S, **Sunetnanta T**, Mongkolwat P. Structuring the knowledge for software process appraisal towards semi-automated support. In: the 24th Asia-Pacific Software Engineering Conference (APSEC); 2017 Dec 4-8; Nanjing, China; 2017.	0.4	2018
Published research work	Roongsangjan S, **Sunetnanta T**, Mongkolwat P. Using FCA implication to determine the compliance of model practice implementation for software process. ACM International Conference Proceeding Series 2017 Jan; 64-70.	0.4	2017

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Peuchpanngarm C, Srinitiworawong P, Samerjai W, **Sunetnanta T.** DIY sensor-based automatic control mobile application for hydroponics. In: the 2016 Sixth International Student Projects Conference (ICT-ISPC); 2016 May 27-28; Nakhon Pathom, Thailand; 2016.	0.4	2016
Published research work	**Sunetnanta T**, Suwannaroj S, Sangpar P. ISO/IEC 29110 for competitiveness - challenges of digital cluster development in Thailand. In: ISO/IEC JTC 1 SC 7 Working Group 24, 10th Anniversary Overview of accomplishments; 2016. Available from http://profs.etsmtl.ca/ claporte/ Publications/Publications/Working%20 Group%2024_10th_Anniversary.pdf	0.4	2016

Current Teaching Load

ITCS	643	Software Engineering	3 (3-0-6)
ITCS	697	Research Project in Computer Science	6 (0-18-0)
ITCS	698	Thesis	12 (0-36-0)

Assigned Teaching Load for the Proposed Program

ITCS	513	Project Management	3 (3-0-6)
ITCS	521	Agile Software Product Management	3 (3-0-6)
ITCS	551	Service Oriented and Cloud Computing	3 (3-0-6)
ITCS	613	Tools and Environments for Software Development	3 (3-0-6)
ITCS	615	Empirical Software Engineering	3 (3-0-6)
ITCS	643	Software Engineering	3 (3-0-6)
ITCS	644	Software Quality Assurance	3 (3-0-6)
ITCS	697	Research Project in Computer Science	6 (0-18-0)
ITCS	698	Thesis	12 (0-36-0)

16. Name Assistant Professor Dr. Thitinan Tantidham

Education

Degree	Degree Name	Institute	Year of Graduation
Ph.D.	Computer Science	RWTH Aachen University, Germany	2010
M.Sc.	Computer Science	Mahidol University	1997
B.Eng.	Computer Engineering	Kasetsart University	1993

Affiliation: Faculty of Information and Communication Technology, Mahidol University

Interesting Research Topics or Specialties

Computer and Data Communications, Green Computing and Applications, Embedded System and Applications

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	**Tantidham T**, Ngamsuriyaroj S, Tungamnuayrith N, Nildam T, Banthao K, Intakot P. Energy consumption collection design for smart building. In: the Ninth IntNULLl Conference on Information and Communication Technology for Embedded Systems and the 11th IntNULLl Conference on Embedded Systems and Intelligent Technology (ICESIT-ICICTES); 2018.	0.4	2018

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Aung YN, **Tantidham T**. Review of Ethereum: smart home case study. In: the 2nd International Conference on Information Technology (InCIT); 2017 Nov 2-3; Nakhon Pathom, Thailand; 2017.	0.4	2018
Published research work	ดวงหทัย แพงจิกรี, ภูวเดช อินทร์ตะโคตร, เจริญศรี มิตรภานนท์, **ฐิตินันท์ ตันติธรรม**, ศุจิกา ศรีนันทกุล. การพัฒนาระบบเซ็นเซอร์ต้นแบบ ด้วย IR Proximity Sensor เพื่อตรวจจับระยะห่างที่ปลอดภัยในการมองจอคอมพิวเตอร์. ใน: เอกสารการประชุมวิชาการระดับประเทศด้านเทคโนโลยีสารสนเทศ (National Conference on Information Technology: NCIT) ครั้งที่ ๙; ๑-๒ พฤศจิกายน ๒๕๖๐. นครปฐม; ๒๕๖๐.	0.4	2018
Published research work	Daramas A, Pattarakitsophon S, Eiumtrakul K, **Tantidham T**, Tamkittikhun N. HIVE: home automation system for intrusion detection. In: the 2016 Sixth International Student Projects Conference (ICT-ISPC); 2016 May 27-28; Nakhon Pathom, Thailand; 2016.	0.4	2016

Current Teaching Load

ITCS	697	Research Project in Computer Science	6 (0-18-0)
ITCS	698	Thesis	12 (0-36-0)

Assigned Teaching Load for the Proposed Program

ITCS	522	Edge Computing and Internet of Things	3 (3-0-6)
ITCS	552	Mobile and Pervasive Computing	3 (3-0-6)
ITCS	612	Network Programming	3 (3-0-6)
ITCS	697	Research Project in Computer Science	6 (0-18-0)
ITCS	698	Thesis	12 (0-36-0)

17. Name Assistant Professor Dr. Worapan Kusakunniran

Education

Degree	Degree Name	Institute	Year of Graduation
Ph.D.	Computer Science and Engineering	University of New South Wales, Australia	2013
B.Eng. (1st Class Honor)	Computer Engineering	University of New South Wales, Australia	2008

Affiliation: Faculty of Information and Communication Technology, Mahidol University

Interesting Research Topics or Specialties

Gait Recognition, Biometrics, Pattern Recognition, Medical Image Processing, Computer Vision, Machine Learning, Action and Behavioral Analysis, Image and Video Processing, Object Tracking, Object Classification and Retrieval

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Tirasirichai B, Thanomboon P, Soontorntham P, **Kusakunniran W**, Robinson M. Bloom Balance: Calorie Balancing Application with Scientific Validation. In: the 15th International Joint Conference on Computer Science and Software Engineering (JCSSE); 2018 Jul 11-13; Nakhon Pathom, Thailand; 2018.	0.4	2018

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Limsuwankesorn C, **Kusakunniran W**, Haga J, Thipajaruratch T, Thongkanchorn K, Borwarnginn P, Pornprasatpol N. Digital game-based learning for delivering technical content. In: the 11th Annual International Conference on Computer Games Multimedia & Allied Technologys (CGAT); 2018 Jun 25; Singapore; 2018.	0.4	2018
Published research work	Pornprasatpol N, **Kusakunniran W**, Haga J, Thipajaruratch T, Thongkanchorn K, Limsuwankesorn C. Interactive storytelling game for delivering technical knowledge to the genneral pubilc: a case sutdy fo delivering IaaS migration using the FELIX federated testbed knowledge. In: the 11th Annual International Conference on Computer Games Multimedia & Allied Technologys (CGAT); 2018 Jun 25; Singapore; 2018.	0.4	2018
Published research work	**Kusakunniran W**, Wu Q, Ritthipravat P, Zhang J. Hard exudates segmentation based on learned initial seeds and iterative graph cut. Computer Methods and Programs in Biomedicine 2018 May;158:173-83.	1	2018

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	**Kusakunniran W**, Wiratsudakul A, Chuachan U, Kanchanapreechakorn S, Imaromkul T. Automatic cattle identification based on fusion of texture features extracted from muzzle images. In: the 19th IEEE International Conference on Industrial Technology (ICIT2018); 2018 Feb 19-22; Lyon Congress CenterLyon, France; 2018. p.1484-9.	0.4	2018
Published research work	Yoopoo K, Ongsritakul S, Tirasirichai B, **Kusakunniran W**, Robinson M. Regression model for predicting the maximum load of the movement. In: the 2nd International Conference on Information Technology (InCIT), 2017 Nov 2-3; Nakhon Pathom, Thailand; 2017.	0.4	2018
Published research work	**Kusakunniran W**, Wu Q, Ritthipravat P, Zhang J. Three-stages hard exudates segmentation in retinal images. In: International Conference on Information Technology and Electrical Engineering (ICITEE); 2017 Oct 12-13; Phuket, Thailand; 2017.	0.4	2018
Published research work	**Kusakunniran W**, Wu Q, Zhang J. Action recognition based on correlated codewords of body movements. In: International Conference on Digital Image Computing: Techniques and Applications (DICTA); 2017 Nov 29 – Dec 1; Sydney, Australia; 2017.	0.4	2017

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Yao L, **Kusakunniran W**, Wu Q, Zhang J, Tang Z. Robust gait recognition under unconstrained environments using hybrid descriptions. In: International Conference on Digital Image Computing: Techniques and Applications (DICTA); 2017 Nov 29 – Dec 1; Sydney, Australia; 2017.	0.4	2017
Published research work	Jiang C, **Kusakunniran W**, Pornprasatpol N, Limsuwankesorn C, Li Y. Smart security guard scheduling system based on the reinforcement learning. In: the 21st International Computer Science and Engineering Conference: Smart Ubiquitos Computing and Knowledge (ICSEC); 2017 Nov 15-18; Bangkok, Thailand; 2017.	0.4	2017
Published research work	Kanchanapreechakorn S, **Kusakunniran W**, Robust human re-identification using mean shape analysis of face images. In: IEEE International Conference of Region 10 (TENCON); 2017 Nov 5-8; Penang, Malaysia; 2017.	0.4	2017
Published research work	**Kusakunniran W**, Prachasri N, Dirakbussarakom N, Yangchaem D. Distinguishing ACL patients from healthy individuals using multilayer perceptron on motion patterns. In: the 9th International Conference on Knowledge and Smart Technology (KST); 2017 Feb 1-4; Chonburi, Thailand; 2017. p. 1-5.	0.4	2017

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	**Kusakunniran W**, Rattanachoosin J, Sutassananon K, Anekkitphanich P. Automatic quality assessment and segmentation of diabetic retinopathy images. In: IEEE International Conference of Region 10 (TENCON); 2016 Nov 22-25; Singapore; 2016. p. 997-1000.	0.4	2017
Published research work	**Kusakunniran W**, Krungkaew R. Dynamic codebook for foreground segmentation in a video. ECTI Transactions on Computer and Information Technology (ECTI-CIT) 2016 Nov;10(2):144-55.	1	2016
Published research work	Krungkaew R, **Kusakunniran W.** Foreground segmentation in a video by using a novel dynamic codebook. In: the International Conference on Electrical Engineering/Electronics, Computer, Telecommunications and Information Technology (ECTI-CON); 2016 Jun; Thailand; 2016. p.1-6.	0.4	2016
Published research work	Prachasri N, Yangchaem D, Dirakbussarakom N, **Kusakunniran W**, Differentiation of motion patterns between anterior cruciate ligament injuries and healthy individuals. In: the 2016 Sixth International Student Projects Conference (ICT-ISPC); 2016 May 27-28; Nakhon Pathom, Thailand; 2016. p. 109-12.	0.4	2016

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Worrawichaipat P, Bhakkalin S, Suthisa-ngiam T, **Kusakunniran W**. I'm road, fury traffic: car running game application. In: the 2016 Sixth International Student Projects Conference (ICT-ISPC); 2016 May 27-28; Nakhon Pathom, Thailand; 2016. p. 174-7.	0.4	2016

Current Teaching Load

ITCS	697	Research Project in Computer Science	6 (0-18-0)
ITCS	698	Thesis	12 (0-36-0)

Assigned Teaching Load for the Proposed Program

ITCS	507	Mathematical Foundations for Computer Science	3 (3-0-6)
ITCS	659	Multimedia Technologies and Applications	3 (3-0-6)
ITCS	697	Research Project in Computer Science	6 (0-18-0)
ITCS	698	Thesis	12 (0-36-0)

18. **Name** Lecturer Dr. Assadarat Khurat

Education

Degree	Degree Name	Institute	Year of Graduation
Dr.-Ing.	Computer Security	Hamburg University of Technology, Germany	2014
M.Sc.	Information and Communication Systems	Hamburg University of Technology, Germany	2005
B.Eng. (2nd Class Honor)	Telecommunication Engineering	King Mongkut's Institute of Technology Ladkrabang	2001

Affiliation: Faculty of Information and Communication Technology, Mahidol University

Interesting Research Topics or Specialties

Privacy Policy Languages, Access Control, Ontology, Intrusion Detection System, Risk Analysis

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Wongvises C, **Khurat A**, Fall D, Kashihara S. Fault tree analysis-based risk quantification of smart homes. In: the 2nd International Conference on Information Technology (InCIT), 2017 Nov 2-3; Nakhon Pathom, Thailand; 2017.	0.4	2018

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Sowattana C, Viriyasitavat W, **Khurat A**. Distributed sonsensus-based Sybil nodes detection in VANETs. In: the 14th International Joint Conference on Computer Science and Software Engineering (JCSSE); 2017 Jul 12-14; Nakhon Sri Thammarat, Thailand; 2017.	0.4	2017
Published research work	**Khurat A**, Suntisrivaraporn B, Gollmann D. Privacy policies verification in composite services using OWL. Computers and Security 2017 Jun; 67:122-41.	1	2017
Published research work	Inso K, Noicharoen P, Meathatanunchai N, **Khurat A**. Play it safe: a personal security application on Android platform. In: the 2016 Sixth International Student Projects Conference (ICT-ISPC); 2016 May 27-28; Nakhon Pathom, Thailand; 2016.	0.4	2016

Current Teaching Load

ITCS	697	Research Project in Computer Science	6 (0-18-0)
ITCS	698	Thesis	12 (0-36-0)

Assigned Teaching Load for the Proposed Program

ITCS	509	Research Methodology in Computer Science	2 (2-0-4)
ITCS	697	Research Project in Computer Science	6 (0-18-0)
ITCS	698	Thesis	12 (0-36-0)

19. Name Lecturer Dr. Karin Sumongkayothin

Education

Degree	Degree Name	Institute	Year of Graduation
Ph.D.	Information Science	Japan Advance Institute of Science and Technology, Japan	2017
Ph.D.	Engineering and Technology	Sirindhorn International Institute of Technology	2017
M.Eng.	Microelectronics	Asian Institute of Technology	2003
B.Eng.	Electrical Engineering	Kasetsart University	1999

Affiliation: Faculty of Information and Communication Technology, Mahidol University

Interesting Research Topics or Specialties

Applied Cryptography, Blockchain Technology, Network Security, Reverse Engineering, Malware Analysis, Offensive and Defensive Security

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	**Sumongkayothin K**. M-ORAM revisited: Security and construction updates. In: the 14th International Conference on Information Security Practice and Experience (ISPEC); 2018 Sep 25-27; Tokyo, Japan; 2018.	0.4	2018

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Gordon S, Huang X, Miyaji A, Su C, **Sumongkayothin K**, Wipusitwarakun K. Recursive Matrix Oblivious RAM: an ORAM construction for constrained storage device. IEEE Transactions on Information Forensics and Security. 12(12):3024-3038; 2017.	1	2017
Published research work	Gordon S, Miyaji A, Su C, **Sumongkayothin K**. A Matrix Based ORAM: design, implementation and experimental analysis. IEICE Transactions. 99-D(8):2044-2055; 2016.	0.4	2016
Published research work	**Sumongkayothin K**, Gordon S, Miyaji A, Su C, Wipusitwarakun K. Recursive M-ORAM: a matrix ORAM for clients with constrained storage space. In: the 6th International Conference of Applications and Techniques in Information Security (ATIS); 2016.	0.4	2016
Published research work	Gordon S, Miyaji A, Su C, **Sumongkayothin K**. Security and experimental performance analysis of a matrix ORAM. In: the IEEE International Conference on Communications (ICC); 2016 May; Kuala Lumpur, Malaysia; 2016.	0.4	2016

Current Teaching Load

ITCS	631	Computer Communications and Networks	3 (3-0-6)
ITCS	697	Research Project in Computer Science	6 (0-18-0)
ITCS	698	Thesis	12 (0-36-0)

Assigned Teaching Load for the Proposed Program

ITCS	509	Research Methodology in Computer Science	2 (2-0-4)
ITCS	631	Computer Communications and Networks	3 (3-0-6)
ITCS	697	Research Project in Computer Science	6 (0-18-0)
ITCS	698	Thesis	12 (0-36-0)

20. Name Lecturer Dr. Mores Prachyabrued

Education

Degree	Degree Name	Institute	Year of Graduation
Ph.D.	Computer Science	University of Louisiana at Lafayette, USA	2013
M.S.	Computer Science	University of Louisiana at Lafayette, USA	2007
M.Eng.	Computer Engineering	Kasetsart University	2002
B.Eng.	Computer Engineering	Kasetsart University	1998

Affiliation: Faculty of Information and Communication Technology, Mahidol University

Interesting Research Topics or Specialties

Virtual Reality, Entertainment Computing, Computer Graphics, Artificial Intelligence

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	**Prachyabrued M,** Robert OP. Development of attack helicopter simulator. In: 5th Asian Conference on Defence Technology (ACDT); 2018 Oct 25-27; Hanoi, Vietnam; 2018.	0.4	2018

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Mongkolwat P, Siriapisith T, **Prachyabrued M**. A Perspective on the needs for simulation and gaming technology in outpatient care. In: The 49th International Conference of the International Simulation & Gaming Association (ISAGA), 2018 July 9-13; Nakhon Pathom, Thailand; 2018.	0.4	2018
Published research work	**Prachyabrued M**, Borst C. Design and evaluation of visual interpenetration cues in virtual grasping. IEEE Transactions on isualization and Computer Graphics 2016 Jun;22(6):1718-31.	1	2016

Current Teaching Load

ITCS	697	Research Project in Computer Science	6 (0-18-0)
ITCS	698	Thesis	12 (0-36-0)

Assigned Teaching Load for the Proposed Program

ITCS	659	Multimedia Technologies and Applications	3 (3-0-6)
ITCS	697	Research Project in Computer Science	6 (0-18-0)
ITCS	698	Thesis	12 (0-36-0)

21. Name Lecturer Dr. Pattanasak Mongkolwat

Education

Degree	Degree Name	Institute	Year of Graduation
Ph.D.	Computer Science	Illinois Institute of Technology, USA	1996
M.Sc.	Computer Science	McNeese State University, USA	1991
B.Sc.	Computer Science	University of the Thai Chamber of Commerce	1988

Affiliation: Faculty of Information and Communication Technology, Mahidol University

Interesting Research Topics or Specialties

Medical and imaging Informatics, Software Engineering, Object-Oriented Programming

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Taongern S, Eiamboonsert P, Nuamsiri W, **Mongkolwat P**, Pengsart P. dCollective: a configurable electronic data collection form and information dashboard. In: the 15th International Joint Conference on Computer Science and Software Engineering (JCSSE); 2018 Jul 11-13; Nakhon Pathom, Thailand; 2018.	0.4	2018

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Owolabi M, Ogbole G, Akinyemi R, Salaam K, Akpa O, **Mongkolwat P**, and et al. Development and reliability of a user-friendly multicenter phenotyping application for hemorrhagic and ischemic stroke. Journal of Stroke and Cerebrovascular Diseases 2017 Jul;11:2662-70.	1	2017
Published research work	Roongsangjan S, Sunetnanta T, **Mongkolwat P**. Using FCA implication to determine the compliance of model practice implementation for software process. In: the 2017 International Conference on Management Engineering, Software Engineering and Service Sciences (ICMSS); 2017 Jan 14-16; Wuhan, China; 2017.	0.4	2017
Published research work	Dandamudi S, Collins JD, Carr JC, **Mongkolwat P**, Rahsepar AA, Tomson TT, Verma N, Arora R, Chicos AB, Kim SS, Lin AC, Passman RS, Knight BP. The Safety of cardiac and thoracic magnetic resonance imaging in patients with cardiac implantable electronic devices. Academic Radiology 2016 Dec;23(12):1489-1505.	1	2016

Current Teaching Load

ITCS	508	Research Methodology in Computer Science	1 (1-0-2)
ITCS	601	Seminar in Computer Science I	1 (1-0-2)
ITCS	697	Research Project in Computer Science	6 (0-18-0)
ITCS	698	Thesis	12 (0-36-0)

Assigned Teaching Load for the Proposed Program

ITCS	509	Research Methodology in Computer Science	2 (2-0-4)
ITCS	603	Seminar in Computer Science	1 (1-0-2)
ITCS	697	Research Project in Computer Science	6 (0-18-0)
ITCS	698	Thesis	12 (0-36-0)

22. Name Lecturer Dr. Pawitra Chiravirakul

Education

Degree	Degree Name	Institute	Year of Graduation
Ph.D.	Computer Science	University of Bath, United Kingdom	2015
M.Sc.	Software Systems Engineering	University College London, United Kingdom	2010
B.Sc. (1st Class Honor)	Information and Communication Technology	Mahidol University	2008

Affiliation: Faculty of Information and Communication Technology, Mahidol University

Interesting Research Topics or Specialties

Cognitive Science, Human-computer Interaction and User Behavioural Model

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Suttichailux P, Tiewchroen P, Mahalao N, **Chiravirakul P**. ChanzeMan: donation master. In: the 2018 Seventh ICT International Student Project Conference (ICT-ISPC); 2018 Jul 11-13; Nakhon Pathom, Thailand; 2018.	0.4	2018

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Rakfukfon K, Siraphaibool S, Rattanadechaphitak S, **Chiravirakul P**. MySRT management system for senior project document repository and tracking. In: Proceedings of the 2017 Sixth International Student Projects Conference (ICT-ISPC); 2017 May 23-24; Skudai, Malaysia; 2017.	0.4	2017
Published research work	Pisalayon N, Sae-Lim J, Rojanasit N, **Chiravirakul P**. FINDEREST: identifying personal skills and possible fields of study based on personal interests on social media content. In: Proceedings of the 2017 Sixth International Student Projects Conference (ICT-ISPC); 2017 May 23-24; Skudai, Malaysia; 2017.	0.4	2017
Published research work	Suwattananon N, Thongliam N, Wongwachirawanich N, **Chiravirakul P**. BeEvaluator: an online evaluation system with KPIs matching. In: Proceedings of the 2016 Fifth ICT International Student Project Conference (ICT-ISPC); 2016 May 27-28; Nakhon Pathom, Thailand; 2016.	0.4	2016
Published research work	Wangskarn N, Siritantitam J, Meesri N, **Chiravirakul P**. Flowty-Flow: a web application for preparation and distribution of standard operating procedures. In: Proceedings of the 2016 Fifth ICT International Student Project Conference (ICT-ISPC); 2016 May 27-28; Nakhon Pathom, Thailand; 2016.	0.4	2016

Current Teaching Load

ITCS	658	Human Computer Interaction	3 (3-0-6)
ITCS	697	Research Project in Computer Science	6 (0-18-0)
ITCS	698	Thesis	12 (0-36-0)

Assigned Teaching Load for the Proposed Program

ITCS	658	Human Computer Interaction	3 (3-0-6)
ITCS	696	Advanced Topics in Computer Science	3 (0-6-3)
ITCS	697	Research Project in Computer Science	6 (0-18-0)
ITCS	698	Thesis	12 (0-36-0)

23. Name Lecturer Dr. Siripen Pongpaichet

Education

Degree	Degree Name	Institute	Year of Graduation
Ph.D.	Computer Science	University of California, Irvine, USA	2016
M.S.	Computer Science	University of California, Irvine, USA	2011
B.Sc. (1st Class Honor)	Information and Communication Technology	Mahidol University	2008

Affiliation: Faculty of Information and Communication Technology, Mahidol University

Interesting Research Topics or Specialties

Situation Recognition, Spatial-Temporal Data Analytics, Event Streams Processing Engines, Micro-Reporting Systems, Database Design and Models, Personal to Public Health Decision Systems

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Phongoen N, Kormpho P, Liawsomboon P, **Pongpaichet S**. Smart complaint management system. In: the 2018 Seventh ICT International Student Project Conference (ICT-ISPC); 2018 Jul 11-13; Nakhon Pathom, Thailand; 2018.	0.4	2018
Published research work	Tang M, Nie F, **Pongpaichet S**, Jain R. Semi-supervised learning on large-scale geotagged photos for situation recognition. Journal of Visual Communication and Image Representation 2017 Oct;48:310-6.	1	2017

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Sahay A, Kumar A, **Pongpaichet S**, Jain R. Multimedia rescue systems for floods. In: the 9th International Conference on Management of Digital EcoSystems (MDES); 2017 Nov 7-10; Bangkok, Thailand; 2017. p. 210-5.	0.4	2017
Published research work	Quadri SM, Prashanth TK, **Pongpaichet S**, Esmin AAA, Jain R. TargetZIKA: Epidemic situation detection and risk preparedness for ZIKA virus. In: the 2017 10th International Conference on Ubi-media Computing and Workshops (Ubi-Media); 2017 Aug 1-4; Pattaya, Thailand; 2017. p. 1-6.	0.4	2017

Current Teaching Load

ITCS	508	Research Methodology in Computer Science	1 (1-0-2)
ITCS	697	Research Project in Computer Science	6 (0-18-0)
ITCS	698	Thesis	12 (0-36-0)

Assigned Teaching Load for the Proposed Program

ITCS	509	Research Methodology in Computer Science	2 (2-0-4)
ITCS	621	Database Design and Administration	3 (3-0-6)
ITCS	682	Advanced Database Systems	3 (3-0-6)
ITCS	697	Research Project in Computer Science	6 (0-18-0)
ITCS	698	Thesis	12 (0-36-0)

24. Name Lecturer Dr. Srisupa Palakvangsa Na Ayudhya

Education

Degree	Degree Name	Institute	Year of Graduation
Ph.D.	Computation	University of Manchester, United Kingdom	2006
M.S.	Advanced Computing	Imperial College of Science, Technology and Medicine, United Kingdom	2000
B.Sc. (1st Class Honor)	Computer Science	Thammasat University	1998

Affiliation: Faculty of Information and Communication Technology, Mahidol University

Interesting Research Topics or Specialties

Data and Knowledge Management

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Robkob A, Kusakunniran W, **Palakvangsa Na Ayudhya S**. Game-Based for Enhancing Autism Children's Communication Skill in Thailand. In: the 12th International Convention on Rehabilitation Engineering and Assistive Technology (i-CREATe); 2018 July 14-16; Shanghai, China; 2018.	0.4	2018

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Noosrikong C, Ngamsuriyaroj S, **Palakvangsa Na Ayudhya S**. Identifying focus research areas of Computer Science researchers from publications. In: IEEE International Conference of Region 10 (TENCON); 2017 Nov 5-8; Penang, Malaysia; 2017.	0.4	2017
Published research work	**Palakvangsa Na Ayudhya S**, Pongchandaj S, Kriangsakdachai S, Sunthornwutthikrai K. KeptAom: aavings management system to increase long term savings behavior of children. In: IEEE International Conference of Region 10 (TENCON); 2017 Nov 5-8; Penang, Malaysia; 2017.	0.4	2017

Current Teaching Load

ITCS	697	Research Project in Computer Science	6 (0-18-0)
ITCS	698	Thesis	12 (0-36-0)

Assigned Teaching Load for the Proposed Program

ITCS	509	Research Methodology in Computer Science	2 (2-0-4)
ITCS	697	Research Project in Computer Science	6 (0-18-0)
ITCS	698	Thesis	12 (0-36-0)

25. Name Lecturer Dr. Wudhichart Sawangphol

Education

Degree	Degree Name	Institute	Year of Graduation
Ph.D.	Information Technology	Monash University, Australia	2017
MIT (MIT Honours)	Software Engineering and Data Management	Monash University, Australia	2012
B.Sc. (1st Class Honor)	Information and Communication Technology	Mahidol University	2009

Affiliation: Faculty of Information and Communication Technology, Mahidol University

Interesting Research Topics or Specialties

Artificial Intelligence, Description Logic, Ontology, Automated Reasoning, Optimisation, Data analysis

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Mitrpanont J, **Sawangphol W**, Chankong C, Jitsuphap A, Wongkhumsin N. I WISH: integrated well-being Internet of Things system for healthiness. In: the 15th International Joint Conference on Computer Science and Software Engineering (JCSSE); 2018 Jul 11-13; Nakhon Pathom, Thailand; 2018.	0.4	2018

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Mitrpanont J, **Sawangphol W**, Roungsuriyaviboon J, Sathapornwatanakul T, Pillavas T, Sangaroonsilp P. MedThaiSAGE: decision support system to suggest healthcare policies using rule findings technique. In: the 15th International Joint Conference on Computer Science and Software Engineering (JCSSE); 2018 Jul 11-13; Nakhon Pathom, Thailand; 2018.	0.4	2018
Published research work	Mitrpanont J, **Sawangphol W**, Vithantirawat T, Paengkaew S, Suwannasing P. K4ThaiHealth: a prototype for Thai routine medical research knowledge extraction & sharing. In: the 2018 Seventh ICT International Student Project Conference (ICT-ISPC); 2018 Jul 11-13; Nakhon Pathom, Thailand; 2018.	0.4	2018
Published research work	Mitrpanont J, Roungsuriyaviboon J, Sathapornwatanakul T, **Sawangphol W**, Kobayashi D, Haga J. Extending MedThaiVis-Thai Medical Research Visualization to SAGE2 Display Walls. In: the 2nd International Conference on Information Technology (InCIT), 2017 Nov 2-3; Nakhon Pathom, Thailand; 2017. [Best Paper Award].	0.4	2018

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Mitrpanont J, **Sawangphol W**, Vithantirawat T, Paengkaew S, Suwannasing P, Daramas A, Chen Y. A Study on Using Python vs Weka on Dialysis Data Analysis. In: the 2nd International Conference on Information Technology (InCIT), 2017 Nov 2-3; Nakhon Pathom, Thailand; 2017.	0.4	2018
Published research work	Haga J, Mitrpanont J, Roungsuriyaviboon J, Sathapornwatanakul T, **Sawangphol W**, Kobayashi D, MedThaiSAGE: Visualization of Thai Medical Research Data on Large Tiled Display Walls. In: the Pacific Rim Application and Grid Middleware Assembly (PRAGMA33); 2017 Oct 16; Brisbane, Australia; 2017.	0.4	2017

Current Teaching Load

ITCS	697	Research Project in Computer Science	6 (0-18-0)
ITCS	698	Thesis	12 (0-36-0)

Assigned Teaching Load for the Proposed Program

ITCS	509	Research Methodology in Computer Science	2 (2-0-4)
ITCS	697	Research Project in Computer Science	6 (0-18-0)
ITCS	698	Thesis	12 (0-36-0)

Full time instructors

1. Name Assistant Professor Dr. Rawesak Tanawongsuwan

Education

Degree	Degree Name	Institute	Year of Graduation
Ph.D.	Computer Science	Georgia Institute of Technology, USA	2003
M.S.	Computer Science	Georgia Institute of Technology, USA	1999
B.S. University Honors	Computer Science and Mathematics	Carnegie Mellon University, USA	1996

Affiliation: Faculty of Information and Communication Technology, Mahidol University

Interesting Research Topics or Specialties

Computer Vision, Computer Graphics

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Roty S, Waritkapun C, **Tanawongsuwan R**, Phongsuphap S. Analysis of microcalcification features for pathological classification of mammogrmas. In: the 10th Biomedical Engineering International Conference (BMEiCON 2017); 2017 Aug 31 – Sep 2; Hokkaido, Japan; 2017.	0.4	2017

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Phtthanachuanchom S, **Tanawongsuwan R**. Color transfer by region exploration and navigation. IEICE Transactions on Information and Systems 2017;E100.D:1962-70.	1	2017

Current Teaching Load

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Assigned Teaching Load for the Proposed Program

ITCS	509	Research Methodology in Computer Science	2 (2-0-4)
ITCS	603	Seminar in Computer Science	1 (1-0-2)
ITCS	602	Seminar in Computer Science II	1 (1-0-2)
ITCS	659	Multimedia Technologies and Applications	3 (3-0-6)

2. Name Lecturer Dr. Preecha Tangworakitthaworn

Education

Degree	Degree Name	Institute	Year of Graduation
Ph.D.	Computer Science	University of Southampton, United Kingdom	2014
M.Sc.	Computer Science	Mahidol University	2006
B.Sc.	Computer Science	Mahidol University	1998

Affiliation: Faculty of Information and Communication Technology, Mahidol University

Interesting Research Topics or Specialties

Conceptualization, Conceptual Modeling, Instructional Design, Intended Learning Outcome, Competency, Outcome-Based Education, ELearning, Technology-Enhanced Learning

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	**Tangworakitthaworn P**, Sorasetsakul T, Sripatoomrak S, Kittiteerathamrong C. TEXT**2**CHART: enhancing learning experiences using graphical representation. In: the 2018 Seventh ICT International Student Project Conference (ICT-ISPC); 2018 Jul 11-13; Nakhon Pathom, Thailand; 2018.	0.4	2018

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	**Tangworakitthaworn P**, Tengchaisri V, Rungsuptaweekoon K, Samakit T. A game-based learning system for plant monitoring based on Internet of Things technology. In: the 15th International Joint Conference on Computer Science and Software Engineering (JCSSE); 2018 Jul 11-13; Nakhon Pathom, Thailand; 2018.	0.4	2018
Published research work	**Tangworakitthaworn P**. Towards a conceptual reasoning in performing pedagogical activities for STEM disciplines. In: the 21st International Computer Science and Engineering Conference (ICSEC); 2017 Nov 15-18; Bangkok, Thailand; 2017	0.4	2017
Published research work	Chanwijit J, Lomwongpaiboon W, Dowjam O, **Tangworakitthaworn P**. Decision support system for targeting higher education. In: the 2016 Sixth International Student Projects Conference (ICT-ISPC); 2016 May 27-28; Nakhon Pathom, Thailand; 2016.	0.4	2016
Published research work	Bubphasuwan N, Rattanachotparnich N, Kaewkum S, **Tangworakitthaworn P**. Serious game learning for novice practitioners in psychomotor domain. In: the 2016 Sixth International Student Projects Conference (ICT-ISPC); 2016 May 27-28; Nakhon Pathom, Thailand; 2016.	0.4	2016

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	**Tangworakitthaworn P**, Gilbert L, Wills G.B. A conceptualization of intended learning outcomes supporting self-regulated learners in indicating learning paths. Journal of Computer Assisted Learning 2015 Oct;31(5):393-404.	1	2015

Current Teaching Load

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Assigned Teaching Load for the Proposed Program

ITCS	509	Research Methodology in Computer Science	2 (2-0-4)
ITCS	603	Seminar in Computer Science	1 (1-0-2)

Part time instructors

1. Name Associate Professor Dr. Supavadee Aramvith

Education

Degree	Degree Name	Institute	Year of Graduation
Ph.D.	Electrical Engineering	University of Washington, USA.	2001
M.Sc.	Electrical Engineering	University of Washington, USA.	1996
B.Sc. (1^{st} Class Honor)	Computer Science	Mahidol University	1993

Affiliation: Department of Electrical Engineering, Faculty of Engineering, Chulalongkorn University

Interesting Research Topics or Specialties

Digital Video Coding and Processing, Digital Image Coding and Processing, Transmissions of Digital Video over Wireless and IP Networks, Applications in Multimedia Communication System, Aspects in Telecommunication Management

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Watcharapinchai N, **Aramvith S**, Siddhichai S. Automatic vehicle classification using linked visual words. Journal of Electronic Imaging 2017 Jul;26(4).	1	2017
Published research work	Maung HM, **Aramvith S**, Miyanaga Y. Error resilience aware rate control and mode selection for HEVC video transmission. In: IEEE International Conference on Consumer Electronics (ICCE); 2017 Jan 8-10; Las Vegas, United States; 2017. p.374-5.	0.4	2017

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Chen S, Maung HM, **Aramvith S**. Improving feature preservation in high efficiency video coding standard. In: Asia-Pacific Signal and Information Processing Association Annual Summit and Conference (APSIPA); 2016 Dec 13-16; Jeju, South Korea; 2016.	0.4	2017
Published research work	Maung H, **Aramvith S**, Miyanaga Y. Improved region-of-interest based rate control for error resilient HEVC framework. In: IEEE International Conference on Digital Signal Processing (DSP); 2016 Oct 16-18; Beijing, China; 2016. p.286-290.	0.4	2017
Published research work	Cajote RD, Ruangsang W, **Aramvith S**, and et al. Wireless video transmission over MIMO-OFDM using background modeling for video surveillance applications. In: the 15th International Symposium on Communications and Information Technologies (ISCIT) 2015 Oct 7-9; Nara, Japan; 2016. p. 237-40.	0.4	2016
Published research work	Maung HM, **Aramvith S**, Miyanaga Y. Region-of-interest based error resilient method for HEVC video transmission. In: the 15th International Symposium on Communications and Information Technologies (ISCIT) 2015 Oct 7-9; Nara, Japan; 2016. p.241-4.	0.4	2016

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Lertniphonphan K, **Aramvith S**, Chalidabhongse TH. Sparse representation of adaptive key frame features for human action classification. In: Asia-Pacific Signal and Information Processing Association Annual Summit and Conference (APSIPA ASC); 2015 Dec 16-19; Hong Kong; 2015. p.1236-40.	0.4	2016

2. Name Associate Professor Dr. Waraporn Jirapunthong

Education

Degree	Degree Name	Institute	Year of Graduation
Ph.D.	Computer Science	City University, United Kingdom	2006
M.Sc.	Computer Science	Mahidol University	2000
B.Sc.	Computer Science	Thammasat University	1997

Affiliation: College of Creative Design and Entertainment Technology, Dhurakij Pundit University

Interesting Research Topics or Specialties

Database System, Software Engineering

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	**Jirapanthong W**, Yampray K, Tancharoen D. Learning VR game development towards software basic profile. In: the 10th International Conference on Ubi-Media Computing and Workshops (Ubi-Media); 2017 Aug 1-4; Pattaya, Thailand; 2017.	0.4	2017

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	**Jirapanthong W**, Niranatlamphong W, Yampray K. Applying a classification model for selecting postgraduate programs. Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics). In: 8th International Conference on Swarm Intelligence (ICSI); 2017 Jul 27-Aug 1; Fukuoka, Japan; 2017. p.330-7.	0.4	2017
Published research work	**Jirapanthong W**. Personal software process with automatic requirements traceability to support startups. Journal of Reviews on Global Economics 2017;6:367-74.	1	2017
Published research work	**Jirapanthong W**. Computer technology to improve medical information in Bangkok, Thailand. Journal of Reviews on Global Economics 2017;6:285-92.	1	2017
Published research work	**Jirapanthong W**. E-Hospital web service. In: the 6th International Workshop on Computer Science and Engineering (WCSE) 2016 Jun 17-19; Tokyo, Japan; 2016. p.590-3.	0.4	2016

3. Name Lecturer Dr. Arthorn Luangsodsai

Education

Degree	Degree Name	Institute	Year of Graduation
Ph.D.	Computer Science	University of Essex, United Kingdom	2011
M.Sc.	Computer Science	University of Essex, United Kingdom	2004
M.Sc.	Analysis, Design, and Management of Information Systems	London School of Economics, United Kingdom	1995
B.Eng.	Computer Science	Thammasat University	1992

Affiliation: Department of Mathematics and Computer Science, Faculty of Science, Chulalongkorn University

Interesting Research Topics or Specialties

Software Engineering, Data Mining, Educational Technology

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Kiangia W, **Luangsodsai A**, Sinapiromsaran K. Weighted minimum consecutive pair of the extreme pole outlier factor. In: the 20th International Computer Science and Engineering Conference (ICSEC); 2016 Dec 14-17; Chiang Mai, Thailand; 2016.	0.4	2017

4. Name Lecturer Dr. Kunwadee Sripanidkulchai

Education

Degree	Degree Name	Institute	Year of Graduation
Ph.D.	Elctrical and Computer Engineering	Carnegie Mellon University, USA.	2005
M.Sc.	Elctrical and Computer Engineering	Carnegie Mellon University, USA.	1999
B.Sc. University Honors	Elctrical Engineering	Cornell University, USA.	1997

Affiliation: Department of Computer Engineering, Faculty of Engineering, Chulalongkorn University

Interesting Research Topics or Specialties

Computer Networking, Cloud Computing, Big Data, Healthcare Data Analytics

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Sirijatuphat R, **Sripanidkulchai K**, Boonyasiri A, and et al. Implementation of global antimicrobial resistance surveillance system (GLASS) in patients with bacteremia. PLoS ONE 2018 Jan;13(1).	1	2018

5. Name Dr. Anon Plangprasopchok

Education

Degree	Degree Name	Institute	Year of Graduation
Ph.D.	Computer Science	University of Southern California, USA.	2010
M.Sc.	Computer Science	University of Southern California, USA.	2005
B.Eng.	Computer Engineering	Chulalongkorn University	2001

Affiliation: National Electronics and Computer Technology Center

Interesting Research Topics or Specialties

Artificial Intelligence and Machine Learning

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Thammasudjarit R, **Plangprasopchok A**, Pluempitiwiriyawej C. A novel label aggregation with attenuated scores for ground-truth identification of dataset annotation with crowdsourcing. IEICE Transactions on Information and Systems 2017 Apr;E100D(4):750-7.	1	2017
Published research work	Sanglerdsinlapachai N, **Plangprasopchok A**, Nantajeewarawat E. Exploring hierarchical linguistic structure for aspect-based sentiment analysis. Journal of Internet Technology 2017;18(4):945-52.	1	2017

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Kiatkumjounwong N, Ngamsuriyaroj S, **Plangprasopchok A**. Web proxy logs classification for burst behavior. In: IEEE International Conference of Region 10 (TENCON); 2016 Nov 22-25; Singapore; 2016. p. 472-7.	0.4	2017
Published research work	Sanglerdsinlapachai N, **Plangprasopchok A**, Nantajeewarawat E. Exploring linguistic structure for aspect-based sentiment analysis. Maejo International Journal of Science and Technology 2016 May;10(2):142-53.	1	2016

6. Name Dr. Siwaruk Siwamogsatham

Education

Degree	Degree Name	Institute	Year of Graduation
Ph.D.	Telecommunication Engineering	Ohio State University, USA.	2002
M.Eng.	Telecommunication Engineering	Ohio State University, USA.	1997
B.Eng.	Computer Engineering	Chulalongkorn University	1994

Affiliation: National Electronics and Computer Technology Center

Interesting Research Topics or Specialties

Cyber Security and Wireless Communication

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Marindra AMJ, Pongpaibool P, Wallada W, **Siwamogsatham S**. An optimized ink-reducing hollowed-out arm meander dipole antenna structure for printed RFID tags. International Journal of Microwave and Wireless Technologies 2017 Mar;9(2):469-79.	1	2017
Published research work	Pongpaibool P, Rattanawan P, Kitjaroen M, Wallada W, **Siwamogsatham S**. An ink-reducing printed rectangular CPW antenna design via selective area thickening. In: the 21st International Symposium on Antennas and Propagation (ISAP); 2016 Oct 24-28; vOkinawa, Japan; 2016. p.674-5.	0.4	2017

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Chauhan JV, Kandwal A, Pongpaibool P, **Siwamogsatham S**. Multilayer notch loaded antenna with superstrate layer of 90 deg tilted elements for wireless communications. Progress In Electromagnetics Research C 2016;63:33-41.	1	2016

7. Name Dr. Somchart Fugkaew

Education

Degree	Degree Name	Institute	Year of Graduation
Ph.D.	Electrical Engineering and Information Systems	The University of Tokyo, Japan	2017
M.Sc.	Computer Science	Mahidol University	2003
B.B.A.	Management Information Systems	Thammasat University	2000

Affiliation: Thai Digital ID Company Limited

Interesting Research Topics or Specialties

Information Security, Privacy and Trust Management, Service Computing/Cloud Computing, Big Data Analysis and Management, Database Systems, E-commerce Applications and Business Intelligence

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	**Fugkeaw S**, Sato H. Enabling dynamic and efficient data access control in cloud computing based on the attribute certificate management and CP-ABE. In: the 26th Euromicro International Conference on Parallel, Distributed and Network-based Processing (PDP); 2018 Mar 21-23**;** Cambridge, United Kingdom; 2018.	0.4	2018

APPENDIX C

Curriculum Mapping

Appendix C

Curriculum Mapping

● Major responsibility ○ Minor responsibility

	Morality and Ethics			Knowledge		Intellectual Development			Interpersonal Relationships and Responsibility		Mathematical, Analytical Thinking, Communication, and IT skills		
	1	2	3	1	2	1	2	3	1	2	1	2	3
1. Required courses													
ITCS 509 Research Methodology in Computer Science	●	●	●	○	○	○	○	○	●	○	●	○	●
ITCS 521 Agile Software Product Management	●	●	○	●	●	●	●	○	●	●	●	○	●
ITCS 522 Edge Computing and Internet of Things	●	●	○	●	●	●	●	○	●	○	●	○	●
ITCS 523 Data Sciences Essentials	●	●	○	●	●	●	●	○	●	○	●	●	●
ITCS 603 Seminar in Computer Science	●	●	●	●	●	●	○	○	●	●	●	○	●
ITCS 659 Multimedia Technologies and Applications	●	●	○	●	●	●	●	○	●	○	●	○	●
ITCS 661 Advanced Artificial Intelligence	●	●	○	●	●	●	●	○	●	○	●	●	●
2. Elective courses													
ITCS 503 Design and Analysis of Algorithms	●	●	○	●	●	●	●	○	●	○	●	●	●
ITCS 504 Computer System Organization and Architecture	●	●	○	●	●	●	●	○	●	○	●	○	●
ITCS 507 Mathematical Foundations for Computer Science	●	●	○	●	○	●	○	○	●	○	●	●	●
ITCS 513 Project Management	●	●	○	●	●	●	●	○	●	●	●	○	●
ITCS 517 Machine Learning	●	●	○	●	●	●	●	●	●	○	●	●	●
ITCS 518 Image Analysis and Understanding	●	●	○	●	●	●	●	○	●	○	●	●	●
ITCS 551 Service Oriented and Cloud Computing	●	●	○	●	●	●	●	●	●	○	●	○	●

	Morality and Ethics			Knowledge		Intellectual Development			Interpersonal Relationships and Responsibility		Mathematical, Analytical Thinking, Communication, and IT skills		
	1	2	3	1	2	1	2	3	1	2	1	2	3
ITCS 552 Mobile and Pervasive Computing	●	●	○	●	●	●	●	○	●	○	●	○	●
ITCS 554 Information Security Management	●	●	○	●	●	●	●	○	●	○	●	●	●
ITCS 612 Network Programming	●	●	○	●	●	●	●	●	●	○	●	○	●
ITCS 613 Tools and Environments for Software Development	●	●	○	●	●	●	●	○	●	○	●	○	●
ITCS 615 Empirical Software Engineering	●	●	○	●	●	●	●	●	●	○	●	○	●
ITCS 621 Database Design and Administration	●	●	○	●	●	●	●	○	●	○	●	○	●
ITCS 628 Data Mining and Knowledge Discovery	●	●	○	●	●	●	●	○	●	○	●	●	●
ITCS 631 Computer Communications and Networks	●	●	○	●	●	●	●	○	●	○	●	○	●
ITCS 643 Software Engineering	●	●	○	●	●	●	●	○	●	○	●	○	●
ITCS 644 Software Quality Assurance	●	●	○	●	●	●	●	○	●	○	●	○	●
ITCS 655 Computer Graphics	●	●	○	●	●	●	●	○	●	○	●	●	●
ITCS 658 Human Computer Interaction	●	●	○	●	●	●	●	○	●	○	●	○	●
ITCS 665 Natural Language Processing	●	●	○	●	●	●	●	●	●	○	●	●	●
ITCS 667 Advanced Computer Vision	●	●	○	●	●	●	●	●	●	○	●	●	●
ITCS 668 Cloud Database and Big Data Technology	●	●	○	●	●	●	●	●	●	○	●	○	●
ITCS 669 System Performance Modeling	●	●	○	●	●	●	●	●	●	○	●	●	●
ITCS 682 Advanced Database Systems	●	●	○	●	●	●	●	●	●	○	●	○	●
ITCS 696 Advanced Topics in Computer Science	●	●	○	●	●	●	●	●	●	○	●	○	●
3. Thesis													
ITCS 698 Thesis	●	●	●	●	●	●	●	●	●	●	●	●	●

	Morality and Ethics			Knowledge		Intellectual Development			Interpersonal Relationships and Responsibility		Mathematical, Analytical Thinking, Communication, and IT skills		
	1	2	3	1	2	1	2	3	1	2	1	2	3
4. Thematic paper													
ITCS 697 Research Project in Computer Science	●	●	●	●	●	●	●	●	●	●	●	●	●

Table of Relationship between Learning Outcomes of the Program and Core Value of Mahidol University

Learning Outcomes (as stated in Section 5, item no. 2)	Core value of Mahidol University
1. Morality and Ethics	
1.1 Possesses morality, ethics and honesty.	Mastery, Integrity
1.2 Have discipline, punctuality and professional integrity.	Mastery, Altruism
1.3 Respect the rights and opinions of others, as well as not violating the rights and intellectual property of others.	Harmony, Integrity
2. Knowledge	
2.1 Have knowledge and understanding of principles and theories in the field of computer science.	Mastery, Determination
2.2 Have ability to self-learn new knowledge and trends in computer science.	Mastery, Determination
3. Intellectual Development	
3.1 Able to review related literature, analyze and summarize issues and problems systematically.	Mastery, Determination
3.2 Able to apply knowledge and tools to develop solutions to problems in computer science.	Mastery, Determination, Originality
3.3 Can synthesize existing knowledge to create new knowledge in computer science.	Mastery, Determination, Originality
4. Interpersonal Relationships and Responsibility	
4.1 Able to work with others, have skills in building relationships and interacting with others.	Harmony
4.2 Demonstrate responsibility for their own actions, being responsible for work in the group, display leadership, be able to work as a team.	Integrity, Leadership
5. Mathematical Analytical Thinking, Communication Skills, and Information Technology Skills	
5.1 Have skills to use the available information and communication technology tools.	Mastery, Determination
5.2 Be able to solve problems using mathematical and statistical methods.	Mastery, Determination, Originality
5.3 Be able to communicate clearly, and to explain and present information effectively using English.	Mastery, Determination

APPENDIX D

Program Learning Outcome

Appendix D

Program Learning Outcomes

Table 1: Comparison between before and after revised objectives of the program

Objectives of the Program B.E. 2557	Revised Objectives of the Program B.E. 2563
1.2.1 Morality, ethics and behavior appropriate to profession with respect to rights of others.	1.2.1 To produce graduates with academic and IT professional morals and ethics.
1.2.2 Knowledge and skills in computer science with understanding of basic principle and theory, and self-learning ability for academic and technology development in computer science.	1.2.2 To produce graduates with knowledge in the principles and theory of computer science, and the ability to independently study related technological advancement in computer science.
1.2.3 Development of research and new knowledge in computer science especially database system, network system, security system, information management system, intelligent systems, software engineering, and information retrieval. Application and integration of body of knowledge in computer science and related fields in order to develop quality software beneficial to society.	1.2.3 To produce graduates who can analyze and solve computing problems using original research and sound knowledge of computer science.
1.2.4 Creativity, learning teamwork, taking leadership and follower roles, and building good relationship with colleagues. Ability to communication in English well.	1.2.4 To produce graduates who have self-responsibility and social interaction skills.
1.2.5 Appropriately use of technology	1.2.5 To produce graduates who can effectively use analytical thinking skills, information technology, and fluency in English.

Table 2: Relationship between objective of the program and program learning outcome

Objective of the Program	Program Learning Outcome				
	PLO1	PLO2	PLO3	PLO4	PLO5
1.2.1 To produce graduates with academic and IT professional morals and ethics.	X				
1.2.2 To produce graduates with knowledge in the principles and theory of computer science, and the ability to independently study related technological advancement in computer science.		X			
1.2.3 To produce graduates who can analyze and solve computing problems using original research and sound knowledge of computer science.			X		
1.2.4 To produce graduates who have self-responsibility and social interaction skills.				X	
1.2.5 To produce graduates who can effectively use analytical thinking skills, information technology, and fluency in English.					X

PLO1	Demonstrate the ability to follow appropriate ethical and professional codes of conduct in research and IT professional practice.
PLO2	Demonstrate knowledge and capability in the theory and principles of computer science. Continue learning independently, expanding computer science knowledge through analysis and synthesis, and understanding new and disruptive technologies.
PLO3	Analyze problems using logical reasoning based on computer science knowledge, synthesize and integrate knowledge in computer science and use research methodology for presenting and solving problems.
PLO4	Demonstrate self-responsibility and teamwork skills with the ability to communicate and transfer knowledge effectively.
PLO5	Apply tools of information and communication technology, mathematics, and statistics to solve problems related to the field of study. Proficiently apply English skills for communication and presentation.

Table 3: Standard domains of learning outcome and Program Learning Outcomes

Domains	Standard Learning Outcomes (TQF)	Program Learning Outcomes				
		1	2	3	4	5
1. Morality and Ethics	1.1 Possesses morality, ethics and honesty.	X				
	1.2 Have discipline, punctuality and professional integrity.	X				
	1.3 Respect the rights and opinions of others, as well as not violating the rights and intellectual property of others.	X				
2. Knowledge	2.1 Have knowledge and understanding of principles and theories in the field of computer science.		X			
	2.2 Have ability to self-learn new knowledge and trends in computer science.		X			
3. Intellectual Development	3.1 Able to review related literature, analyze and summarize issues and problems systematically.			X		
	3.2 Able to apply knowledge and tools to develop solutions to problems in computer science.			X		
	3.3 Can synthesize existing knowledge to create new knowledge in computer science.			X		
4. Interpersonal Relationships and Responsibility	4.1 Able to work with others, have skills in building relationships and interacting with others.				X	
	4.2 Demonstrate responsibility for their own actions, being responsible for work in the group, display leadership, be able to work as a team.				X	
5. Mathematical Analytical Thinking, Communication Skills, and Information Technology Skills	5.1 Have skills to use the available information and communication technology tools.					X
	5.2 Be able to solve problems using mathematical and statistical methods.					X
	5.3 Be able to communicate clearly, and to explain and present information effectively using English.					X

Table 4: Learning and Assessment Strategies for Program Learning Outcomes Evaluation

PLOs	Learning Method	Assessment
Morality and Ethics PLO 1: Demonstrate the ability to follow appropriate ethical and professional codes of conduct in research and IT professional practice. 1) Possesses morality, ethics and honesty. 2) Have discipline, punctuality and professional integrity. 3) Respect the rights and opinions of others, as well as not violating the rights and intellectual property of others.	- Teacher-directed instruction. - Active learning.	- Formative assessmen.t
Knowledge PLO 2: Demonstrate knowledge and capability in the theory and principles of computer science. Continue learning independently, expanding computer science knowledge through analysis and synthesis, and understanding new and disruptive technologies. 1) Have knowledge and understanding of principles and theories in the field of computer science. 2) Have ability to self-learn new knowledge and trends in computer science.	- Teacher-directed instruction. - Active learning. - Cognitive activation.	- Formative assessment. - Summative assessment.
Intellectual Development PLO 3: Analyze problems using logical reasoning based on computer science knowledge, synthesize and integrate knowledge in computer science and use research methodology for presenting and solving problems. 1) Able to review related literature, analyze and summarize issues and problems systematically 2) Able to apply knowledge and tools to develop solutions to problems in computer science. 3) Can synthesize existing knowledge to create new knowledge in computer science.	- Teacher-directed instruction. - Active learning. - Cognitive activation.	- Formative assessment. - Summative assessment.

PLOs	Learning Method	Assessment
Interpersonal Relationships and Responsibility PLO 4: Demonstrate self-responsibility and teamwork skills with the ability to communicate and transfer knowledge effectively. 1) Able to work with others, have skills in building relationships and interacting with others. 2) Demonstrate responsibility for their own actions, being responsible for work in the group, display leadership, be able to work as a team.	- Active learning. - Cognitive activation.	- Formative assessment.
Mathematical Analytical Thinking, Communication Skills, and Information Technology Skills PLO 5: Apply tools of information and communication technology, mathematics, and statistics to solve problems related to the field of study. Proficiently apply English skills for communication and presentation. 1) Have skills to use the available information and communication technology tools. 2) Be able to solve problems using mathematical and statistical methods. 3) Be able to communicate clearly, and to explain and present information effectively using English.	- Teacher-directed instruction. - Active learning. - Cognitive activation.	- Formative assessment. - Summative assessment.

Terminologies:

Active learning focuses on promoting the engagement of students in their own learning. Examples include practices such as group work, use of information and communication technology, or student self-assessment.

Cognitive activation includes practices capable of challenging students in order to motivate them and stimulate higher-order skills, such as critical thinking, problem solving and decision making. Examples include the demonstration or presentation of a project, research, problem solving methods, and summarizing the content of a research paper.

Teacher-directed instruction encompasses practices based on lecturing, memorization and repetition, where the teacher is the main actor responsible for transmitting knowledge to receptive students. Examples include experience sharing, demonstration, case study, lectures, and problem-based instruction.

Formative assessment is to monitor student learning to provide ongoing feedback that can be used by instructors to improve their teaching and by students to improve their learning. Examples of formative

assessments include quizzes, homework, in-class questions and answers, in-class observation or presentation activities.

Summative assessment focuses on evaluating student learning at the end of an instructional unit by comparing it against some standard or benchmark. Examples of summative assessments include a midterm exam, final exam, final project, a paper, senior project/recital.

Table 5: Relationship between Courses of the Program and Program Learning Outcomes

Code	Name	Credits	Program Learning Outcomes				
			1	2	3	4	5
1. Required Courses							
ITCS 509	Research Methodology in Computer Science	2 (2-0-4)	I/P	I/P	I/P	I/P	I/P
ITCS 521	Agile Software Product Management	3 (3-0-6)	P/R	P/R	P/R	P/R	P/R
ITCS 522	Edge Computing and Internet of Things	3 (3-0-6)	P/R	P/R	P/R	P/R	P/R
ITCS 523	Data Sciences Essentials	3 (3-0-6)	P/R	P/R	P/R	P/R	P/R
ITCS 603	Seminar in Computer Science	1 (1-0-2)	I/P	I/P	I/P	I/P	I/P
ITCS 659	Multimedia Technologies and Applications	3 (3-0-6)	P/R	P/R	P/R	P/R	P/R
ITCS 661	Advanced Artificial Intelligence	3 (3-0-6)	P/R	P/R	P/R	P/R	P/R
2. Elective courses							
ITCS 503	Design and Analysis of Algorithms	3 (3-0-6)	P/R	P/R	P/R	P/R	P/R
ITCS 504	Computer System Organization and Architecture	3 (3-0-6)	P/R	P/R	P/R	P/R	P/R
ITCS 507	Mathematical Foundations for Computer Science	3 (3-0-6)	P/R	P/R	P/R	P/R	P/R
ITCS 513	Project Management	3 (3-0-6)	P/R	P/R	P/R	P/R	P/R
ITCS 517	Machine Learning	3 (3-0-6)	P/R	P/R	P/R	P/R	P/R
ITCS 518	Image Analysis and Understanding	3 (3-0-6)	P/R	P/R	P/R	P/R	P/R
ITCS 551	Service Oriented and Cloud Computing	3 (3-0-6)	P/R	P/R	P/R	P/R	P/R
ITCS 552	Mobile and Pervasive Computing	3 (3-0-6)	P/R	P/R	P/R	P/R	P/R
ITCS 554	Information Security Management	3 (3-0-6)	P/R	P/R	P/R	P/R	P/R
ITCS 612	Network Programming	3 (3-0-6)	P/R	P/R	P/R	P/R	P/R
ITCS 613	Tools and Environments for Software Development	3 (3-0-6)	P/R	P/R	P/R	P/R	P/R
ITCS 615	Empirical Software Engineering	3 (3-0-6)	P/R	P/R	P/R	P/R	P/R
ITCS 621	Database Design and Administration	3 (3-0-6)	P/R	P/R	P/R	P/R	P/R
ITCS 628	Data Mining and Knowledge Discovery	3 (3-0-6)	P/R	P/R	P/R	P/R	P/R
ITCS 631	Computer Communications and Networks	3 (3-0-6)	P/R	P/R	P/R	P/R	P/R
ITCS 643	Software Engineering	3 (3-0-6)	P/R	P/R	P/R	P/R	P/R
ITCS 644	Software Quality Assurance	3 (3-0-6)	P/R	P/R	P/R	P/R	P/R

Code	Name	Credits	Program Learning Outcomes				
			1	2	3	4	5
ITCS 655	Computer Graphics	3 (3-0-6)	P/R	P/R	P/R	P/R	P/R
ITCS 658	Human Computer Interaction	3 (3-0-6)	P/R	P/R	P/R	P/R	P/R
ITCS 665	Natural Language Processing	3 (3-0-6)	P/R	P/R	P/R	P/R	P/R
ITCS 667	Advanced Computer Vision	3 (3-0-6)	P/R	P/R	P/R	P/R	P/R
ITCS 668	Cloud Database and Big Data Technology	3 (3-0-6)	P/R	P/R	P/R	P/R	P/R
ITCS 669	System Performance Modeling	3 (3-0-6)	P/R	P/R	P/R	P/R	P/R
ITCS 682	Advanced Database Systems	3 (3-0-6)	P/R	P/R	P/R	P/R	P/R
ITCS 696	Advanced Topics in Computer Science	3 (0-6-3)	P/R	M	P/R	P/R	P/R
3. Thesis							
ITCS 698	Thesis	12 (0-36-0)	M	M	M	M	M
4. Thematic paper							
ITCS 697	Research Project in Computer Science	6 (0-18-0)	M	M	M	M	M

I = ELO is introduced & assessed R = ELO is reinforced & assessed

P = ELO is practiced & assessed M = Level of Mastery is assessed

According to Section 3's 3.1.7 and Table 5, the mapping between expected learning outcomes and year of study is shown below.

Table 6: The expectation of learning outcomes at the end of the academic year

Year of study	Knowledge, skills, and any other expected learning outcomes
1st	After the 1st year of study, the students are expected to touch on some parts of the expected learning outcomes of the curriculum and to complete the core knowledge of the curriculum, especially research methods, and some elective courses which are relevant to their specific research interests in order to be ready for conducting their thesis or research project in the 2nd year of study.
2nd	After the 2nd year of study, the students are expected to learn and apply advanced knowledge, and develop research and development skills in order to complete their thesis or research project as required for graduation and to fulfill all expected learning outcomes.

APPENDIX E

The Revised Curriculum

Appendix E

The Revision of Master of Science Program

in Computer Science Volume B.E. 2557

Faculty of Information and Communication Technology

and Faculty of Graduate Studies, Mahidol University

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1. **The Curriculum was approved by the Office of the Higher Education Commission on 1 December B.E. 2557 and 2 revised versions were approved by the Office of the Higher Education Commission on 25 February B.E. 2558 and 17 March B.E. 2559 repectively.**

2. **The Mahidol University Council has approved this revised curriculum in the 553 meeting on 19 February B.E.2020**

3. **The revised curriculum will be effective with student class B.E. 2563 from the 1st semester of the Academic Year B.E. 2563 onwards.**

4. **Rationale of revision**

   4.1 The program is required to be revised according to the Office of the Higher Education Commission's Post Graduate Curriculum Standard Criterion B.E. 2558, Guidelines for Managing Post Graduate Curriculum Standard Criterion B.E. 2558, and Internal Quality Assurance B.E. 2557.

   4.2 The content of the program is needed to be updated with contemporary body of knowledge in computer science according to the change in computer technology.

5. **The details of the revision**

   5.1 Addition of teaching schedule to include weekdays regular office hours.

   5.2 Adjustment of qualifications of prospective students according to the concurrent demand of prospective students.

   5.3 Adjustment of collaboration with other universities to be none.

5.4 Adjustment of the faculty in charge of the program

Current Program (B.E. 2557)	Revising Program (B.E. 2563)
Assistant Professor Dr. Boonsit Yimwadsana	Assistant Professor Dr. Boonsit Yimwadsana
Assistant Professor Dr. Sukanya Pongsuphap	-
Assistant Professor Dr. Songsri Tangsripairoj	Assistant Professor Dr. Songsri Tangsripairoj
-	Assistant Professor Dr. Robert Egrot

5.5 Adjustment of the course category in the curriculum structure by closing foundation courses

5.6 Adjustment of the course category in the elective courses

Current Program (B.E. 2557)	Revising Program (B.E. 2563)
Elective Courses 5 groups 1. Software Engineering Courses 2. Database and Knowledge Management Courses 3. Intellectual System Courses 4. Multimedia Courses 5. Computer Network and Security System Courses	Elective Courses 1 groups 1. Elective Courses

5.7 Adjustment of the courses in the curriculum structure as follows:

The Comparison Table of Courses between the Current Program and Revising Program

Courses of the Current Program (B.E. 2557)		Courses of the Revising Program (B.E. 2563)		Remark
Foundation Courses (non-credits)				
ITCS 503 Design and Analysis of Algorithms	3 (3-0-6)			move to foundation elective courses
ITCS 504 Computer System Organization and Architecture	3 (3-0-6)			move to foundation elective courses
ITCS 507 Mathematical Foundations for Computer Science	3 (3-0-6)			move to foundation elective courses
Required Courses Plan A (A2) and Plan B 15 credits		**Required Courses Plan A (A2) and Plan B 18 credits**		
ITCS 508 Research Methodology in Computer Science	1 (1-0-2)			closed course
		ITCS 509 Research Methodology in Computer Science	2 (2-0-4)	new course
		ITCS 521 Agile Software Product Management	3 (3-0-6)	new course
		ITCS 522 Edge Computing and Internet of Things	3 (3-0-6)	new course
		ITCS 523 Data Sciences Essentials	3 (3-0-6)	new course
ITCS 589 Professional Practices in IT Project Management	1 (0-2-1)			closed course
ITCS 601 Seminar in Computer Science I	1 (1-0-2)			closed course
ITCS 602 Seminar in Computer Science II	1 (1-0-2)			closed course
		ITCS 603 Seminar in Computer Science	1 (1-0-2)	new course
ITCS 621 Database Design and Administration	3 (3-0-6)			move to foundation elective courses
ITCS 631 Computer Communications and Networks	3 (3-0-6)			move to foundation elective courses

Courses of the Current Program (B.E. 2557)		Courses of the Revising Program (B.E. 2563)		Remark
ITCS 643 Software Engineering	3 (3-0-6)			move to foundation elective courses
		ITCS 659 Multimedia Technologies and Applications	3 (3-0-6)	move from elective courses (multimedia courses)
ITCS 661 Advanced Artificial Intelligence	3 (3-0-6)	ITCS 661 Advanced Artificial Intelligence	3 (3-0-6)	changed course description
Elective Courses Plan A (A2) not less than 9 credits **Plan B not less than 15 credits**		**Elective Courses Plan A (A2) not less than 6 credits** **Plan B not less than 12 credits**		
		ITCS 503 Design and Analysis of Algorithms	3 (3-0-6)	move from foundation courses
		ITCS 504 Computer System Organization and Architecture	3 (3-0-6)	move from foundation courses
		ITCS 507 Mathematical Foundations for Computer Science	3 (3-0-6)	move from foundation courses changed course description
		ITCS 513 Project Management	3 (3-0-6)	move from elective courses (database and knowledge management courses)

Courses of the Current Program (B.E. 2557)		Courses of the Revising Program (B.E. 2563)		Remark
		ITCS 517 Machine Learning	3 (3-0-6)	move from elective courses (intelectual courses) changed course description
		ITCS 518 Image Analysis and Understanding	3 (3-0-6)	move from elective courses (intelectual courses) changed course description
		ITCS 551 Service Oriented and Cloud Computing	3 (3-0-6)	move from elective courses (computer network and security system courses) changed course description
		ITCS 552 Mobile and Pervasive Computing	3 (3-0-6)	move from elective courses (computer network and security system courses)

Courses of the Current Program (B.E. 2557)		Courses of the Revising Program (B.E. 2563)		Remark
		ITCS 554 Information Security Management	3 (3-0-6)	move from elective courses (computer network and security system courses)
		ITCS 612 Network Programming	3 (3-0-6)	new course
		ITCS 613 Tools and Environments for Software Development	3 (3-0-6)	new course
		ITCS 615 Empirical Software Engineering	3 (3-0-6)	new course
		ITCS 621 Database Design and Administration	3 (3-0-6)	move from required courses
		ITCS 628 Data Mining and Knowledge Discovery	3 (3-0-6)	move from elective courses (database and knowledge management courses)
		ITCS 631 Computer Communications and Networks	3 (3-0-6)	move from required courses
		ITCS 643 Software Engineering	3 (3-0-6)	move from required courses

Courses of the Current Program (B.E. 2557)		Courses of the Revising Program (B.E. 2563)		Remark
		ITCS 644 Software Quality Assurance	3 (3-0-6)	move from elective courses (software engineering courses)
		ITCS 655 Computer Graphics	3 (3-0-6)	move from elective courses (multimedia courses)
		ITCS 658 Human Computer Interaction	3 (3-0-6)	move from elective courses (multimedia courses)
		ITCS 665 Natural Language Processing	3 (3-0-6)	move from elective courses (intelectual courses)
		ITCS 667 Advanced Computer Vision	3 (3-0-6)	move from elective courses (intelectual courses) changed course description
		ITCS 668 Cloud Database and Big Data Technology	3 (3-0-6)	new course
		ITCS 669 System Performance Modeling	3 (3-0-6)	new course

Courses of the Current Program (B.E. 2557)		Courses of the Revising Program (B.E. 2563)		Remark
		ITCS 682 Advanced Database Systems	3 (3-0-6)	move from elective courses (database and knowledge management courses)
		ITCS 696 Advanced Topics in Computer Science	3 (0-6-3)	new course
1. Software Engineering Courses				
ITCS 541 Software Requirement Analysis and Specification	3 (3-0-6)			closed course
ITCS 542 Software Metrics	3 (3-0-6)			closed course
ITCS 585 Professional Practices in Software Engineering	1 (0-2-1)			closed course
ITCS 644 Software Quality Assurance	3 (3-0-6)			move to foundation elective courses
ITCS 645 Object-Oriented Analysis and Design	3 (3-0-6)			closed course
ITCS 651 Model-Driven Design and Development	3 (3-0-6)			closed course
2. Database and Knowledge Management Courses				
ITCS 513 Project Management	3 (3-0-6)			move to foundation elective courses changed course description
ITCS 584 Professional Practices in Data Management	1 (0-2-1)			closed course
ITCS 624 Advanced Information Storage and Retrieval	3 (3-0-6)			closed course

Courses of the Current Program (B.E. 2557)		Courses of the Revising Program (B.E. 2563)		Remark
ITCS 628 Data Mining and Knowledge Discovery	3 (3-0-6)			move to foundation elective courses
ITCS 629 Knowledge Engineering	3 (3-0-6)			closed course
ITCS 681 Special Topics in Information Technology	3 (3-0-6)			closed course
ITCS 682 Advanced Database Systems	3 (3-0-6)			move to advanced elective courses
ITCS 695 Independent Study	3 (0-6-3)			closed course
3. Intellectual Courses				
ITCS 514 Decision Support and Expert Systems	3 (3-0-6)			closed course
ITCS 517 Machine Learning	3 (3-0-6)			move to advanced elective courses
ITCS 518 Image Analysis and Understanding	3 (3-0-6)			move to foundation elective courses
ITCS 611 Knowledge-based Systems	3 (3-0-6)			closed course
ITCS 662 Advanced Pattern Recognition	3 (3-0-6)			closed course
ITCS 663 Image and Signal Processing	3 (3-0-6)			closed course
ITCS 665 Natural Language Processing	3 (3-0-6)			move to advanced elective courses
ITCS 667 Advanced Computer Vision	3 (3-0-6)			move to advanced elective courses
4. Multimedia Courses				
ITCS 587 Professional Practices in Multimedia Systems	1 (0-2-1)			closed course

Courses of the Current Program (B.E. 2557)		Courses of the Revising Program (B.E. 2563)		Remark
ITCS 655 Computer Graphics	3 (3-0-6)			move to foundation elective courses
ITCS 658 Human Computer Interaction	3 (3-0-6)			move to foundation elective courses
ITCS 659 Multimedia Technologies and Applications	3 (3-0-6)			move to required courses
ITCS 663 Image and Signal Processing	3 (3-0-6)			closed course
ITCS 667 Advanced Computer Vision	3 (3-0-6)			move to advanced elective courses
5. Computer Network and Security System Courses				
ITCS 551 Service Oriented and Cloud Computing	3 (3-0-6)			move to advanced elective courses
ITCS 552 Mobile and Pervasive Computing	3 (3-0-6)			move to foundation elective courses changed course description
ITCS 554 Information Security Management	3 (3-0-6)			move to foundation elective courses
ITCS 556 Computer and Network Forensics	3 (3-0-6)			closed course
ITCS 571 Numerical Methods for Mathematical Optimization	3 (3-0-6)			closed course
ITCS 583 Professional Practices in Networks and Security	1 (0-2-1)			closed course

Courses of the Current Program (B.E. 2557)		Courses of the Revising Program (B.E. 2563)		Remark
ITCS 633 Computer Network Design and Management	3 (3-0-6)			closed course
ITCS 652 Computer System Performance Analysis and Evaluation	3 (3-0-6)			closed course
ITCS 653 Advanced Computer Architecture	3 (3-0-6)			closed course
ITCS 654 Parallel Computation	3 (3-0-6)			closed course
ITCS 656 Computer and Communication Security	3 (3-0-6)			closed course
Thesis 12 credits				
ITCS 698 Thesis	12 (0-36-0)	ITCS 698 Thesis	12 (0-36-0)	unchanged
Thematic Paper 6 credits				
ITCS 697 Research Project in Computer Science	6 (0-18-0)	ITCS 697 Research Project in Computer Science	6 (0-18-0)	changed course description

6. The Comparison Table of the Curriculum Structure between the Current Program and Revised Program Based on Criteria on Graduate Studies B.E. 2558 (set by Ministry of Education)

6.1 Plan A (A2)

Course Category		Credits		
Current Program	Revised Program	Criteria on Graduate Studies B.E. 2558	Curriculum Structure of the Current Program	Curriculum Structure of the Revised Program
Foundation Courses	--	Course work not less than 12	Non-credits	--
Required Courses	Required Courses		16	18
Elective Courses	Elective Courses		not less than 9	not less than 6
Thesis	Thesis	not less than 12	12	12
Total credits (not less than)		**36**	**37**	**36**

6.2 Plan B

Course Category		Credits		
Current Program	Revised Program	Criteria on Graduate Studies B.E. 2558	Curriculum Structure of the Current Program	Curriculum Structure of the Revised Program
Foundation Courses	--	Course work not less than 12	Non-credits	--
Required Courses	Required Courses		16	18
Elective Courses	Elective Courses		not less than 15	not less than 12
Thematic Paper	Thematic Paper	not less than 3 and not more than 6	6	6
Total credits (not less than)		**36**	**37**	**36**