



**Master of Science Program in Computing
(International Program)**

Handbook 2019



**College of Computing
Prince of Songkla University**

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Graduate Study Program 2019

College of Computing, Prince of Songkla University

1. Curricular Title

Master of Science Program in Computing (International Program)

2. Degree Title

Master of Science (Computing)

3. Abbreviation

M.Sc. (Computing)

4. Number of Credits

A program of study with the emphasis on academic and research development in various areas at a level higher than a bachelor's degree or a graduate diploma, the program consists of at least 36 credits of study:

Plan A: Research focused

Plan A1 - Thesis only with 36 credits

Plan A2 - 24 thesis credits and 12 coursework credits

Plan B: Minor thesis (independent study) of 6 credits and 30 coursework credits (This plan is not available for 2019 program)

5. Philosophy

Teaching and producing basic research, or problem-oriented research and application, including the use of industrial and social problems as a basis for learning (Problem-based Learning) to develop technologies, body of knowledge and computer innovation for the benefits of social and economic development.

6. Goals

- 1) To develop knowledgeable and professional graduates in the fields of Data Science and Artificial Intelligence, Software Engineering and Media, and Computer Systems and Communication. The goal is that graduates can apply the body of knowledge to the career at an effective level.
- 2) To produce graduates with the ability to study, research and develop new science, which will bring benefits for oneself and society.
- 3) To develop each graduate as a valuable human resource who can respond to the country's development policies while exhibiting integrity and ethics.

7. Program Commencement

The program commences in academic year 2019.

8. Teaching Time

Monday – Friday (normal office hours)

9. Responsible Institute

College of Computing, Prince of Songkla University, Phuket Campus, Thailand

10. Education Policy

Conform to Prince of Songkla University Regulations for Graduate Studies BE 2556.

11. Career Examples

- 1) Software Engineer
- 2) Computer Technical Officer
- 3) System, Software, and Application Designer and Developer
- 4) Information Systems Manager
- 5) Plan and Policy Officer
- 6) Computer Graphics and Multimedia Designer
- 7) Computer Network Administrator
- 8) Data Scientist
- 9) Professor
- 10) Internet of Things and Embedded System Engineer

11) Data Engineer

12. Lecturers Responsible for the Program

No.	Academic Position	Name - Surname	Education Degree
1	Asst.Prof.	Dr. Rattana Wetprasit	Ph.D. (Computer Science), Griffith University, Australia Master Degree in Applied Statistic, National Institute of Development Administration (NIDA), Thailand Bachelor Degree in Marine Science, Chulalongkorn University, Thailand
2	Asst.Prof.	Dr. Aziz Nanthaamornphong	Ph.D. (Computer Science), University of Alabama, USA Master Degree in Information Technology, Kasetsart University, Thailand Bachelor Degree in Industrial Engineering, Thammasat University, Thailand
3	Asst.Prof.	Dr. Warodom Werapun	Ph.D. in Computer Engineering (ENSEEIH, France) Master II Research in Computer Engineering (ENSEEIH, France) M. Eng. in Computer Engineering (KMITL, Bangkok) B. Eng. in Computer Engineering (PSU, Songkla)

13. Admission Requirements

Requirements for Plan A1:

Students applying for graduate study in the program must meet the following requirements:

- 1) Complete the bachelor of science in computing or other related bachelor degrees (for example, Computer Science, Computer Engineering, Information technology, Software Engineering) with at least 3.25/4.0 overall GPA **OR**

- 2) Complete the bachelor degree in the fields as described in Requirement 1 with at least 2.75/4.0 overall GPA **AND** have the research experience related to the computing fields or have a publication (journal or proceeding) or have a national academic award **OR**
- 3) Complete the bachelor degree in the fields as described in Requirement 1 with at least 3.00/4.0 overall GPA **AND** or have at least 2 years work experience in computing fields **AND**
- 4) Students must pass an English proficiency exam as determined by the Graduate School. Test results cannot be older than 2 years, counting from the commencement of studies at Prince of Songkla University. However, the program committee may request the applicant to pass an English proficiency exam within 1 year from commencement of studies.
- 5) In addition to the requirements listed above, the consideration will be based on the program committee and Prince of Songkla University Regulations for Graduate Studies.

Requirements for Plan A2:

Students applying for graduate study in the program must meet the following requirements:

- 1) Complete the bachelor degree (earned at least 36 credits of course work related to the computing subjects) with at least 2.75/4.0 overall GPA **OR**
- 2) Complete the bachelor degree with at least 2.50/4.0 overall GPA **AND** have the research experience related to the computing fields or have a publication (journal or proceeding) or have a national award or have at least 2 years work experience in computing fields **OR**
- 3) Complete the bachelor degree (earned at least 36 credits of course work related to the computing subjects) **AND** have the research experience related to the computing fields or have a publication (journal or proceeding) or have a national award or have at least 2 years work experience in computing fields **AND**
- 4) Students must pass an English proficiency exam as determined by the Graduate School. Test results cannot be older than 2 years, counting from the commencement of studies at Prince of Songkla University. However, the program committee may request the applicant to pass an English proficiency exam within 1 year from commencement of studies.
- 5) In addition to the requirements listed above, the consideration will be based on the program committee and Prince of Songkla University Regulations for Graduate Studies.

Other requirements shall comply with Prince of Songkla University Regulations for Graduate Studies. (<https://grad.psu.ac.th/en/current-student/regulations.html>)

Application Documents

1. Graduate School Application Form
2. A copy of official Bachelor's Degree transcript
3. A copy of official Bachelor's Degree diploma
4. Two letters of recommendation from the academic lecturers
5. Research paper or publication (for applicants with research experience or publication)
6. A letter of work experience from the employer (for applicants with at least 2 years work experience)
7. A copy of one of the following certificates of English proficiency: TOEFL, IELTS, TOEIC, CU-TEP, TU-GET, PSU-TEP
8. One to two pages of a statement of purpose
9. A copy of passport

Apply

The applicant must apply via the application online system

at <http://www.grad.psu.ac.th/admission/>

More Information

E-mail: grad.ict@phuket.psu.ac.th or Tel. +66 76 27-6119-20 Fax. +66 76 27-6102

14. Curriculum Structure

Curriculum Structure (Plan A1 and Plan A2)

Plan A1		36	Credits
	- Thesis	36	Credits
Plan A2		36	Credits
	- Compulsory Course	6	Credits
	- Elective Course	6	Credits
	- Thesis	24	Credits

1. Compulsory Course for Plan A2

969-601	Research Methodology in Computing	3(3-0-6)
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969-602	Advanced Statistics for Computing	3(3-0-6)
969-603	Seminar *	1(0-2-1)
* = Audit Subject		

2. Elective Course for Plan A2

2.1 Data Science and Artificial Intelligence

969-610	Data Mining	3(3-0-6)
969-611	Natural Language Processing	3(3-0-6)
969-612	Computer Vision	3(3-0-6)
969-613	Text Analytics and Its Applications	3(3-0-6)
969-614	Artificial Intelligence	3(3-0-6)
969-615	Neural Networks	3(3-0-6)
969-616	Big Data Analytics and Applications	3(3-0-6)
969-617	Advanced Database Management System	3(3-0-6)
969-618	Financial Technology	3(3-0-6)
969-619	Information Technology for Business	3(3-0-6)

2.2 Software Engineering and Media

969-620	Software Maintenance and Evolution	3(3-0-6)
969-621	Architectural Thinking	3(3-0-6)
969-622	Software Verification and Validation	3(3-0-6)
969-623	Formal Method Engineering	3(3-0-6)
969-624	Advanced Empirical Software Engineering	3(3-0-6)
969-625	Advanced Web Technologies	3(3-0-6)
969-626	Reality Technology	3(3-0-6)
969-627	Image Processing	3(3-0-6)
969-628	Human-Computer Interaction	3(3-0-6)

2.3 Computer Systems and Communication

969-630	Mobile and Wireless Networks	3(3-0-6)
969-631	Advanced Data Communication and Computer Networking	3(3-0-6)
969-632	Advanced Cloud Computing	3(3-0-6)
969-633	Computer Network Security	3(3-0-6)

969-634	Distributed Computing Systems	3(3-0-6)
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2.4 Others

969-640	Special Topics in Computing I	3(3-0-6)
969-641	Special Topics in Computing II	3(3-0-6)

15. Course Code Meaning

A course code is assigned to each course. The course code is composed of 6 digits.

The first three digits are the department code (the College of Computing code is 969).

The last three digits are reserved for the course identification code, with the following format:

The first digit:

6 means the coursework is provided for graduate students only
8 means thesis

The second digit:

0 means Compulsory course
1 means Data Science and Artificial Intelligence course
2 means Software Engineering and Media course
3 means Computer Systems and Communication course
4 means Others

The third digit (the last digit):

0-9 means the course number in each field indicated by the second digit

16. Credit Code Meaning

Each course will have a set of numbers detailing the course credit and summarizing the teaching plan per week. For example,

3(2-3-4) means 3 credits
2 hours/week for lecture,
3 hour/week for practical work, and
4 hour/week for self-study.

17. Study Plan

Academic Year (Plan A1):

Academic Year 1 – 1st Semester

969-603	Seminar *	1(0-2-1)
969-801	Thesis	9(0-27-0)
	Total	<u>9(0-29-1)</u>

Academic Year 1 – 2nd Semester

969-603	Seminar *	1(0-2-1)
969-801	Thesis	9(0-27-0)
	Total	<u>9(0-29-1)</u>

Academic Year 2 – 1st Semester

969-603	Seminar *	1(0-2-1)
969-801	Thesis	9(0-27-0)
	Total	<u>9(0-29-1)</u>

Academic Year 2 – 2nd Semester

969-603	Seminar *	1(0-2-1)
969-801	Thesis	9(0-27-0)
	Total	<u>9(0-29-1)</u>

* = Audit Subject

Academic Year (Plan A2):Academic Year 1 – 1st Semester

969-601	Research Methodology in Computing	3(3-0-6)
969-602	Advanced Statistics for Computing	3(3-0-6)
969-603	Seminar *	1(0-2-1)
969-802	Thesis	3(0-9-0)
Total		<u>9(6-11-13)</u>

Academic Year 1 – 2nd Semester

969-xxx	Elective Course I	3(3-0-6)
969-xxx	Elective Course II	3(3-0-6)
969-603	Seminar *	1(0-2-1)
969-802	Thesis	3(0-9-0)
Total		<u>9(6-11-13)</u>

Academic Year 2 – 1st Semester

969-603	Seminar *	1(0-2-1)
969-802	Thesis	9(0-27-0)
Total		<u>9(0-29-1)</u>

Academic Year 2 – 2nd Semester

969-603	Seminar *	1(0-2-1)
969-802	Thesis	9(0-27-0)
Total		<u>9(0-29-1)</u>

* = Audit Subject

18. Course Descriptions

969-601	Research Methodology in Computing	3(3-0-6)
	Research principles and methods in computing; problem analysis for research topic identification; data collection for research planning; identification of samples and techniques; result analysis; result explanation and discussion; report writing; preparation for academic presentation; journal publications	
969-602	Advanced Statistics for Computing	3(3-0-6)
	Data collection; data presentation; measures of location and dispersion; basic probability; probability distribution; estimation; hypothesis testing; analysis of variance; regression and correlation; nonparametric statistics; time series analysis and forecasting; factor analysis	
969-603	Seminar	1(0-2-1)
	Presentation and discussion on current interesting topics in computing	
969-607	Computing Project Management	3(3-0-6)
	The concept and initiation of computing projects; format of project plan; human resource management; project management;	

risk management; project monitoring and reporting; quality project management; change management; project implementation and evaluation; computing technology selection and management

969-608 Management Information System 3(3-0-6)

Elements and types of management information systems; role of information technology in business operation; information flow within an organization; using information technology for improving quality, productivity and competitive advantages of organizations; electronic business; development of organization information systems; planning, evaluation, and cost-benefit analysis of information technology systems; the impact of information technology on individual, organization, and communities; ethics, laws and national policies concerning information technology

969-610 Data Mining 3(3-0-6)

Data preprocessing for data mining; statistical approaches for estimation and prediction; classification; clustering analysis; association analysis and data mining applications

969-611 Natural Language Processing 3(3-0-6)

Principles of natural language processing; lexical analysis; syntactic analysis; semantic analysis; problems and ambiguities in natural language; relation between sentences

969-612 Computer Vision 3(3-0-6)

Signal and image processing; image enhancement; image transformation and segmentation; visual perception; pattern recognition; shape analysis; scene description and scene interpretation; sensors and microcontroller boards

969-613 Text Analytics and Its Applications 3(3-0-6)

Problem identification; writing systems; information extraction; language resources; named entity recognition; document classification; document clustering, document categorization; sentiment analysis, text summarization, intellectual property law; applications to business, security, biomedical data, and software

969-614	Artificial Intelligence	3(3-0-6)
	Definitions and principles of artificial intelligence; state spaces problems; heuristic search; natural language processing; knowledge representation; machine learning; expert systems; decision support systems; computer vision and image processing; artificial intelligence applications	
969-615	Neural Networks	3(3-0-6)
	Biological neural networks; brain central and modulation systems; pattern recognition; pattern classification; neural network model; artificial neural network; unsupervised learning; matching and self-organized networks; supervised learning; back propagation neural network; adaptive resonance theory; neural networks based on competition; fuzzy reasoning; applications of neural networks algorithms and learning models	
969-616	Big Data Analytics and Applications	3(3-0-6)
	Big Data analysis concepts, fundamental environments, advanced data management and storage methods, advanced analytics algorithm; data visualization; big data analytics to handle real-world problems	
969-617	Advanced Database Management System	3(3-0-6)
	Advanced database systems; distributed databases; data integrity; data reliability; data security and consistency; relational theory; semantics of data types; connection between programming languages and database systems	
969-618	Financial Technology	3(3-0-6)
	Financial service systems for banking; models and technologies in finance; risks in financial transaction processing system; data encryption; authentication and data verification; financial security protocol; digital signature; data security on financial data communication; intruder detection systems; system security technologies; policy, laws and regulations related to data security; disruptive technology i.e. blockchain, cyptocurrency, machine learning	

- 969-619 Information Technology for Business 3(3-0-6)**
- Applying information technology to business operations; software application selection for business operations, such as accounting, finance, human resource, production, inventory control, forecasting, marketing, supply chain; case studies related to adopt information technology in business operations; information technology innovation for business
- 969-620 Software Maintenance and Evolution 3(3-0-6)**
- Fundamental concepts of software evolution and software maintenance; object-oriented reengineering; refactoring; software maintenance tools; change patterns; empirical analysis of software maintenance; defect prediction models; software quality analysis; software evolution visualization
- 969-621 Architectural Thinking 3(3-0-6)**
- Architectural thinking principles; role of architects; architecture requirements; architecture tactics; architecture patterns; architecture deliverables; TOGAF architecture definition document; architecture capability framework; architecture development methods; architecture tools; TOGAF reference models
- 969-622 Software Verification and Validation 3(3-0-6)**
- Fundamental concepts and methods for verification and validation of software product; software reviews, software inspection, software testing; software problem analysis and reporting
- 969-623 Formal Method Engineering 3(3-0-6)**
- Formal methods; formal specification; mathematical notation; schema calculus constructions; software development with formal method; semi-formal language; cleanroom software engineering; test generation from software specification; formal method tools; case studies
- 969-624 Advanced Empirical Software Engineering 3(3-0-6)**
- The scientific process for experiments in software engineering; the importance of empirical study in software engineering; the distinction between traditional analytical techniques and

empirical techniques; using empirical evidence for software engineering practices; experimental design; reporting the experimental results; case studies in software engineering

- 969-625 Advanced Web Technologies 3(3-0-6)**
- Principle and architecture of semantic web; representation XML, RDF, and OWL languages, ontologies knowledge, advanced applications and services; concepts and objectives of web services; web services technology; web services architectures; web services operations; related protocols; advanced web service development; example of applications
- 969-626 Reality Technology 3(3-0-6)**
- Using the reality technology to architectural design; user-interactive presentations; reality programming; techniques to create various realities
- 969-627 Image Processing 3(3-0-6)**
- Digital image processing in the context of real-world applications; histogram transformation; noise signal reduction; edge detection; image enhancement; image segmentation; image coding; data compression
- 969-628 Human-Computer Interaction 3(3-0-6)**
- Psychological principles of human-computer interaction; user-centered design and prototyping; conceptual models and metaphors; software design rationale; design of widget; natural languages; user interface architectures; user interface development for mobile devices; graphical user interface development tools
- 969-630 Mobile and Wireless Networks 3(3-0-6)**
- Design and implementation of protocols; applications for mobile and wireless networking; techniques for using signal channels; transport layers of wireless network; wireless network problems; various device constraints; node mobility; wireless network simulation
- 969-631 Advanced Data Communication and Computer Networking 3(3-0-6)**

	Internet architecture; design and implementation of internet systems; reliable data transmission; data congestion control; internet routing techniques; wireless communication; quality of services; domain name systems; internet security problems	
969-632	Advanced Cloud Computing	3(3-0-6)
	High performance computing; service architecture; services and frameworks of high performance computing; principles of cloud computing systems; software development for cloud computing; big data support capabilities on cloud computing systems	
969-633	Computer Network Security	3(3-0-6)
	Importance of security in information system and computer network; security of hardware, software, data, and business processes; security architecture and policy; information exchange and ownership; access control; cryptography technology; digital signature; authentication; certification and key system management; security techniques and standards of information systems; security email; computer network security protection tools	
969-634	Distributed Computing Systems	3(3-0-6)
	Distributed version of the producer-consumer problem and protocols; simple communication; the problem of time and clocks; termination detection algorithms; process work in distributed environments; distributed deadlock detection; different types of deadlocks; distributed computing problems and analyses	
969-640	Special Topics in Computing I	3(3-0-6)
	Special topics in computing; subject descriptions conform to program committee and instructors	
969-641	Special Topics in Computing II	3(3-0-6)
	Special topics in computing; subject descriptions conform to program committee and instructors	
969-801	Thesis	36(0-108-0)
	Research study on the topic of interested fields available in the program under supervision of a faculty advisor; thesis overviews	

should be presented to the thesis committee or program committees regularly every semester; the thesis must be written in an appropriate format

969-802 Thesis 24(0-72-0)

Research study on the topic of interested fields available in the program under supervision of a faculty advisor; thesis overviews should be presented to the thesis committee or program committees regularly every semester; the thesis must be written in an appropriate format

969-803 Minor Thesis 6(0-18-0)

Independent study on interesting topic at the master’s degree level, compile into a report, and present in the final

19. Full Time Lecturers of the Curriculum

No.	Academic Position	Name - Surname	Education Degree
1	Asst.Prof.	Dr. Rattana Wetprasit	Ph.D. (Computer Science), Griffith University, Australia Master Degree in Applied Statistic, National Institute of Development Administration (NIDA), Thailand Bachelor Degree in Marine Science, Chulalongkorn University, Thailand
2	Asst.Prof.	Dr. Aziz Nanthaamornphong	Ph.D. (Computer Science), University of Alabama, USA Master Degree in Information Technology, Kasetsart University, Thailand Bachelor Degree in Industrial Engineering, Thammasat University, Thailand
3	Asst.Prof.	Dr. Warodom Werapun	Ph.D. in Computer Engineering (ENSEEIH, France)

			<p>Master II Research in Computer Engineering (ENSEEIH, France)</p> <p>M. Eng. in Computer Engineering (KMITL, Bangkok)</p> <p>B. Eng. in Computer Engineering (PSU, Songkla)</p>
4	-	Dr. Nattapong Tongtep	<p>Doctor of Philosophy (PhD) in Information Technology (combined MSc/PhD), Sirindhorn International Institute of Technology (SIIT), Thammasat University, Thailand</p> <p>Bachelor of Science (BSc) in Computer Science, 1st Class Honors, Prince of Songkla University, Thailand</p>
5	-	Dr. Vorawika Wattanasunthon	<p>Ph.D. (Technology), University of Girona, Spain</p> <p>Master of Science in Computer and Engineering Management, Assumption University, Thailand</p> <p>Bachelor of Science Program in Microbiology, KMUTT, Thailand</p>
6	-	Dr. Noppon Lertchuwongsa	<p>Doctorat en physique Très Honorable</p> <p>At Ecole doctoral: Sciences et Technologies de l'information, des Télécommunications et des Systèmes, Université Paris XI, Paris, France.</p> <p>Master Degree in Electrical Engineering, King Mongkut's Institute of Technology Ladkrabang, Thailand</p> <p>Bachelor Degree in Electrical Engineering, King Mongkut's Institute of Technology Ladkrabang, Thailand</p>
7	-	Dr. Komsan Kanjajisit	<p>PhD (Electrical Engineering), Heriot-Watt University, Edinburgh, United Kingdom</p>

			M.Eng (Electrical Engineering), King Mongkut's Institute of Technology North Bangkok, Thailand B.Eng (Electrical Engineering), Rajamangala Institute of Technology, Thailand
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Note: Publications of all full time lecturers of the curriculum is in Appendix A.

20. Potential Research Topics

Software Engineering: Topics include, but are not limited to, the following.

1. Agile Software Development
2. Software Architecture and Design
3. Empirical Software Engineering
4. Software Process Improvement
5. Software Maintenance
6. Formal Engineering
7. Formal Modeling and Specification
8. Software Verification and Validation
9. Model-based Testing

Digital Media: Topics include, but are not limited to, the following.

1. Serious Games
2. Interactive Media
3. Physics-based Animation
4. Human-Computer Interaction
5. Mobile Application
6. Architectural Visualization
7. Augmented and Virtual Reality

Digital Media: Topics include, but are not limited to, the following.

1. Artificial Intelligence
2. Computer Vision
3. Natural Language Processing
4. Knowledge Representation
5. Machine Learning
6. Expert System
7. Robotics
8. Text Mining

Computer Networking: Topics include, but are not limited to, the following.

1. Mobile Ad-hoc Networks
2. Wireless Sensor Networks
3. Network Mobility
4. Integration of Mobile Ad-hoc Networks and Network Mobility
5. Vehicular Networking
6. Virtual Networks
7. Internet of Things

Database Systems: Topics include, but are not limited to, the following.

1. Data Mining
2. Data Warehouse
3. Distributed Database
4. Big Data

Cloud Computing: Topics include, but are not limited to, the following.

1. Cloud Computing Architecture
2. Traffic Management for Cloud Computing
3. Cloud Computing Applications
4. Mobile Cloud Computing

Knowledge Management: Topics include, but are not limited to, the following.

1. Information Management
2. Information Retrieval
3. Information Extraction

21. Completion of Study

Requirement for graduation (degree award) must conform to Prince of Songkla University Regulations for Graduate Studies.

Plan A1:

- 1) Submit the written thesis and pass the thesis defense examination. The defense includes an oral presentation of thesis research, followed by a question-and answer session that is open to all faculty members. The thesis examination committee will determine whether the defense is acceptable **AND**

- 2) A student's research work must be published or accepted for publication in a peer reviewed journal with quality conforms to Graduate School policy **AND**
- 3) Pass the minimum English proficiency test set by the Graduate School for each program of study.

Plan A2:

- 1) Completion of all courses as required by the program of study with a minimum cumulative GPA of 3.00 **AND**
- 2) Submit the written thesis and pass the thesis defense examination. The defense includes an oral presentation of thesis research, followed by a question-and answer session that is open to all faculty members. The thesis examination committee will determine whether the defense is acceptable. **AND**
- 3) A student's research work must be published or accepted for publication in a peer reviewed journal with quality conforms to Graduate School policy **OR** A student must present his/her full paper at an academic international conference (and have it published in the conference proceedings) **AND**
- 4) Pass the minimum English proficiency test set by the Graduate School for each program of study.

22. Quality Assurance of Program Administration

22.1. Progress Report

Through-out study time, they must present their Thesis progress report at least once a semester.

22.2. Duration of Study

Not more than 5 academic years.

22.3. Number of Credit per Semester

Students may not register for more than 15 credits (credit and audit combined) per semester, and registration must be with the consent of the academic or thesis advisor.

22.4. Thesis Proposal

The students will develop a written research proposal. This should contain an introduction to the research area, a review of relevant literature in the area, a description of problems to be investigated, an identification of basic goals and objectives of the research, a methodology and timetable for approaching the research, and an extensive bibliography.

The student will deliver an oral presentation of the research proposal, which is followed by question-and-answer session that is open to all faculty members and which covers topics related directly or indirectly to the research area. The committee will determine whether the proposal is acceptable based upon both the written and oral presentations.

The thesis proposal examination committee consists of 3 to 5 members:

- a. Thesis advisor
- b. Thesis co-advisor (if requested)
- c. Lecturer and/or recognized expert in the related field of research
- d. At least 1 external expert in the related field of research who is not the current thesis co-advisor

Notes: 1) The thesis advisor / co-advisor may not act as the Chairperson of the committee.

2) The thesis examination committee must be appointed by the Faculty committee.

22.5. Thesis Examination

The student will develop a written thesis that demonstrates that the student has performed original research that makes a definite contribution to current knowledge. Its format and content must be acceptable to both the student's committee and the Graduate School.

The student will defend the written thesis. The defense includes an oral presentation of thesis research, followed by a question-and answer session. The committee will determine whether the defense is acceptable.

The thesis examination committee consists of 3 to 5 members:

- a. Thesis advisor
- b. Thesis co-advisor (if requested)
- c. At least 1 lecturer who is not the current thesis co-advisor and a recognized expert in the related area
- d. At least 1 external expert in the related field of research who is not the current thesis co-advisor

Notes: 1) The thesis advisor / co-advisor may not act as the Chairperson of the committee.

2) The thesis examination committee must be appointed by the Faculty committee.

22.6. Detection of Plagiarism

The Graduate School has to ensure that every thesis and publication meets the expected quality and reliability standards. Students must maintain proper ethical standards in their research and must not copy work from other people as well as their own work without proper citation.

In order to prevent plagiarism, all students must submit form GS14 together with a Turnitin™ Originality Report to the advisor and examination committee prior to the thesis examination. When the thesis is completed, students must submit the printed GS14 Turnitin™ Originality Report, together with an electronic copy of the report on CD to the Graduate School.

22.7. English Proficiency

Master's Degree students must pass the English proficiency test as determined by the Graduate School. Example of Guidelines (updated: Oct-2018) are as following:

Testing institute	Master's Degree (International Program)
PSU-TEP	An average of at least 60% in Reading and Structure, Listening and Writing
CU-TEP	At least 60 score in Reading, Listening and Writing
TOEFL (Paper Based)	Score of 500
TOEFL (revised Paper-delivered Test)	Score of 46
TOEFL (Institutional Testing Program)	Score of 520
TOEFL (Computer Based)	Score of 173
TOEFL (Internet Based)	Score of 61
IELTS	Score of 5

Note: The most updated information on English proficiency testing (PSU-TEP) may be obtained at the Education Unit, 2nd Floor, Faculty of Liberal Arts (Tel. 0-7428-6665) or via website www.grad.psu.ac.th

Test results need to have been obtained within 2 years before commencing studies at PSU. Students who wish to use test results from TOEFL, IELTS, or other testing institutes must submit a [General Request Form 1 \(RF1\)](#) for English language equivalent with the valid test result through the academic/thesis advisor to the Graduate School for approval.

In cases where exam scores were obtained from other sources or where a student has graduated from an educational institution where the language of tuition was English, and where there is evidence of sufficient English language proficiency, the Graduate School will use its discretion in considering each case.

22.8. Documents and Forms

Students can view related documents and forms at the following URL:

<https://www.computing.psu.ac.th/en/ms-computing/>

The information on the website (updated: Oct-2018) includes:

Related Documents:

[Academic calendar](#)

[Thesis Manual](#)

[Graduate Study Guideline](#)

[Thesis Examination](#)

[Thesis proposal Examination](#)

[Request Form for External Examiner](#)

[Position in form](#)

Graduate Study's Forms:

[GS. 1 Request for Advisor and Co-advisor Appointment](#)

[GS. 1/1 Request for Change of Advisor and/or Co-advisor](#)

[GS. 2 Request for Thesis Proposal Approval](#)

[GS. 2/1 Request for Thesis Proposal Amendment](#)

[GS. 3 Request for Appointment of Thesis Examination Committee](#)

[GS. 3/1 Request for Change of Thesis Examination Committee](#)

[GS. 4 Request for Thesis Examination](#)

[GS. 4/1 The Information of Publication of Thesis](#)

[GS. 4/2 Request for Change of Thesis Examination Date](#)

[GS. 6 Thesis Format Correction Form](#)

[GS. 8 Request for Thesis Submission](#)

[GS. 14 Originality Report \(Submission with thesis and manuscript or publication\)](#)

BS Forms:

[BS. 1 Request for Appointment of Thesis Proposal Examination Committee](#)

[BS. 1/1 Request for Change of Thesis Proposal Examination Committee](#)

[BS. 2/2 Report on Thesis Proposal Edit](#)

[BS. 3 Request for Change of Thesis Proposal Examination Date](#)

[BS. 4/1 Request for submit manuscript of thesis](#)

[BS. 5 Report on Thesis Edit](#)

RF Forms:

[RF. 1 General Request Form](#)

[RF. 1/3 General Request Form](#)

[RF. 1/3 General Request Form \(thesis exam\)](#)

[RF. 1/5 General Request Form](#)

Other Forms:

[Graduate School Dissertation Funding for Thesis](#)

Note: Students are encouraged to visit website regularly for the most updated documents and forms.

Appendix A: Full Time Lecturers of the Curriculum

1. Asst.Prof.Dr. Rattana Wetprasit

Ph.D. (Computer Science), Griffith University, Australia

Master Degree in Applied Statistic, National Institute of Development Administration (NIDA), Bangkok, Thailand

Bachelor Degree in Marine Science, Chulalongkorn University, Bangkok, Thailand

Research Interests: Software Engineering, Software Process Improvement, Software Quality

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Publications (for the last 5 years):

2016

1. Nanthaamornphong, A. and Wetprasit, R., A Case Study: Adoption of Agile in Thailand, The Proceeding of the 8th International Conference on Advanced Computer Science and Information Systems, Malang, Indonesia, Oct 15-16, 2016 (Best Session Presenter) [IEEE]
2. Wetprasit, R. and Nanthaamornphong, A., Phuket Smart City and the Needs of its Population, The Proceeding of the 12th National Conference on Computing and Information Technology (NCCIT 2016), Khon Kaen, Thailand, pp.599-604, Jul, 2016.
3. Chaisutanon, A., Nanthaamornphong, A., and Wetprasit, R., "Code Smell Influences in the Code Review for Open Source Software Projects", The 12th National Conference on Computing and Information Technology (NCCIT 2016), Khon Kaen, Thailand, pp.170-175, Jul, 2016.

2015

4. Nanthaamornphong, A. and Wetprasit, R., "Evaluation of the Visitor Pattern to Promote Software Design Simplicity", Jurnal Teknologi (Science and Engineering), vol.77, no. 9, pp.61-77, 2015 [Scopus indexed]
5. Wongsai, N., Siddoo, V., and Wetprasit, R., 2015. Factors of Influence in Software Process Improvement: An ISO/IEC 29110 for Very-Small Entities. The 7th International Conference on Information Technology and Electrical Engineering (ICITEE), Thailand.
6. Siddoo, V., & Wetprasit, R. (2015). Petty Cash Control System: A Retail Business Case Study. The 7th National Conference on Information Technology (NCIT), (pp. 364-369). Chaingmai, Thailand.

2014

7. A. Nanthaamornphong, and R. Wetprasit. A Controlled Experiment: Do Visitor Patterns Improve Design Simplicity? In the 8th Malaysian Software Engineering Conference (MySEC 2014), Langkawi, Malaysia, IEEE Computer Society, 2014. (Best paper award)
8. V. Siddoo, and R. Wetprasit. Design and Tool for Decision Making Cooperative and Work Integrated Workplace. In the 29th International Technical Conference on Circuits/Systems, Computers and Communications (ITC-CSCC 2014), pages 645-647, Phuket, Thailand, 2014.
9. V. Siddoo and R. Wetprasit. The Design of Targets and Performance Indicators for Payment Service: Telecommunication Organization Case Study. In the 9th National Conference on Computing and Information Technology (NCCIT 2014), pages 340-345, Phuket, Thailand, 2014.
10. V. Siddoo and R. Wetprasit. The Payment Process Improvement by Applying Netting Accounts Receivable and Accounts Payable Method: A Retail Business Case Study. In the National 4 Conference on Information Technology (NCIT 2014), pages 95-101, Nakhon Ratchasima, Thailand, 2014.

2. Asst.Prof.Dr. Aziz Nanthaamornphong

Ph.D. (Computer Science), University of Alabama, USA

Master Degree in Information Technology, Kasetsart University, Bangkok, Thailand

Bachelor Degree in Industrial Engineering, Thammasat University, Bangkok, Thailand

Research Interests: Software Engineering, Empirical Software Engineering, Software Quality, Agile

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Publications (for the last 5 years):

2018

1. Aziz Nanthaamornphong and Jeffrey Carver, Test-Driven Development in HPC Science: A Case Study, Computing in Science and Engineering, vol. 20, no. 5, pp. 98-113, 2018. [ISI indexed]
2. Hong Anh Le, Ninh Thuan Truong, and Aziz Nanthaamornphong, A Model-based Method for Modeling and Verifying Event-Based Aspect-Oriented Applications, Recent Advances and Future Prospects in Knowledge, Information and Creativity Support Systems: Selected Revised Papers from the 10th International Conference on Knowledge,

Information and Creativity Support Systems (KICSS 2018),Phuket, Thailand, pp. 281-289

2017

3. Aziz Nanthaamornphong, Saknarong Pomwong, Kwanrudee Klebkaew, and Napawan Jindamanee, Squirrel: A Code Snippet Repository, *Journal of Telecommunication, Electronic and Computer Engineering*, vol.9, no.3-3, pp.73-77 [Scopus Indexed]
4. Aziz Nanthaamornphong and Anawat Leatongkam, Modern Fortran Transformation Rules for UML Sequence Diagrams, *Journal of Telecommunication, Electronic and Computer Engineering*, vol.9, no.3-4, pp.131-136 [Scopus Indexed]
5. Aziz Nanthaamornphong and Thanyarat Kitpanich, The Study of Code Reviews based on Software Maintainability in Open Source Projects, *Journal of Telecommunication, Electronic and Computer Engineering*, vol.9, no.3-4, pp.123-129 [Scopus indexed]
6. Aziz Nanthaamornphong and Jeffrey Carver, Test-Driven Development in scientific software: a survey, *Software Quality Journal*, vol.25, issue 2, pp.343-372 [ISI indexed]
7. Anawat Leatongkam, Aziz Nanthaamornphong, and Damian W. Rouson, WIP: Generating Sequence Diagrams for Modern Fortran, *The 2017 International Workshop on Software Engineering for Science Held during ICSE 2017*, pp. 22-23, Buenos Aires
8. Anawat Leatongkam and Aziz Nanthaamornphong, Modern Fortran Transformation Rules for UML Sequence Diagrams, *The 13th National Conference on Computing and Information Technology (NCCIT 2017)*, pp.247-280, Bangkok, Thailand.
9. Thanyarat Kitpanich and Aziz Nanthaamornphong, The Empirical Evidence on Software Maintainability in Open Source Projects, *The 13th National Conference on Computing and Information Technology (NCCIT 2017)*, pp.267-273, Bangkok, Thailand.

2016

10. Jonathan Krein, Lutz Prechelt, Natalia Juristo, Aziz Nanthaamornphong, Jeffrey Carver, Sira Vegas, Charles Knutson, Kevin Seppi, Dennis Eggett, A Multi-Site Joint Replication of a Design Patterns Experiment Using Moderator Variables to Generalize across Contexts, *IEEE Transactions on Software Engineering*, vol.42, no.4, pp. 302-321 [ISI indexed]
11. Aziz Nanthaamornphong, A Case Study: Test-Driven Development in a Microscopy Image-Processing Project, *The 4th International Workshop on Software Engineering for High Performance Computing in Computational Science and Engineering (SE-HPCCSE16)* co-located with *Super Computing 2016*, pp. 9-16, Salt Lake City, Utah, USA
12. Aziz Nanthaamornphong and Rattana Wetprasit, A Case Study: Adoption of Agile in Thailand, *The 8th International Conference on Advanced Computer Science and Information Systems*, pp. 585-590, Malang, Indonesia.

13. Aziz Nanthaamornphong and Apatta Chaisutanon, Empirical Evaluation of Code Smells in Open Source Projects: Preliminary Results, The 1st International Workshop on Refactoring (IWor 2016) in Conjunction with ASE 2016, pp.5-8, Singapore
14. Aziz Nanthaamornphong, Weerayut Hongsa, Nimaslan Auseng, and Chanwit Julrod, The Log File Management with AirLog, The 12th National Conference on Computing and Information Technology (NCCIT 2016), pp. 292-297, Khon Kaen, Thailand
15. Rattana Wetprasit and Aziz Nanthaamornphong, Phuket Smart City and the Needs of its Population, The 12th National Conference on Computing and Information Technology (NCCIT 2016), pp.599-604, Khon Kaen, Thailand
16. Suchada Pongprom, Aziz Nanthaamornphong, and Rattana Wetprasit, Encouraging Students' Interest in Software Development by Test-Driven Development, The 12th National Conference on Computing and Information Technology (NCCIT 2016), pp.478-483, Khon Kaen, Thailand
17. Apatta Chaisutanon, Aziz Nanthaamornphong, and Rattana Wetprasit, Code Smell Influences in the Code Review for Open Source Software Projects, The 12th National Conference on Computing and Information Technology (NCCIT 2016), pp.170-175, Khon Kaen, Thailand

2015

18. Aziz Nanthaamornphong and Rattana Wetprasit, Evaluation of the Visitor Pattern to Promote Software Design Simplicity, Jurnal Teknologi, vol. 77, no. 9, pp. 61-77 [Scopus indexed]
19. Aziz Nanthaamornphong, Jeffrey Carver, Karla Morris, and Salvatore Filippone, Extracting UML Class Diagrams from Object-Oriented Fortran: ForUML, Scientific Programming, vol. 2015, Article ID 421816, 15 pages [ISI indexed]
20. Aziz Nanthaamornphong, Anawat Leatongkam, Thanyarat Kitpanich, and Pongsakorn Thongnuan, Bytecode-based Class Dependency Extraction Tool: Bytecode-CDET, The 7th International Conference on Information Technology and Electrical Engineering, pp. 6-11, Chiangmai, Thailand

2014

21. Aziz Nanthaamornphong, Jeffrey Carver, Karla Morris, Hope A. Michelsen, Damian W. I. Rouson, Building CLiIME via Test-Driven Development: A Case Study, Computing in Science & Engineering, vol.16, no. 3, pp. 36-46 [ISI indexed]
22. Aziz Nanthaamornphong and Rattana Wetprasit, A Controlled Experiment: Do Visitor Patterns Improve Software Simplicity, The 8th Malaysian Software Engineering (MySEC), pp. 90-95, Langkawi, Malaysia

3. Asst.Prof.Dr. Warodom Werapun

Ph.D. in Computer Engineering (ENSEEIH, France)

Master II Research in Computer Engineering (ENSEEIH, France)

M. Eng. in Computer Engineering (KMITL, Bangkok)

B. Eng. in Computer Engineering (PSU, Songkla)

Research Interests: LoRA network, Peer-to-Peer network, Distributed system

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Publications (for the last 5 years):

2018

1. W. Werapun, W. Srimala, K Chaowanawatee, T. Karode, “Smart Logistics Framework: A Case Study of Phuket RO Water System”, The 2018 4th International Conference on Innovation and Industrial Logistics (ICIIL2018), Bangkok, Thailand, Aug 2018, Page:44-48 (SCOPUS indexing)

2017

2. W. Werapun, K. Chaowanawatee, “LoRa Smart Parking for Phuket Smart City”, The 8th PSU-UNS International Conference on Engineering and Technology (ICET-2017), Novi Sad, Serbia, June 8-10, 2017, Page: 25 (1-4) (Best Paper Award)

2016

3. P. Tantisarkhornkhet, W. Werapun, Beatrice Paillassa, “SDN Experimental on the PSU Network”, The 2016 International Symposium on Intelligent Signal Processing and Communication Systems (ISPAC 2016), Phuket, Thailand, 24-27 Oct 2016, Page: 453-458 (IEEE Indexing)
4. P. Tantisarkhornkhet, W. Werapun, “QLB: QoS Routing Algorithm for Software-Defined Networking”, The 2016 International Symposium on Intelligent Signal Processing and Communication Systems (ISPAC 2016), Phuket, Thailand, 24-27 Oct 2016, Page: 395-400 (IEEE Indexing)

2015

5. W. Werapun, A. Kamhang and A. Wachiraphan, “Design of Home Automation Framework with Social Network Integration”, Frontiers in Artificial Intelligence and Applications, Volume 275, 2015, Pages 219-226, DOI: 10.3233/978-1-61499-503-6-219, CiteScore2015: 0.21, SJR2015: 0.162, SNIP 2015: 0.194, Publisher:IOS Press, ISSN:0922-6389, E- ISSN:1535-6698, (SCOPUS Indexing)

2014

6. A. Heednacram, W. Werapun, “Java Predictors for Water Level Forecast Based on Daily Gage Height”, *Advanced Materials Research (AMR)*, vol. 931-932, pp. 839-843, 2014. (ISBN: 978- 3-03835-090-3, DOI:10.4028/www.scientific.net/AMR.931-932.839, ISI & SCOPUS Indexing).
7. W. Werapun and J. Suaboot, “Data Integrity for Energy Measurement of Sensor Nodes as Home Services,” *The 29th International Technical Conference on Circuits/Systems, Computers and Communications (ITC-CSCC 2014)*, July 1-4, 2014 Phuket, Thailand, pp. 829-830.

4. Dr. Nattapong Tongtep

Doctor of Philosophy (PhD) in Information Technology (combined MSc/PhD), Sirindhorn International Institute of Technology (SIIT), Thammasat University, Thailand

Bachelor of Science (BSc) in Computer Science, 1st Class Honors, Prince of Songkla University, Thailand

Research Interests: Information Extraction, Text Mining, Human Language Technology, Applied Informatics

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Publications (for the last 5 years):

2017

1. Wangle, B. and Tongtep, N. Pattern-Sensitive Loanword Estimation for Thai Text Clustering, *WJST*, Vol. 14, No.10, pp.813-823, October 2017.
2. Kiawkaew, T., and Tongtep, N. Pattern Extraction of Polite Response to Customer Feedback. In *Proceedings of the Twelfth International Conference on Knowledge, Information and Creativity Support Systems (KICSS 2017)*, November 9-11, 2017, Nagoya, Japan, pp. 132-137.
3. Kunpattanasopon, N., Tongtep, N., and Hashimoto, K. Noise Reduction Effect on Thai Social Texts Sentiment Analysis. In *Proceedings of International Joint Symposium on Artificial Intelligence and Natural Language Processing (iSAI-NLP 2017)*, pp. 104-115, August 27-29, 2017, Prachuap Khiri Khan, Thailand.
4. Charornreh, S., Masalong, H., Bootem, P., and Tongtep N., The Management Information System for Universal Design in Thailand: Thai-UDee. In *Proceedings of the Thirteenth National Conference on Computing and Information Technology (NCCIT 2017)*, July 6-7, 2017, Bangkok, Thailand, pp. 247-252.

5. Wanglem, B., and Tongtep N., Text Readability Assessment using Loanword Extraction from Thai Texts. In Proceedings of the Thirteenth National Conference on Computing and Information Technology (NCCIT 2017), July 6-7 2017, Bangkok, Thailand, pp. 361-366.
6. Pat-iam, T., and Tongtep N., Automatic Report Generation using Report Name and Data Structure Extraction. In Proceedings of the Thirteenth National Conference on Computing and Information Technology (NCCIT 2017), July 6-7 2017, Bangkok, Thailand, pp. 744-749.
7. อนุรักษ์ ทองเทพ และ เลอศักดิ์ บุญล้ำ, การเตรียมความพร้อมเยาวชนเพื่อก้าวสู่สังคมดิจิทัลด้วยวิธีการเรียนรู้แบบเชิงรุก. The 6th PSU Education Conference, 19-20 ธันวาคม 2560, หาดใหญ่, สงขลา, หน้า 420-421
8. ทิพย์อรุณ เขียวแก้ว และ อนุรักษ์ ทองเทพ, การวิเคราะห์การสกัดรูปแบบการตอบกลับที่สุภาพต่อข้อความแสดงความเห็นที่มีต่อสินค้าและบริการ. การประชุมวิชาการระดับประเทศด้านเทคโนโลยีสารสนเทศ (National Conference on Information Technology) ครั้งที่ 9, 1-2 พฤศจิกายน 2560, ศาลายา, นครปฐม. หน้า 122-127.
9. นวพงษ์ อติวัฒนานนท์, ธนวัฒน์ วิชัย, ทัดพงษ์ บุบผั่น, และ อนุรักษ์ ทองเทพ, การสกัดรูปแบบสำหรับการตั้งชื่ออาหารไทย. การประชุมวิชาการระดับประเทศด้านเทคโนโลยีสารสนเทศ (National Conference on Information Technology) ครั้งที่ 9, 1-2 พฤศจิกายน 2560, ศาลายา, นครปฐม. หน้า 128-132.
10. ศุภโชค หนูปาน, จิรายุ ชินวงษ์, Borey Sok และ อนุรักษ์ ทองเทพ, การพัฒนาระบบแนะนำคำที่ใช้ทดแทนสำหรับงานเขียนภาษาอังกฤษ. การประชุมวิชาการระดับประเทศด้านเทคโนโลยีสารสนเทศ (National Conference on Information Technology) ครั้งที่ 9, 1-2 พฤศจิกายน 2560, ศาลายา, นครปฐม. หน้า 252-257.

2016

11. Siriphunwaraphon, C., Tongtep, N., and Charoenporn, T. "Human Personality toward Digital Gameplay Analytics for Edutainment-based Instructional Design", In Proceedings of The Eighth International Conference on Knowledge and Smart Technology (KST 2016), pp. 205-210, February 3-6, 2016, Chiang Mai, Thailand.
12. Sermsri, J., Phomkeaw K., Klamchawee K., and Tongtep N. Web Accessibility Transformation Creator for People with Disabilities. In Proceedings of The Twelfth National Conference on Computing and Information Technology (NCCIT 2016), July 7-8 2016, Khon Kaen, Thailand, pp. 25-30.
13. Wonghaeon, L., Keeredet N., Punpauk S., and Tongtep N. Emotion Categorization System for the Thai Texts. In Proceedings of The Twelfth National Conference on Computing and Information Technology (NCCIT 2016), July 7-8 2016, Khon Kaen, Thailand, pp. 31-36.
14. อนุรักษ์ ทองเทพ, การพัฒนาทักษะการเรียนรู้ตลอดชีวิตด้วยกลยุทธ์การเรียนรู้เชิงรุกสำหรับการจัดการระบบสารสนเทศ. The 5th PSU Education Conference, 19-20 ธันวาคม 2559, หาดใหญ่, สงขลา, หน้า 50

2015

15. Nalad, C., Charoenporn, T., Tongtep, N., "The Monitoring Management System for Tangible Cultural Heritage Surveillance," in Advanced Informatics: Concepts, Theory and Applications (ICAICTA), 2015 2nd International Conference, vol., no., pp.1-5, 19-22 Aug. 2015.

5. Dr. Vorawika Wattanasunthon

Ph.D. (Technology), University of Girona, Spain

Master of Science in Computer and Engineering Management, Assumption University, Thailand

Bachelor of Science Program in Microbiology, KMUTT, Thailand

Research Interests: Serious games, Simulation, Augmented/Virtual reality, UI/UX

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Publications (for the last 5 years):

2018

1. Theppaitoon, M. and Wattanasoontorn, V. A Classification of Visual Style for 3D Games. The Fourteen National Conference on Computing and Information Technology (NCCIT2018). Chiangmai, Thailand. Page: 12-17. 5-6 July 2018.

2017

2. V. Wattanasoontorn, C. Rakna. A visualization design and development of a traffic light control simulation, APHEIT journal (Science and Technology), ISSN 2286-9514, Volumn 12, July-December 2017

2016

3. Rakna C. and Wattanasoontorn V. "The Simulation of a GPS Based Traffic Control System, iTraffic. "The Twelfth National Conference on Computing and Information Technology (NCCIT2016). Khonkaen, 2016. 182-187.
4. Nanon, Kantida, Voravika Wattanasoontorn and Rattana Wetprasit. "A conceptual framework of a serious game for learning enhancement in museum." The Twelfth National Conference on Computing and Information Technology (NCCIT2016). Khonkaen, 2016. 176-181.

2014

5. V. Wattanasoontorn, I. Boada, M. Sbert, J. Olivet and D. Juvinyà. LISSA a serious game to teach CPR and use of AED, Resuscitation Journal, Elsevier, Volume 85, Supplement 1, Page S72, May 2014.
6. V. Wattanasoontorn, M. Sbert, and R. Garcia. Book Section: Serious Games for e-Health Care, Springer Book of Simulations, Serious Games and Their Applications. Series: Gaming Media and Social Effects, pages 127-146, January 2014.
7. Boada, V. Wattanasoontorn, J. Manuel García-González, A. Rodríguez-Benítez, and M. Sbert. LISSA, a serious game to learn CPR and AED use (Best Paper Award), In the Global Conference on Teaching and Learning with Technology (CTLT 2014), Pages 130-150, Singapore, 9-10 July 2014.
8. V. Wattanasoontorn, R. Garcia and M. Sbert. Optimal textures for 3D real time architectural visualization, In the 29th International Technical Conference on Circuit/Systems Computers and Communications (ITC-CSCC 2014), Pages 659-660 Phuket, Thailand, 1-4 July 2014.
9. M. Sbert, I. Boada, V. Wattanasoontorn, A. Rodríguez-Benítez, J. Manuel García-González and E. Soto. A game to relive Don Quixote's adventures, 1er Congreso de la Sociedad Española para las Ciencias del Videojuego, Barcelona, 24 juny de 2014.
10. Boada, V. Wattanasoontorn, J. Olivet, D. Juvinyà, and M. Sbert. LISSA a serious game to teach CPR and use of AED. The poster presentation in the Congress of the European Resuscitation Council, Bilbao, Spain, 15-17 May 2014.
11. V. Wattanasoontorn and M. Sbert. Interactive design of new-media for learning for children in preoperational stage. In the Asian Conference on Technology in the Classroom (ATCT2014), Pages 279-285, Osaka, Japan, 17-20 April 2014.

6. Dr.Noppon Lertchuwongsa

Doctorat en physique Très Honorable At Ecole doctoral: Sciences et Technologies de l'information, des Télécommunications et des Systèmes, Université Paris XI, Paris, France.

Master Degree in Electrical Engineering, King Mongkut's Institute of Technology Ladkrabang, Thailand

Bachelor Degree in Electrical Engineering, King Mongkut's Institute of Technology Ladkrabang, Thailand

Research Interests: Color Computer Vision, Sensors, Automatic Systems

Email: noppon.l(at)phuket.psu.ac.th

Publications (for the last 5 years):

2017

1. นพพน เลิศชูวงศา และ นิพนธ์ ปริญาวุฒิชัย. 2560. การปรับปรุงเทคนิคการทำเหมืองข้อมูลเพื่อความเข้าใจพฤติกรรมกรรมการยื่นหนังสือ ในห้องสมุดที่ดิจิทัล, วารสารราชชนกปริทรรศ. Vol. 14(32), p. 133-144
2. Kanghae, S., and Lertchuwongsa, N. 2017. Dental shade with histogram comparison in android. Proceedings of the 8th PSU-UNS International Conference on Engineering and Technology. Paper No. T4-1.2 Page 1-4 (Presentation date: 10 June 2017)

2015

3. วิรัตน์ พรหมเมศ และ นพพน เลิศชูวงศา. 2015. Security controlled system on raspberry pi with Eigen face technique and illumination change. Proceedings of the ECTI-CARD 2015. Page: 205-209. (Presentation date: 9 July 2015)
4. กิติภูมิ เพื่อรักษา และ นพพน เลิศชูวงศา. 2015. Kinect sensor for patient aiding system, Proceedings of the AUC2 conference 2015. Page: 247-251. (Presentation date: 29 April 2015)

7. Dr. Komsan Kanjajisit

PhD (Electrical Engineering), Heriot-Watt University, Edinburgh, United Kingdom

M.Eng (Electrical Engineering), King Mongkut's Institute of Technology North Bangkok, Thailand

B.Eng (Electrical Engineering), Rajamangala Institute of Technology, Thailand

Research Interests: Computational Electromagnetics, Microsystems and MEMS, Metamaterial and Antenna-Based Sensors, Microfabrications

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Publications (for the last 5 years):

2018

1. Komsan Kanjanasit and Changhai Wang, "A Wideband Resonant Cavity Antenna Assembled Using a Micromachined CPW Fed Patch Source and a Two-Layer Metamaterial Superstrate," IEEE Transactions on Components, Packaging and Manufacturing Technology, 2018 (Impact Factor 1.66 ; ISI Q3) Early Access
2. K. Kanjanasit and C. H. Wang, "Study of Multiband Resonant Absorbers Based on Modified Electric LC Resonators," Proceedings of ECTI-CON 2018, Chiangrai, Thailand, 18–21 Jul., pp.210-213, (2018)

2017

3. Irina Vendik, Alexander Rusakov, Komsan Kanjanasit, Jiasheng Hong, Dmitry Filonov, “Ultra-Wideband (UWB) Planar Antenna with Single-, Dual-, and Triple-Band Notched Characteristic Based on Electric Ring Resonator,” *IEEE Antennas and Wireless Propagation Letters*, vol. 16, pp.1597-1600, Jun, 2017 (Impact Factor 2.533 ; ISI Q1)
4. K. Kanjanasit and C. H. Wang, “A Broadband Resonant Cavity Antenna Using a Metamaterial Based on Double-Side Identical Arrays,” *2017 IEEE Conference on Antenna Measurements and Applications (CAMA)*, Tsukuba, Ibaraki, Japan, pp.51-54, 4–6 Dec., (2017)
5. A. Rusakov, I. B. Vendik, K. Kanjanasit, “Tri-Mode Electric Ring Resonator and Adjustable UWB Triple Band-Notched Antenna,” *2017 IEEE Conference of Russian Young Researchers in Electrical and Electronic Engineering (EIConRus)*, St. Petersburg, Russia, pp.317-321, 1–3 Feb., (2017)

2016

6. K. Kanjanasit and C. H. Wang, “A High Performance Micromachined CPW Fed Aperture Coupled Compact Patch Antenna Using a Double-Tuned Impedance Matching Method,” *The 2016 International Symposium on Intelligent Signal Processing and Communication Systems (ISPACS 2016)*, Phuket, Thailand, pp.134-137, 24-27 Oct. (2016)
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Appendix B: Prince of Songkla University Regulations for Graduate Studies BE 2556

The Regulations for Graduate Studies have been updated in accordance with the higher education standards set by the Ministry of Education. By virtue of section 15(2) of the Prince of Songkla University Statute BE 2522, these regulations were passed by resolution of the 346th (2/2556) Prince of Songkla University Council meeting on 16th February 2013.

1. These regulations are called “Prince of Songkla University Regulations for Graduate Studies BE 2556.

2. These regulations apply to all Prince of Songkla University graduate students from academic year 2013 onwards.

3. These regulations supersede all previous announcements and regulations regarding the subject.

4. Definitions:

- “University Council” means Prince of Songkla University Council
- “Academic Council” means Prince of Songkla University Academic Council
- “University” means Prince of Songkla University
- “Graduate School” means Graduate School, Prince of Songkla University
- “Faculty” means Faculty, Graduate School, College, Institute, or equivalent authority administering graduate study programs
- “Dean” means Faculty Dean, Dean of the Graduate School, College/Institute Director, or equivalent executives in charge of graduate study programs
- “Department” means a Department of graduate study programs

- “Graduate Studies Committee of Graduate School” means the Graduate Studies Committee of Prince of Songkla University Graduate School
- “Credit” means credit completed by program requirement
- “Faculty Graduate Studies Committee” means a Graduate Studies Committee at Faculty, College, or Institute level.
- “Graduate Student” means Prince of Songkla University graduate student

5. The President or Vice President acting on behalf of the President is the arbitrator of these regulations. In cases of uncertainty or matters not covered in these regulations, or with exceptional cases, the President or acting Vice President will be the final adjudicator, and such matters will be reported to the Academic Council.

Section 1

Administration of Graduate Studies

Topic 6: Graduate level studies shall be organized as follows:

6.1 The Graduate School regulates and maintains the standard of graduate studies programs at Prince of Songkla University.

6.2 The Graduate School is responsible for coordinating and supporting graduate education, and the faculties are responsible for providing education in their respective subjects.

6.3 The Graduate School may provide multidisciplinary curricula in order to facilitate and administer education in courses which are relevant to several faculties.

Section 2

Graduate Study Programs

Topic 12: Structure of Graduate Study Programs

12.1 Graduate Diploma and Higher Graduate Diploma

Graduate Diploma: A comprehensive program of study with an emphasis on academic and professional development, applicants must have a bachelor's degree or equivalent from an accredited college or university. The program consists of at least 24 credits of study.

Higher Graduate Diploma: A comprehensive program of study with an emphasis on academic and professional development, applicants must have completed 6 years of study at bachelor's degree and master's degree level, or equivalent qualifications from an accredited college or university. The program consists of at least 24 credits of study.

12.2 Master's Degree: A program of study with the emphasis on academic and research development in various areas at a level higher than a bachelor's degree or a graduate diploma, the program consists of at least 36 credits of study with 2 study plans to choose from:

Plan A – Research focused

Plan A1 - Thesis only with 36 credits. Students may be assigned additional audit coursework.

Plan A2 - Combined coursework and thesis with at least 18 thesis credits and 18 coursework credits.

Plan B - Coursework focused

Students do not have to write a thesis, but have to write a minor thesis (independent study) of at least 6 credits.

12.3 Doctor of Philosophy: A program of study with the emphasis on academic and research development in various areas at a level higher than a master's degree or a higher graduate diploma. The program consists of at least 48 credits of study for applicants with a master's degree or equivalent and at least 72 credits of study for applicants with a bachelor's degree or equivalent with an excellent academic record. There are 2 study plans to choose from:

Plan 1 – Thesis only plan, where research of exceptional quality leading to novel studies is emphasized. Students may be assigned additional audit coursework or activities.

Plan 1.1 – Applicants with a master’s degree or equivalent must take at least 48 thesis credits.

Plan 1.2 – Applicants with a bachelor’s degree or equivalent must take at least 72 thesis credits.

Plan 2 – Combined coursework and thesis plan, where research of high quality leading to academic and professional development are emphasized.

Plan 2.1 – Applicants with a master’s degree or equivalent must take at least 36 thesis credits and at least 12 coursework credits.

Plan 2.2 – Applicants with a bachelor’s degree or equivalent must take at least 48 thesis credits and at least 24 coursework credits.

Topic 13: Duration of Study

a. Graduate Diploma and Higher Graduate Diploma – depending on the program of study, but not more than 3 academic years.

b. Master’s Degree – depending on the program of study, but not more than 5 academic years.

c. Doctor of Philosophy – depending on the program of study, but not more than 8 academic years for students with a bachelor’s degree and not more than 6 academic years for students with a master’s degree.

Section 3

Graduate Study Lecturers

Topic 24 Qualifying Examination Committee

Committees consist of at least 3 members:

- The Program Convenor as chairperson

- Thesis advisor
- A lecturer

Upon completion of the qualifying examination and its approval, the faculty staff must submit the result to the Graduate School.

Topic 25 Thesis Proposal Examination Committee

Committees consist of 3 to 5 members:

- Thesis advisor
- Thesis co-advisor (if any)
- Lecturer and/or recognized expert in a related field of research

Upon completion of the proposal examination and its approval, students must submit the **Request for Thesis Proposal Approval form (GS2)** to the Graduate School.

Topic 27 Thesis Examination Committee

At the end of a student's research work, a thesis examination committee must be appointed by submission of the Request for Appointment of Thesis Examination Committee form (GS3).

The committee consists of:

- a. At least 1 external expert in the related field of research who is not the current thesis co-advisor
- b. At least 1 lecturer who is not the current thesis co-advisor and a recognized expert in the related area
- c. Thesis advisor
- d. Thesis co-advisor (if requested)

Note: The thesis examination committee consists of at least 3, but not more than 5 members, and the thesis advisor / co-advisor may not act as the Chairperson of the committee. For Ph.D. level, the external expert chairs the examination committee.

Section 5

Student Registration

Topic 34 Registration

Number of Credits per Semester

Students may not register for more than 15 credits per semester, and registration must be done with the consent of the academic or thesis advisor.

Thesis Advisor / Co-advisor

Students under a master's degree Plan A program and Ph.D. students must file the **Request for Advisor and Co-advisor Appointment (GS1)** before registering for thesis credits. The form should be filed at the student's respective school or faculty.

Registration Procedure

Both online and advance registration are available to students. The PSU academic calendar at www.grad.psu.ac.th or the Registrar's Division website provide the relevant information about registration period, deadlines and procedures for each campus at:

- Hat Yai Campus: www.reg.psu.ac.th
- Pattani Campus: www.regist.pn.psu.ac.th
- Phuket Campus: www.phuket.psu.ac.th/registra
- Surat Thani Campus: www.reg.surat.psu.ac.th
- Trang Campus: www.trang.psu.ac.th

Topic 36 Change of Study Plan

A request for changing a student's plan of study must be filed and approved by the respective school / faculty. The request can be made after having studied for at least 1 semester.

Topic 37 Change of Study Program

In order to request a change in the program of study, the **Request for a Change of Study Program (GS12)** may be filed through the respective school / faculty to the Graduate School for approval.

Topic 38 Changing the Level of Study

Students who wish to switch the level of study from a master's degree to a doctorate degree in the same area of study, or vice versa, may file a **Request for Change of Level of Study (GS13)** through their respective school / faculty to the Graduate School for approval.

Topic 40 Transfer of Course Credits

Students may request a course credit transfer by filing a **Request for Credit/Coursework Transfer (GS10)** to their respective school / faculty for approval. The transferred credits must be from courses or a thesis at graduate level, taken within the previous 3 years with a grade of P, S, or at least B.

Section 6

Assessment of Educational Outcomes

Topic 42 Examinations at Graduate Level

42.1 Comprehensive Examination

Master's degree Plan B and Ph.D. students in Plant Science are required to take a comprehensive exam set by the school / faculty. The comprehensive exam assesses a student's ability to apply the knowledge and principles acquired through study or research to their field work.

42.2 Thesis Examination

42.3 Minor Thesis Examination

42.4 Qualifying Examination (For Ph.D. student)

All Ph.D. students are required to pass a qualifying exam, set by their respective school / faculty, within 4 semesters of admission to the program. The qualifying exam assesses a student's basic knowledge and readiness to conduct research at doctoral level.

42.5 English Language Proficiency Examination

Section 7

Thesis and Minor Thesis

Topic 49 Thesis Examination

A student is required to do the following:

- a. Agree upon the time and date of the exam with all thesis examination committee members;
- b. Fill out and submit the **Request for Thesis Examination (GS4)** with the approval of the thesis advisor to the Graduate School at least 2 weeks prior to the examination date;
- c. Provide a copy of the thesis to all thesis examination committee members at least 2 weeks prior to the examination date;
- d. Prepare the forms **Specification of Thesis Examination Report (GS.5/1)** and **Report on Thesis Examination (GS5)** for committee members to complete and sign on the day of the exam. The completed forms will then be forwarded to the Graduate School by the faculty;
- e. If the thesis title needs to be revised after examination, the student needs to inform the faculty and complete the **Request for Change of Thesis Title (GS5/2)**.

Topic 50 Submission of the Completed Thesis

After completion of the thesis, students should submit the following items to the Graduate School:

- a. GS8 Request for Thesis Submission

- b. GS14 Originality Report
- c. Committee approval signatures page (page ii of the thesis)
- d. Thesis Format Inspection Report (Yellow Sheet) issued by the Graduate School upon submission of form GS6
- e. One printed and bound copy of the completed thesis
- f. A CD containing the PDF files of the completed thesis

Non-Thesis Examination and Submission

Examination must comply with the school / faculty non-thesis regulation. The complete non-thesis book and CD disc with files of the complete non-thesis work must be submitted to the respective faculty.

Topic 53 Thesis Format Inspection

The layout and format of the following 6 thesis pages will be checked by the Graduate School:

- a. Front cover
- b. Inside cover (i)
- c. Approval (committee signatures) page (ii)
- d. 2 certification pages (iii & iv)
- e. CV page (last page of thesis)

Students can submit these pages for inspection at the One Stop Service, Graduate School, together with the **Thesis Format Correction Form (GS 6)**. They will be given immediate feedback on whether the format is correct or changes are needed. For more information, please go to the thesis formatting guidelines at **Thesis Manual**.

Section 8

Completion of Study

Topic 54 Completion of Study

Requirement for graduation (degree award):

a. Completion of all courses as required by the program of study with a minimum cumulative GPA of 3.00

b. Pass the minimum English proficiency test set by the Graduate School for each program of study.

c. Pass the required exams:

(i) For master's degree Plan B students: Pass the comprehensive exam and non-thesis exam with a grade of S or X;

(ii) For master's degree Plan A students: Pass the thesis proposal examination and thesis examination with a grade of S or X;

(iii) For Ph.D students: Pass the qualifying exam, thesis proposal examination and thesis examination with a grade of S or X.

d. Publication Requirements

(i) A master's degree Plan A student must present his/her work at an academic conference (and have it published in the conference proceedings), or have it published or accepted for publication in a peer-reviewed journal;

(ii) A Ph.D. students' research work must be published or accepted for publication in a peer reviewed journal.

Upon completion of all requirements set by the program and the Graduate Study Regulation B.E. 2556, students may file a request for graduation to the **Registrar's Division online**. The Registrar's Division will then check all the graduating criteria before forwarding the request to the Graduate School for verification of graduation and submitting it to the President of the University Council for approval.

Section 9

Student Status

Topic 58 Suspension of Study

The suspension of study may not be longer than 2 semesters. Upon approval, students must maintain their student status by submitting a student status maintenance request at the Registrar's Division and pay the status maintenance fee at the Finance Office.

Topic 59 Retirement/Termination of Study

Students who wish to terminate their study may file a request using the form assigned by the Registrar's Division through their respective program committee to the Graduate School. The request will be approved by the president of the university.

Topic 61 Dismissal from Study

Reasons for student dismissal:

- a. Not registering within 30 days after commencement of a semester without having obtained approval for suspension of study;
- b. Obtaining a cumulative GPA of less than 2.50 in any single semester;
- c. Completing 2/3 of the required coursework credits, not including thesis credits, and receiving a cumulative GPA of less than 2.75;
- d. Exceeding the maximum permissible duration of study (as defined in Section 13) with a cumulative GPA of less than 3.00;
- e. Thesis proposal not having been approved within these times:
 - (1) Master's degree Plan A1
 - 4 semesters for full time students
 - 5 semesters for part time students
 - (2) Master's degree Plan A2
 - 5 semesters for full time students
 - 6 semesters for part time students

(3) Ph.D. Plan 1

- 6 semesters for full time students
- 7 semesters for part time students

(4) Ph.D. Plan 2

- 7 semesters for full time students
- 8 semesters for part time students

- f. Not passing the thesis examination or comprehensive examination at the 2nd attempt;
- g. Not submitting the completed thesis within 6 months of the thesis examination date;
- h. Not submitting the completed non-thesis work within 3 months of the examination date;
- i. The Graduate School finds a student to be guilty of serious misconduct.