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**ABET SELF-STUDY**

**QUESTIONNAIRE:**

**TEMPLATE FOR A   
SELF-STUDY REPORT**

2020-2021 Review Cycle

**ENGINEERING ACCREDITATION COMMISSION**

**ABET**

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# Introduction

The Self-Study Report is expected to be a quantitative and qualitative assessment of the strengths and limitations of the program being submitted for review.

The Self-Study Report will provide information critical to a thorough on-site review of the program. Therefore, the Report will address the extent to which the program meets applicable ABET Criteria and policies. In so doing, it is necessary that the Report address all methods of instructional delivery used for the program, all possible paths that students may take to completion of the degree, and all remote offerings available to students in the program.

Each Commission of ABET provides a ***Self-Study Questionnaire*** to assist the program in completing the Self-Study Report.

# Requirements and Preparation

The program name used on the cover of the Self-Study Report **must** be identical to that used in the institutional publications, on the ABET Request for Evaluation (RFE), and on the transcripts of graduates. This will ensure that the program is correctly identified in ABET records and that graduates can be correctly identified as graduating from an accredited program.

Normally, each program requires a Self-Study Report.

While the *Questionnaire* focuses primarily on accreditation criteria, it also includes questions related to certain sections of the ABET *Accreditation Policy and Procedure Manual* (APPM).

While it is important that the overall structure in the *Questionnaire* be retained, it is not necessary to preserve notes or pages of instructions about preparing the Self-Study Report.

A program may use terminology different from that used in the *Questionnaire*. If different terminology is used, it is important that the Self-Study Report provide notes of explanation to clearly link the terminology in the Report to terminology used in the *Questionnaire*.

Tables in the *Questionnaire* may be modified in format to more clearly present the information for the program. When this is done, it is suggested that a brief explanatory footnote be included about why the table was modified. Rows may be added to or deleted from tables to better accommodate program information.

The **educational unit** is the administrative unit having academic responsibility for the program(s) being reviewed by a given Commission of ABET. For example, if a single program is being reviewed, the educational unit may be the department. If more than one program is being reviewed, the educational unit is the administrative unit responsible for the collective group of programs being reviewed by that Commission. For example, if multiple programs are reviewed, the educational unit may be the college.

# Supplemental Materials

The following materials are to be supplied in addition to the Self-Study Report:

* The general institution catalog covering course details and other institutional information applicable at the time of the review.
* Promotional brochures or literature describing program offerings of the institution.
* Official academic transcripts of recent graduates. The **official academic transcript** contains a listing of all the courses taken by a graduate, year/semester courses were taken, the grades earned, and degree(s) earned. The Team Chair will request a specific sampling size of transcripts for each program and will provide a timeframe in which they should be provided to program evaluators. Each academic transcript is to be accompanied by the program requirements for the graduate and by worksheets that the program uses to show how the graduate has fulfilled program requirements. It is not required to remove names and other personal identifying information from transcripts and associated student records before providing them to the Evaluation Team. However, if desired, personal identifying information may be replaced with a simple alphanumeric code by which the documents may be referred to during the evaluation.

# Submission and Distribution of Self-Study Report

**NOTE: No email submission is permitted. No hard copy submission will be accepted. No submission on a data stick is permitted. The submission cannot be a combination of hard copy and electronic file.**

The Self-Study Report and Supplemental Material should be uploaded section by section or as a single upload option as **pdf files on your institution’s page in the ABET Administration Management System.**

Catalogs that are available only electronically must be submitted in a pdf format. The catalog must be the version available at the time the Self-Study Report is prepared. Web-based versions may not be submitted.

* **To ABET Headquarters via upload by July 1** of the calendar year of the review:
  + Upload **one** Self-Study Report section by section or as a single document upload option, including all appendices for **each** program
  + Upload **one** set of the supplemental materials (**without the academic transcripts)**:
* The Team Chair and Program Evaluators will be able to access the Self-Study Report through the ABET Accreditation Management System. There will be no need to transmit these materials to the team.
* The institution’s primary contact will need to coordinate with the Team Chair to confirm where to send a set of transcripts for each program.
* Please send an e-mail to [accreditation@abet.org](mailto:accreditation@abet.org) if there are any questions.

# Confidentiality

All information supplied is for the confidential use of ABET and its authorized agents. It will not be disclosed without authorization of the institution concerned, except for summary data not identifiable to a specific institution or documents in the public domain.

# Template

The template for the Self-Study Report begins on the next page.

**ABET**

**Self-Study Report**

**for the**

**Computer Engineering Program**

**at**

**Mahidol University**

**Thailand**

**August, 2020**

**CONFIDENTIAL**

The information supplied in this Self-Study Report is for the confidential use of ABET and its authorized agents and will not be disclosed without authorization of the institution concerned, except for summary data not identifiable to a specific institution.

**Program Self-Study Report**

**for  
EAC of ABET  
Accreditation or Reaccreditation**

# BACKGROUND INFORMATION

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## Program History

Mahidol University has its origins in the establishment of Siriraj Hospital in 1888 by H.M. King Chulalongkorn (King Rama V). The hospital’s medical school is the oldest higher education institute in Thailand, granting its first medical degree in 1893. In 1943, it became the University of Medical Sciences. In 1969, the university was renamed by H.M. King Bhumibol Adulyadej (King Rama IX) after his father, H.R.H Prince Mahidol of Songkla, who is widely regarded as the “Father of Modern Medicine and Public Health of Thailand”. Its vision, mission, core values, and strategic objectives are as follows:

Vision: Mahidol University is determined to be a world class university.

Mission: To excel in health, sciences, arts, and innovation with integrity for the betterment of Thai society and the benefit of mankind.

Core values: Mastery, Altruism, Harmony, Integrity, Determination, Originality, Leadership

Strategic Objectives:

1. Research Excellence

2. Teaching and Learning Excellence

3. Health Care and Services Excellence

4. Internationalization

MU now offers a diversity of expertise in science, medicine and health science, veterinary science, engineering, arts, social science and humanities, management, music, etc. It has 17 faculties (responsible for both research and teaching), 9 institutes (mainly focusing on research), 6 colleges (mainly focusing on teaching) and 9 centers (mainly providing academic services). There are totally 470 academic programs offered by all faculties and colleges; they are categorized as in Table I.

Table I. Academic programs offered by Mahidol University

|  |  |  |  |
| --- | --- | --- | --- |
| **Degree** | **Thai Programs** | **International Programs** | **Total** |
| Bachelor | 54 | 31 | 85 |
| Master | 122 | 120 | 242 |
| Doctoral | 22 | 86 | 108 |
| Diploma, Certificate | 31 | 4 | 35 |

The establishment of the Faculty of Engineering was first approved by the University Council in 1989, by the Ministry of University Affairs in 1990, and by the Royal Decree in 1990. Its vision, mission, and strategic objectives are as follows:

Vision: Interdisciplinary research towards world class engineering.

Mission: To generate interdisciplinary world class engineering innovation, research, and academics to develop graduates with systematic thinking, altruism, and readiness in advancing engineering and technology for better living of Thai and global communities

Strategic Objectives:

1. Interdisciplinary engineering research and innovation development for global and social impact.

2. Outcome-based engineering education for globally-competent graduates.

3. Industrial collaborations and engineering services development with social responsibility.

4. Administrative management based on sustainable engineering.

5. Branding and enhancing human resources for world class competitiveness.

The faculty is currently housed in three buildings in Salaya Campus, comprising an area of approximately 56,000 square meters. It consists of 7 departments including Biomedical Engineering, Civil and Environmental Engineering, Chemical Engineering, Computer Engineering, Electrical Engineering, Industrial Engineering, and Mechanical Engineering. They offer 10 Bachelor’s, 14 Master’s, and 6 Doctoral degree programs in total.

The establishment of the Department of Computer Engineering (EGCO) began with the commencement of the Bachelor of Engineering Program in Computer Engineering by the Department of Electrical Engineering in 1997. In 2003, EGCO was officially split from its sister department. It now offers 3 academic programs:

1. B.Eng. (Computer Engineering). Commenced in 1997, the program is run by EGCO and supported by the government budget.

2. B.Eng. (Computer Engineering), International Program. Commenced in 2008, it is jointly operated by EGCO and MUIC under its own revenue.

3. M.Eng. (Computer Engineering), Special Program. Commenced in 2011, the program is regulated by the Faculty of Graduate Studies and run by EGCO under its own revenue.

The Bachelor of Engineering (Computer Engineering) program, was commenced in 1994. Its first batch of students transferred from the second year of the Bachelor of Engineering (Electrical Engineering) and the first enrollment is 1994. The program underwent major revisions in year 2002, 2007, 2012, and the current curriculum is the revised curriculum currently in year 2018, as summarized in Table II.

Table II Revision and approval history of the program

|  |  |  |
| --- | --- | --- |
| **Curriculum** | **Number of Credits** | **Change, reasons** |
| B.Eng. (Computer Engineering), New curriculum, 1997 |  | Establishment of B.Eng. (Computer Engineering) |
| B.Eng. (Computer Engineering),  Revised curriculum, 2002 |  |  |
| B.Eng. (Computer Engineering),  Revised curriculum, 2007 | 141 credits | IEEE/ ACM |
| B.Eng. (Computer Engineering),  Revised curriculum, 2012 | 138 credits | Thailand Qualification Framework |
| B.Eng. (Computer Engineering),  Revised curriculum, 2018 | 142 credits | Outcome-Based Education |

Major changes in the program occurred in 2012. Thai Qualifications Framework was used as the national standard of all program. A major change includes the total required credits from 141 to 138. Specific courses were reduced, cooperative education was added to program, and the number and variety of elective courses.

In 2018, the computer engineering program was updated guided by outcome-based learning principles. In this process, the needs of stakeholders were collected and used to guide the updates.

As a result, the total required credits were increased to 140. Elective courses were grouped to provide depth to better serve the rapidly changing needs of industry. Moreover, the idea of distinction track was also introduced in this program.

## Options

The computer engineering undergraduate program has a degree option, the Bachelor degree of Engineering (Computer Engineering). However, the program has considerable elective ﬂexibility both within computer engineering and across disciplines. By properly choosing elective courses according to provided guidelines, student can tailor their technical depth based on their interest.

## Program Delivery Modes

The computer engineering program is delivered at the Faculty of Engineering, Mahidol University, Salaya campus. Most classes are scheduled in the daytime between 8.30 a.m. -5.30 p.m. on Monday-Friday. The nominal time to complete academic graduation is eight terms. This program also requires the completion of engineering training or cooperative education.

## Program Locations

The computer engineering program is delivered at Mahidol University, Salaya campus. Some courses are delivered by lecturers from Faculty of Science, Faculty of Social Sciences and Humanities, and Faculty of Sport Science. A few of courses belong to Electrical Engineering Department and therefore conducted by electrical engineering lecturers.

## Public Disclosure

Program Education Objectives (PEOs), Student Outcomes (SOs), annual student enrollment and graduation data of this program are posted to http://co.eg.mahidol.ac.th.

## Deficiencies, Weaknesses or Concerns from Previous Evaluation(s) and the Actions Taken to Address Them

The program has never been evaluated by ABET.

**GENERAL CRITERIA**

# CRITERION 1. STUDENTS

In this section, the policies for student admission and evaluation are described. Most of them were declared by Mahidol University and Faculty of Engineering.

## Student Admissions

The Faculty of Engineering and the Department of Computer Engineering adheres to the general admissions policy of Mahidol University which are composed of two systems in two rounds, known as university’s quota system for the first round and the central admission system for the second round. The quota system is organized by the university; the applicant can select only one program. The requirements for admission such as exam scores or grade point average from high school are announced to public as well as the name of candidates who pass the first round of admission. This ends up in February to March of the year. The second round or the central admission system is run by the Association of the Rector of Thailand and the Office of the Higher Education Commission, the candidates can apply for four programs which is then ranked and submitted for the interview only one program in May to June. Table 1-1 shows the students admissions over the past 7 academic years. The data are for all freshmen entering the program.

**Table 1-1** Students admissions for the past seven years

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Academic Year** | **Freshmen applied** | | **Freshmen admitted** | | **Freshmen enrolled** | | **Total**  **Enrollment** |
| **University’s quota** | **Central admission** | **University’s quota** | **Central admission** | **University’s quota** | **Central admission** |
| 2013 | 30 | 15 | 26 | 14 | 25 | 11 | 36 |
| 2014 | 30 | 35 | 6 | 33 | 6 | 34 | 40 |
| 2015 | 30 | 32 | 8 | 30 | 8 | 28 | 36 |
| 2016 | 40 | 15 | 25 | 12 | 25 | 12 | 37 |
| 2017 | 44 | 20 | 23 | 19 | 23 | 19 | 42 |
| 2018 | 35 | 5 | 37 | 4 | 36 | 4 | 40 |
| 2019 | 38 | 5 | 17 | 23 | 17 | 23 | 40 |

## Evaluating Student Performance

The academic standing of each student is determined at the conclusion of each academic term. To be in good academic standing, a student must maintain a cumulative grade point average (GPA) of 2.0 or higher. Mahidol students receive a letter grade for each course completed through the engineering degree as shown in Table 1-2.

**Table 1-2** Letter grade to grade point conversion

|  |  |  |  |
| --- | --- | --- | --- |
| **Grade** | **Achievement** | **Final score**  **(% Range)** | **GPA** |
| A | Excellent | 90-100 | 4.0 |
| B+ | Very Good | 85-89 | 3.5 |
| B | Good | 80-84 | 3.0 |
| C+ | Fairly Good | 75-79 | 2.5 |
| C | Fair | 70-74 | 2.0 |
| D+ | Poor | 65-69 | 1.5 |
| D | Very Poor | 60-64 | 1.0 |
| F | Fail | Less than 60 | 0 |

Moreover. other letter grades, without credit points, are assigned for course work taken as shown in Table 1-3.

**Table 1-3** Other letter grades without credit points

| **Grade** | **Meaning** | **Situations** |
| --- | --- | --- |
| F | Fail | 1. Students fail a major examination or project.  2. Students are absent on the exam date without permission from the Faculty Committee.  3. Students are not allowed to take the examination because they have failed to attend 80 percent of the total class time (including lectures, internships and field trips).  4. Students violate the rules regarding examinations, for example, are late for the exam, dress inappropriately according to the student uniform regulations, or engage in cheating. |
| S | Satisfactory | Non-credit or credit courses in which that subject has a non-score grading system, such as Engineering Training |
| U | Unsatisfactory |
| AU | Audit  (study of a course which leads to no credit being awarded) | Courses in which students receive no credit; however, students must attend at least 80 percent of the classes. |
| I | Incomplete (awaiting evaluation) | 1. Students do not take the exam or do not hand in their reports on time due to health problems but submit a medical certificate. However, a final decision will be made by the Faculty Committee.  2. Students are not allowed to take the exam because they attend less than 80% of the classes due to health problems and submit a medical certificate. However, a final decision will be made by the Faculty Committee.  3. Students are unable to take the exam or hand in a report due to circumstances beyond their control. Again, a final decision will be made by the Faculty Committee. |
| P | In progress (the study is incomplete) | This symbol will be given only when the teaching process of a course has not been completed, or the course needs more than one trimester to complete its requirements. |
| T | Transfer of Credit | This symbol will be given for transferred courses from other educational institutes. |
| W | Withdrawal | 1. Students are allowed to withdraw from courses after the add/drop period; however, they will not receive a refund.  2. Students are allowed to take a leave of absence.  3. Students are suspended. |
| X | No report from the instructor | It will be given if the student’s grade has not been submitted by the lecturer within the designated deadline. |

To earn a bachelor’s degree in computer engineering, students must complete the subjects in the curriculum, have minimum GPA of 2.0 in all work attempted at Mahidol University. Other requirements include a minimum of 240 hours of Engineering Training course, etc. Program faculty share ideas and information regarding the grading of coursework. Rubrics are encouraged and often used for grading consistency in student work. Pre-requisites for program courses are strictly enforced. Passing the pre-requisite is required to continue to be enrolled in the next course in the sequence the following semester. Rules regarding class attendance, load, grades, and appeals are located in the course syllabus to be hand out at the first hour of the class.

Students who fail to meet criteria for good standing (a term and cumulative GPA of at least 2.0) are placed on academic warning or probation. All students are automatically classified under the following:

1. Regular normal status students, or

2. Students on probation.

The classification will start at the end of the student’s second semester of the first academic year, and will occur at the end of every semester once the student has entered the second year, and will continue until graduation. The classifications of a student’s status are showed in Table 1-4.

**Table 1-4** Criteria for status of student

|  |  |
| --- | --- |
| **Students  Status** | **Criteria** |
| Regular | Students with a cumulative GPA of 2.00 or higher |
| Probation Type I | Students with a cumulative GPA of 1.50 or higher but less than 1.80 |
| Probation Type II | Students with a cumulative GPA of 1.80 or higher but less than 2.00 |

Students will be removed from probation when the student achieves a Cumulative GPA of 2.00 or higher. Failure to achieve the minimum Cumulative GPA standard during the designated probation period will result in dismissal as stated in the Mahidol University Regulations on Diploma and Undergraduate Study 2009.

Table 1-5 Retention rate

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Academic Year of Entering** | **First Year (# students)** | **4th Year (# students)** | **Academic Year of Graduates (# students)** | **Number of Graduates in 4 years (# students)** | **Number of Graduates in 5 years (# students)** | **Total Number of Graduates (# students)** |
| 2010 | 58 | 55 | 2013 | 51 | 8 | 59 |
| 2011 | 36 | 33 | 2014 | 28 | 3 | 31 |
| 2012 | 35 | 28 | 2015 | 27 | 3 | 30 |
| 2013 | 36 | 31 | 2016 | 29 | 1 | 30 |
| 2014 | 40 | 34 | 2017 | 33 | 1 | 34 |

For students with academic performance problems, the Academic Counseling system composed of Academic Advisor, Departmental Head and Associate Dean of Academics Affairs will keep track of each student’s academic performance through the information available on the University system. Students with academic performance problems will be identified, using the criteria set by Mahidol University. The Academic Counseling Unit will then prepare and arrange the following:

1. A formal notification letter issued by the Associate Dean for Academic Affairs that will be sent to the student’s parents or guardians, informing them about the student’s academic status and the university’s academic standard policy;

2. A warning message to Academic Advisor and Departmental Head;

3. Give consultation to students (and parents/guardians) if they ask for an appointment to clarify the student’s academic status.

## Transfer Students and Transfer Courses

**There are admission Standards for Transferring Program within Mahidol University. Students who wish to transfer program must meet the following qualifications:**

1. Students must be undergraduate students at Mahidol University and they are not candidate to be new students.

2. Student must have a university entrance examination score in the central system run by the Association of the Rector of Thailand and the Office of the Higher Education Commission or exam scores on the university's quota system or the direct receiver of the Faculty. The scores should not be less than the last order of students of the program where the student will be transferred.

3. Students never been approved for a university transfer.

4. Students Have been studied at least two semesters before transferring.

**Program Requirements:**

1. The transfer will take place at least one academic year and the subject must be asked for and approved by between the Deans of the two faculties of Mahidol University. The transfer should be proceeded before enrolling in the semester to study for at least 8 weeks.

2. The consideration for transferring the program should be completed and proposed to the university for approval not less than 1 week before registration.

3. Transfer of program upon approval must comply with Mahidol University Regulations on Diploma and Undergraduate Study 2009.

3.1 The courses will be eligible for transfer credits if its content matches three-fourths or more of the content of the equivalent program.

3.2 A grade T will appear on the transcript for a transferred course but will not be counted as part of the cumulative Grade Point Average.

**Criteria for Consideration:**

1. There is a seat available from the enrollment number in comparison with the number of the university's admissions plan.

2. Approved by the faculty members of prior programs and the program to be admitted.

**Transfer of Students from Other University:**

Students from other higher education institutions must have the following features.

1. Being an undergraduate student of another higher education institution and not being a candidate for a new student.

2. Similar qualifications as transfer student within Mahidol University.

**Criteria and consideration of transfer of students from other higher education institutions in Thailand and other countries.**

1. There is a seat available from the enrollment number in comparison with the number of the university's admissions plan at the end of the academic year.

2. The student need to be transferred sends the written request to the university before the semester to study at least 8 weeks.

3. Approved by the faculty members of the institution in which the student is affiliated.

**Exchange Students Services:**

1. Provide international students with an international exchange program who would like to study the course in the university's curriculum. With the qualification of being an undergraduate student in a foreign higher education institution, including agreement documents (MOU) with the university or university sections that specify how long they will be enrolled in the course, or how long they will be enrolled and the Type of International Exchange.

2. International exchange students who need a transcript should be enrolled according to Mahidol University Regulation regarding undergraduate student registration and regular enrollment (Thai) and Continuing Studies 2010.

3. Practices other than this notice are under the rector consideration.

## Advising and Career Guidance

All students receive academic advising. Faculty within department serve as primary academic advisors to all students within the computer engineering department. For each semester, each student is mandatory to meet their academic advisor at the beginning semester for advising and guidance.

At the Faculty of Engineering, departments take responsibility for advising their own majors on curricular and career matters. In the first term, freshmen take some required orientation activities from the department, faculty and university where they receive formal instructions on living, learning including planning their courses of study and registering for classes. All students are notified the academic calendar and course registration schedule two weeks before registration. Student is mandatory to meet their academic advisor for advising and approval for student registration for each academic term. If student fail to meet their academic advisor, student may not be able to register in that academic term. The primary regular contact between the student and their advisor occurs during the first two weeks of each academic term and the meeting evidence must be recorded by academic advisor.

Because of the career requirement, Engineering students get a good sense of career choices, professional opportunities, and how to pursue them through their work experiences. The interaction with alumni who have a broad spectrum of work experiences help students gain a strong sense of their professional and academic goals by the time they graduate. Students also develop extensive networks through their own and their friends’ contacts in industry. Furthermore, students get career advice from career and employment service center. Students frequently seek advice and obtain letters of recommendation from faculty members with whom they have developed rapport.

## Work in Lieu of Courses

The program has no provision for awarding credit for work in lieu of courses. In very rare exceptions students may be allowed to apply for credit by examination. Such application would require the approval of the dean on the recommendation of the chair.

## Graduation Requirements

In order to graduate, the students must complete 138 credits based on each program’s requirements. Students have to check the course record at the fourth-year level. All students must complete the following areas of study to graduate:

1. General Education

2. Required Courses

3. Free Electives

4. Engineering Training

To graduate, students must earn a minimum Cumulative GPA of 2.00. The Commission on Higher Education also requires that a student must study at least three years before qualifying for graduation. Students are required to request for their graduation and to check the printed course record provided by the Academic Affairs Units before their last semester. They need to update themselves about the graduation information at the Academic Affairs Unit. Only students who have completed all course requirements within the second semester can attend the graduation ceremony in that academic year.

Honors and Awards:

In recognition of exceptional students, the University has an honors system. Students maintaining high scholastic cumulative GPAs are eligible to graduate with honors. Students who have earned a cumulative GPA between 3.25 and 4.00 will be eligible for honors if they meet all of the following requirements according to Mahidol University regulations.

1. First Class Honors: earn a cumulative GPA of 3.50 or higher

2. Second Class Honors: earn a cumulative GPA between 3.25 and 3.49

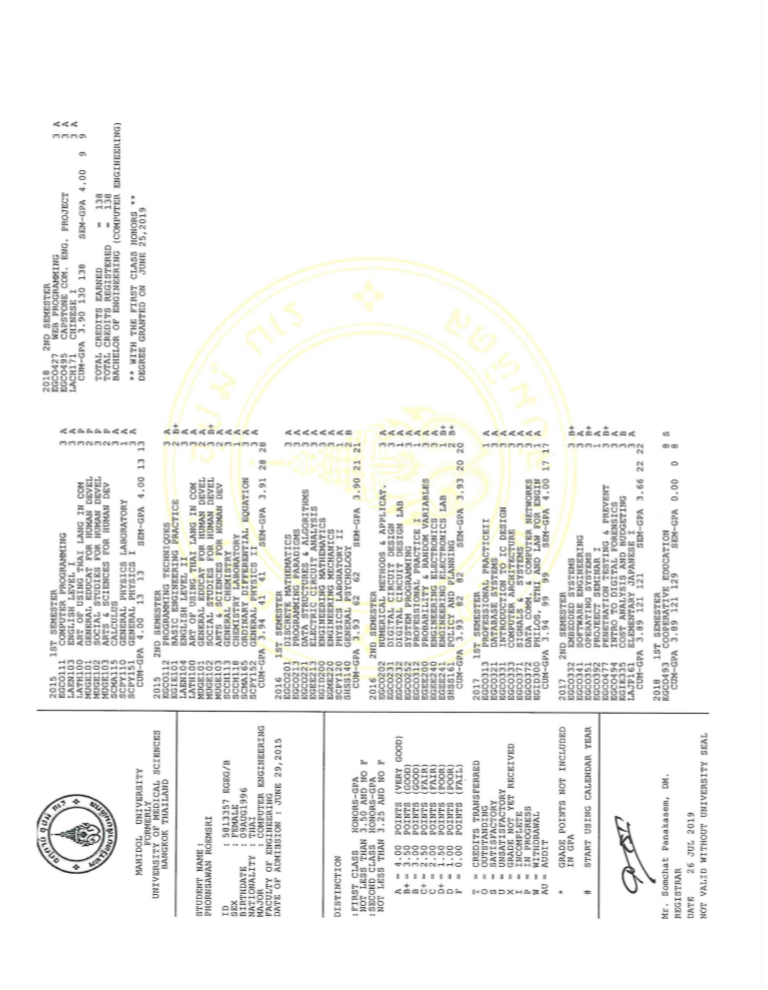
3. Completed all courses required to earn the degree within 4 years.

Table 1-6 Graduated Students for the past six years

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Academic Year of Entering | First year | 4th year | Academic Year of Graduates | Number of Graduates in 4 years | Number of Graduates in 5 years | Total Number of Graduates |
| 2010 | 58 | 55 | 2013 | 51 | 8 | 59 |
| 2011 | 36 | 33 | 2014 | 28 | 3 | 31 |
| 2012 | 35 | 28 | 2015 | 27 | 3 | 30 |
| 2013 | 39 | 31 | 2016 | 29 | 1 | 30 |
| 2014 | 40 | 34 | 2017 | 33 | 1 | 34 |
| 2015 | 36 | 34 | 2018 | 31 | 1 | 32 |

## Transcripts of Recent Graduates

The program will provide transcripts from some of the most recent graduates. **The team chair will specify which transcripts to provide.** Transcripts should be accompanied by copies of degree audits and/or other explanations for interpreting the transcripts. State how the program and any program options are designated on the transcript.



# CRITERION 2. PROGRAM EDUCATIONAL OBJECTIVES

Educational objectives for the computer engineering program have been developed in conjunction with our constituents based on, and are consistent with, the mission statements of Mahidol University and Faculty of Engineering. This section contains the mission statements of the university and faculty, and elaborates the process by which these objectives were determined, how the program ensures these objectives are achieved, and the systematic assessment to assure continuous improvement of the program.

## Mission Statement

The mission and vision statements of Mahidol University as well as the Faculty of Engineering and Department of Computer Engineering are as follows:

**MU Vision:** Mahidol University is determined to be a world class university.

**MU Mission:** To excel in health, sciences, arts, and innovation with integrity for the betterment of Thai society and the benefit of mankind.

This translate into **core values** as listed below.

M - Mastery - รู้แจ้ง รู้จริง สมเหตุ สมผล

A - Altruism - มุ่งมั่นเพื่อผู้อื่น

H - Harmony - กลมกลืนกับสรรพสิ่ง

I - Integrity - มั่นคงยิ่งในคุณธรรม

D - Determination - แน่วแน่ทำกล้าตัดสินใจ

O - Originality - สร้างสรรค์สิ่งใหม่

L - Leadership - ใฝ่ใจเป็นผู้นำ

(<https://mahidol.ac.th/core-value/>)

**EG Vision:** Interdisciplinary Research towards World Class Engineering

**EG Mission:** To Create Interdisciplinary World Class Engineering Research, Innovation and Academics to Develop Graduates with Capability of the 21st Century Skills and Advanced Engineering and Technology for Global Communities

(<https://www.eg.mahidol.ac.th/egmu/about/vision-mission.html>)

## Program Educational Objectives

Three-to-five years after graduation, graduates from Computer Engineering, Mahidol University (EGCO) are engaged in the following:

1. Graduates lead or participate in the design and development of computer networks hardware and software, embedded systems, for various applications. Graduates also apply knowledge and skills to solve advanced computer-related engineering problems.

2. Graduates combine communication and leadership skills to become productive members of interdisciplinary teams and they do so ethically and professionally.

3. Graduates pursue advanced education and engage in lifelong learning to be well adapted to rapidly changing digital technologies and demanding applications.

The program educational objectives can be found on: <http://co.eg.mahidol.ac.th>

## Consistency of the Program Educational Objectives with the Mission of the Institution

The Computer Engineering Program’s Educational Objectives are directly linked to the university and the Faculty of Engineering mission statements which aim to produce graduates with (1) strong technical competence in their professions; (2) high potential for professional growth and (3) solid characters and high integrity both in the workplace and in global community. The Computer Engineering Program focuses on preparing graduates for challenging professions in the 21st century with knowledge and competence in engineering practice proficiently in the fields of computer engineering (PEO1), ability to engage globally in diverse fields through graduate level studies and new frontier research, development, and innovation (PEO3). Graduates also assume leadership roles and contribute to the economy of nation, which is consistent with the University’s mission of community engagement and contributing productively to Thai society. Furthermore, the PEOs promote professionally and ethically in the workplace (PEO2).

**Table 2-1** Consistency of PEOs with the University and Faculty’ mission statements including core value and graduate attributes of Mahidol University

| **Mission** | **PEO1** | **PEO2** | **PEO3** |
| --- | --- | --- | --- |
| To excel in health, sciences, arts, and innovation with integrity for the betterment of Thai society and the benefit of mankind. | **🗸** | **🗸** | **🗸** |
| To Create Interdisciplinary World Class Engineering Research, Innovation and Academics to Develop Graduates with Capability of the 21st Century Skills and Advanced Engineering and Technology for Global Communities | **🗸** | **🗸** | **🗸** |
| **Core Value** | **PEO1** | **PEO2** | **PEO3** |
| Mastery เป็นผู้ฉลาดรอบรู้ | **🗸** |  |  |
| Altruism ไม่เห็นแก่ตัวทำประโยชน์แก่ผู้อื่นโดยไม่หวังผลตอบแทน |  | **🗸** |  |
| Harmony มีความเป็นเอกภาพ ประสานเป็นหนึ่งเดียว |  | **🗸** |  |
| Integrity มีความซื่อสัตย์ มั่นคงในคุณธรรม | **🗸** | **🗸** |  |
| Determination มีความมุ่งมั่น ตั้งใจ มุมานะ | **🗸** |  | **🗸** |
| Originality มีความคิดริเริ่ม แปลกใหม่ ไม่เหมือนใคร | **🗸** |  |  |
| Leadership มีความเป็นผู้นำ |  | **🗸** |  |
| **Graduate Attributes** | **PEO1** | **PEO2** | **PEO3** |
| T-Shaped: Breadth & Depth  รู้แจ้ง รู้จริง ทั้งด้านกว้างและลึก | **🗸** |  |  |
| Globally Talented มีทักษะ  ประสบการณ์ สามารถแข่งขันได้ระดับโลก | **🗸** | **🗸** |  |
| Socially Contributing  มีจิตสาธารณะ สามารถทำประโยชน์ให้สังคม |  | **🗸** | **🗸** |
| Entrepreneurially Minded  กล้าคิด กล้าทำ กล้าตัดสินใจ สร้างสรรค์สิ่งใหม่ในทางที่ถูกต้อง | **🗸** | **🗸** |  |

## Program Constituencies

The Computer Engineering Department classifies its primary constituents and timing as shown in Table 2-2. These program constituencies are (1) Alumni (2) Employers (3) Industry Advisory Board (IAB) and (4) Faculty.

Table 2‑2 Review schedules among different constituencies

|  |  |  |
| --- | --- | --- |
| **Constituencies** | **Frequency** | **Roles** |
| Alumni (2-5 years out) | Every two year | Provide feedback three alumni survey |
| Employers (Some are alumni) | Annually | Provide feedback three employers survey |
| Industry Advisory Board (IAB) | Every two year | Provide feedback three IAB meetings |
| Faculty (Curriculum Committee/ Faculty Committee) | Every six month | Assemble feedback from all four sources |

The computer engineering PEOs were developed based on the needs of its constituencies. These were identified and agreed upon by the computer engineering faculty, in preparation for the initial determination of the PEOs. Each program constituency is listed below, together with a brief rationale for its inclusion.

Prospective employers are corporations and government institutions that employ computer engineers, especially those offering career opportunities in geographical areas and industry sectors preferred by computer engineering students at Mahidol. The PEOs must reflect their needs in order to ensure that computer engineering graduates will be highly sought-after in the job market.

Industry partners are corporations and government institutions that participate in Mahidol University’s cooperative education program, especially those who offer or could offer opportunities for computer engineering students. The PEOs must reflect their needs in order to maximize the benefit of the cooperative education experience to computer engineering students.

## Process for Review of the Program Educational Objectives

The Computer Engineering Program’s Educational Objectives are periodically reviewed so that it remains consistent with all related mission, the needs of constituencies and the ABET criteria. The process is to provide an opportunity for all constituent groups to review the PEOs at the frequency of no less than every three years as shown in Table 2-1.

Constituents are asked to select among the responses listed below concerning the appropriateness of the PEOs relative to their alignment with the University mission and with constituents needs. Also, all constituent groups are encouraged to add additional suggestions or comments. The goal is to receive at least 70% agree and above ratings on each of the PEOs. Any ratings falling below this target would be considered cause for reconsideration of the PEOs. Rating is divided into 5 levels, i.e., 5: Strongly agree; 4: agree; 3: Unsure; 2: disagree; and 1: strongly disagree.

# CRITERION 3. STUDENT OUTCOMES

## Student Outcomes

The student outcomes for the Computer Engineering program are listed below. Graduates of the Computer Engineering Program will have attained the following outcomes by the time of graduation. They are also found at: https://co.eg.mahidol.ac.th/

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics

2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors

3. an ability to communicate effectively with a range of audiences

4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts

5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives

6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions

7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies

## Relationship of Student Outcomes to Program Educational Objectives

The relationship between the Program Educational Objectives and the Computer Engineering student outcomes is depicted in Table 3-1.

**Table 3-1** Relationship (Mapping) between Student Outcomes and Program Educational Objectives

| **Student Outcomes** | **Program Educational Objectives** | | |
| --- | --- | --- | --- |
| **PEO1** | **PEO2** | **PEO3** |
| 1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics | ✓ |  | ✓ |
| 2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors | ✓ |  |  |
| 3. an ability to communicate effectively with a range of audiences |  | ✓ |  |
| 4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts | ✓ |  | ✓ |
| 5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives | ✓ | ✓ |  |
| 6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions | ✓ |  |  |
| 7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies | ✓ |  | ✓ |

Direct assessment of program outcomes (SOs)

The Computer Engineering Student Outcomes can be assessed directly by applying general performance criteria to each outcome. The Computer engineering department established general Performance Criteria that define measurable/quantifiable knowledge, skills or abilities for each of the Student Outcomes (see Table 3-2). The Performance Criteria are directly applied to specific assignments similar to a grading rubric. Therefore, each instructor is assigned (by the Program Committee) 2 or 3 Student Outcomes that are addressed in their junior or senior level course. The instructor selects an assignment (this can be a homework or test question(s), lab report (or portion), article analysis, term paper, etc.) in which the students are asked to demonstrate the knowledge, skills or abilities identified in the Performance Criteria. For this assignment, each student’s achievement is measured and levels of achievement will be more specifically defined and graded from 1-4 or 5 depending on complexity.

Data from instructors are contained in spreadsheets by outcome and performance criteria for each student. These data, in conjunction with copies of the assessment mechanism (homework, exam, etc.) are collected by the Program Committee at the end of each academic year and maintained in the “Direct Outcome Assessment Course Binders”. The level of achievement for each student across Performance Criteria and the achievement of a given criteria across students are automatically tabulated in the spreadsheet. The Program Committee reviews these data and provides a report to the Department Head and Faculty Dean with specific concerns and any recommendations for improvement. These are then discussed by the full faculty and any decisions voted on.

**Table 3-2** The Computer Engineering Student Outcomes and Corresponding General Performance Indicator

| **Student Outcome (SOs)** | **General Performance Indicators (PIs)** |
| --- | --- |
| 1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics | 1-1 Applies programming to achieve analytical or numerical solution to model equations  1-2 Examines approaches to solving an engineering problem by applying principles of engineering, science, and mathematic in order to choose the more effective approach  1-3 Demonstrates knowledge of translation of theory to real world applications and/or engineering practices  1-4 Applies mathematics and statistics in analyzing engineering data  1-5 Demonstrates the ability to identify the problems |
| 2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors | 2-1 Produces a clear and unambiguous needs statement in a design project  2-2 Identifies constraints on the design problem, and establishes criteria for acceptability and desirability of solutions based on the economics analysis. |
| 3. an ability to communicate effectively with a range of audiences | 3-1 Writing conforms to appropriate technical style format appropriate to the audience  3-2 Appropriate use of tools  3-3 Mechanics and grammar are appropriate  3-4 Body language and clarity of speech enhances communication |
| 4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts | 4-1 Knows code of ethics for the discipline  4-2 Evaluates conflicting/competing social values in order to make informed decisions about an engineering solution. |
| 5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives | 5-1 Recognizes participant roles in a team setting and fulfills appropriate roles to assure team success  5-2 Share responsibilities and information on schedule with others on the team  5-3 Collaborate in resolving conflict management with team members |
| 6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions | 6-1 Observes good engineering practice  6-2 Determines data that are appropriate to collect and selects appropriate equipment, protocols, etc. for measuring the appropriate variables to get required data  6-3 Uses appropriate tools to analyze data and verifies and validates experimental results including the use of statistics to account for possible experimental error and draws conclusion |
| 7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies | 7-1 Able to find information relevant to problem solution without guidance  7-2 Selects appropriate techniques and tools for a specific engineering task and compares results with results from alternative tools or techniques |

Indirect assessment of Student outcomes (SOs)

Course objectives and course learning outcomes (CLOs) are determined for each course and linked to Student Outcomes (SOs). The CLOs are assessed in every course, in each semester by both students and faculty. The student online survey at the end of the course asks students to answer the questions using a 5-point scale about (1) the level that the course objective and CLOs was provided in this course or not? And (2) the level that student feel to achieve this objective and Course Outcomes. The data from the surveys are included in the “Course Binders” and submitted to the Program Committee for review.

The Computer Engineering Program regularly assesses and evaluates the extent to which student outcomes are being attained by using different tools and processes. The results of both the assessment and evaluation processes are collected as the data for the continuous improvement of the program. These processes provide the data necessary for assessment, and then evaluation is used further to determine the attainment of student outcomes. There are three steps used for the assessment, evaluation, and feedback to the continuous improvement of the Computer Engineering Program.

1. First, the assessment tools for gathering the data from each course or other sources can be direct or indirect. Direct assessment generally depends on the course activities, whereas indirect assessments mostly obtained by using some surveys or questionnaires. Therefore, how well designing forms of surveys and appropriate activities for the specific and applicable data should be considered.

2. For evaluation, the surveys are arranged by the faculty committee with appropriate questions to improve the program objectives and student outcomes. Then, the results from assessment and evaluation are analyzed and compared to a pre-set performance indicator, which constitutes the evaluation processes.

3. The evaluated results are feedback to faculty members. The degree of evaluation results is used to set the pre-set targets that will be the driving force for the continuous improvement processes.

Details of the process consist of the following few chronological steps:

1. Faculty members, staff, and students deliberated among themselves and reached common understanding of the implications of each of the individual SOs.

2. The program faculty identified key performance indicators (i.e., rubrics or attributes, types of competences) that best represent the requirement of each of the SOs. Here and thereafter, these rubrics are collected in a data file and easily accessible for use in the various assessments (direct and indirect) as needed.

3. Each course syllabus, especially the content of it, was then used to guide the identification of the major SOs that the course can cover. This step was repeated for all core courses of the program and collected in a matrix format mapping between the courses and the SOs.

4. Assessments were conducted for each yearly cycle for all core courses and their results, together with supporting student work are available in each course portfolio.

The data collection and evaluation stages for each type of data are indicated. The specific instrument that is used for assessment and the associated timings is the senior exit survey

Moreover, there are other sources of data that can be used in improvement process. These sources of data may not have the official form, but may come from conversation and observation. This kind of sources are:

1. Direct Comments from Students

2. Faculty Observation

3. Student Outcomes Review

All data sources used for program evaluation are listed in Table 3-3. This process is performed every year. The schedule for program assessment is shown in Table 3-4.

Table 3-3 Data Most Commonly Uses for Program Improvement

| **Source** | **Description** |
| --- | --- |
| Senior Exit Survey | Responses to directed questions about the program |
| Direct Comments from Students | Solicited and unsolicited comments from students |
| Faculty Observation | Observations of student performance |
| Student Outcomes Review | Rubric-based evaluation of specified course materials (exams, homework sets, reports, etc.) to assess the achievement of each Student Outcome. |

**Table 3-4** Schedule for Program Assessment

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Assessment** | **Begin of 1st  Semester** | **End of 1st  Semester** | **Begin of 2nd Semester** | **End of 2nd  Semester** | **Summer** |
| Senior Exit Survey |  |  |  |  | ✓ |
| Direct Comments from Students | ✓ | ✓ | ✓ | ✓ | ✓  (revise) |
| Faculty Observation | ✓ | ✓ | ✓ | ✓ | ✓  (revise) |
| Student Outcomes Review |  | ✓ |  | ✓ | ✓  (revise) |

For Computer Engineering Program, the expected level of attainment for each of the student outcomes is 80%. If the score of a student outcome is less than 80%, each course that SO must be revised and the lecturers will propose some improvement techniques. Trends of SO score will be considered in a meeting of faculty members.

Significant discrepancies between the student and instructor responses are discussed by the committee and any recommendations presented to the full faculty. For example, if students indicate that a particular objective was not well addressed, or if students felt they were not able to achieve particular CLOs, these are identified and the relationship to Student Outcomes used in conjunction with Direct Assessment materials in Outcome assessment.

The courses and the relationship with student outcomes and performance indicators are described in Table 3-5.

**Table 3‑5** Relationship between courses and student outcomes

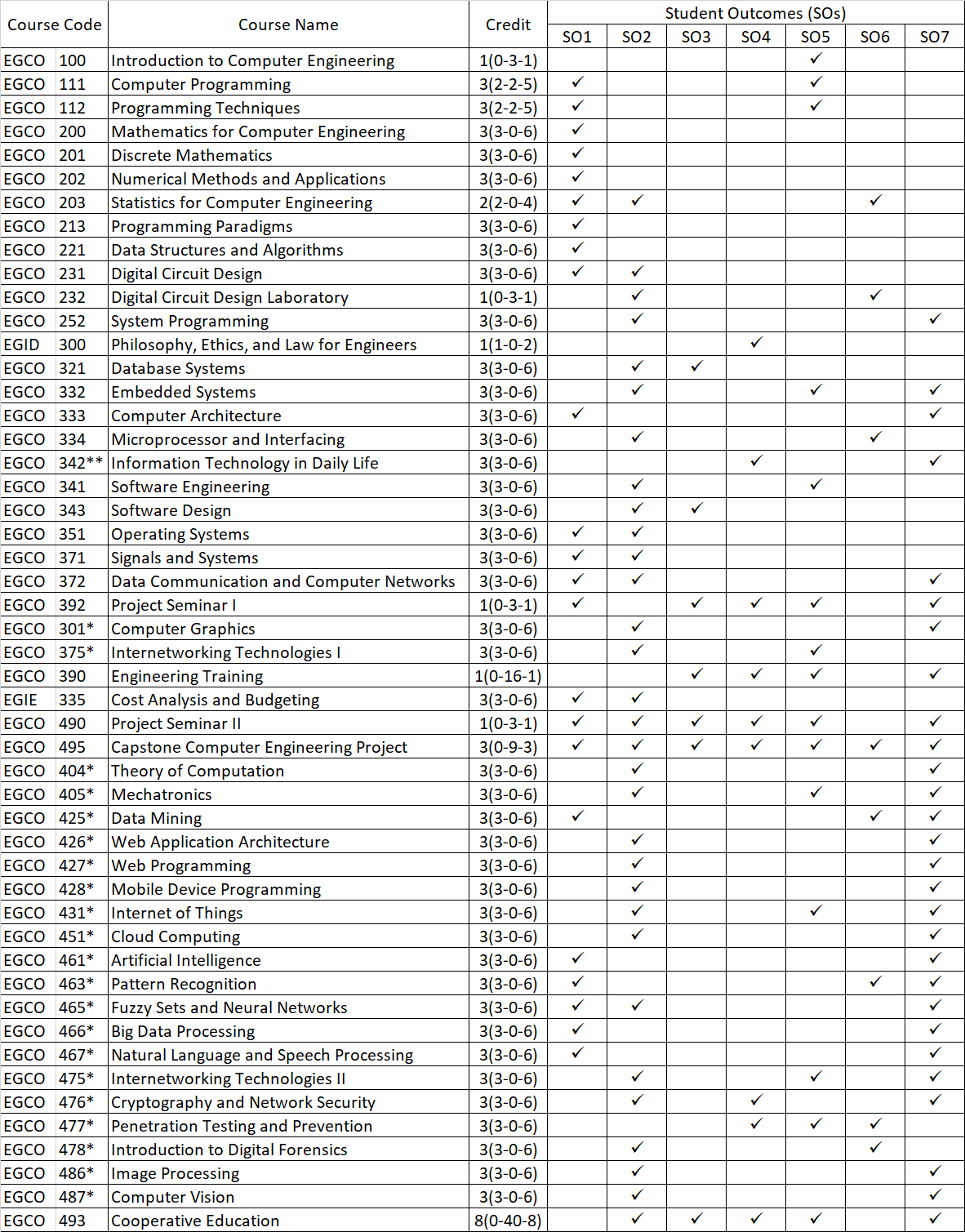


Table 3‑6 Course–Performance Indicator Relationship with selected courses

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Selected Course** | | **SO1** | | | | | **SO2** | | **SO3** | | | | **SO4** | | **SO5** | | | **SO6** | | | **SO7** | |
| **1-1** | **1-2** | **1-3** | **1-4** | **1-5** | **2-1** | **2-2** | **3-1** | **3-2** | **3-3** | **3-4** | **4-1** | **4-2** | **5-1** | **5-2** | **5-3** | **6-1** | **6-2** | **6-3** | **7-1** | **7-2** |
| EGCO 202 Numerical Methods and Applications | 3 | ✓ | ✓ | ✓ | ✓ | ✓ |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| EGCO 221 Data Structures and Algorithms | 3 | ✓ | ✓ | ✓ | ✓ | ✓ |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| EGCO 232 Digital Circuit Design Laboratory | 1 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | ✓ | ✓ | ✓ |  |  |
| EGID 300 Philosophy, Ethics, and Law for Engineers | 1 |  |  |  |  |  |  |  |  |  |  |  | ✓ | ✓ |  |  |  |  |  |  |  |  |
| EGCO 321 Database System | 3 |  |  |  |  |  | ✓ | ✓ |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| EGCO 332 Embedded Systems | 3 |  |  |  |  |  | ✓ | ✓ |  |  |  |  |  |  |  |  |  |  |  |  | ✓ | ✓ |
| EGCO 333 Computer Architecture | 3 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | ✓ | ✓ |
| EGCO 341 Software Engineering | 3 |  |  |  |  |  |  |  |  |  |  |  |  |  | ✓ | ✓ | ✓ |  |  |  |  |  |
| EGCO 392 Project Seminar I | 1 |  |  |  |  |  |  |  | ✓ | ✓ | ✓ | ✓ |  |  |  |  |  |  |  |  |  |  |
| EGCO 495 Capstone Computer Engineering Project | 3 |  |  |  |  |  |  |  | ✓ | ✓ | ✓ | ✓ |  |  | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |  |  |

Table 3‑7 Assessment instruments for each student outcome on 2018-2020

| **SOs** | **Instruments** | **Data Collections** | **Embedded Questions** |
| --- | --- | --- | --- |
| SO1 | Direct: EGCO 202 Numerical Methods and Applications  EGCO 221 Data Structures and Algorithms  Indirect: Student Exit Survey | 1/2020  1/2019  1/2018  2/2020  2/2019  1/2018  2020, 2019, 2018 | Midterm Exam Q.2, 3; Final ExamQ.1, 5; Assignment 1, 2, 3  Midterm Exam Q.2.2, 3; Final Exam Q.2.1; Project 2  Midterm Exam Q.1.1, 3.1; Final Exam Q.2.4, 3.8; Project 2  - |
| SO2 | Direct: EGCO 321 Database Systems  EGCO 332 Embedded Systems  Indirect: Student Exit Survey | 1/2020  1/2019  1/2018  2/2020  2/2019  2/2018  2020, 2019, 2018 | Midterm Exam Q.2; Final Exam Q.9; Assignment  Midterm Exam Q.2, 8; Final Exam Q.9; Assignment, Project  Midterm Exam Q.2  - |
| SO3 | Direct: EGCO 392 Project Seminar I  EGCO 495 Capstone Computer Engineering Project  Indirect: Student Exit Survey | 2/2020  2/2019  2/2018  2/2020  2/2019  2/2018  2020, 2019, 2018 | Final Report  Final Report  Project  Project  - |
| SO4 | Direct: EGID 300 Philosophy, Ethics, and Law for Engineers  EGCO 392 Project Seminar I  Indirect: Student Exit Survey | 1/2020  1/2019  1/2018  2/2020  2/2019  2/2018  2020, 2019, 2018 | Final Report  Final Report  - |
| SO5 | Direct: EGCO 341 Software Engineering  EGCO 495 Capstone Computer Engineering Project  Indirect: Student Exit Survey | 2/2020  2/2019  2/2018  2/2020  2/2019  2/2018  2020, 2019, 2018 | Software Testing Report  Project  Project  - |
| SO6 | Direct: EGCO 323 Digital Circuit Design Laboratory  EGCO 495 Capstone Computer Engineering Project  Indirect: Student Exit Survey | 2/2020  2/2019  2/2018  2/2020  2/2019  2/2018  2020, 2019, 2018 | Lab Exam  Project  Project  - |
| SO7 | Direct: EGCO 332 Embedded Systems  EGCO 333 Computer Architecture  Indirect: Student Exit Survey | 2/2020  2/2019  2/2018  1/2020  1/2019  1/2018  2020, 2019, 2018 | Midterm Exam Q.1; Project  Midterm Exam Q.1; Project  Final Exam Q.4, Q.7  - |

# CRITERION 4. CONTINUOUS IMPROVEMENT

This section shows processes for regularly assessing and evaluating the extent to which the student outcomes are being attained.

## Student Outcomes

Data for each of student outcome, 1 to 7, are showed as the numerical goals and current values for each assessment criteria. The numerical score is the number of students answered with “agree” and “above” divided by the total number of respondents. A target score of 80% for each evaluation mode has been proposed. Any score that is less than 80% is painted with a grey background. An example of SO review is showed in Table 4-3.

**Table 4-3** An Example of Student Outcome Review

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **SO1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics** | | | | | |
| *Assessment Data Sources* | | Student Outcomes Reviews, Course Evaluation Survey, Senior Exit Survey | | | |
| Percentage of students who scored on a selected exam question with the level of “fair” or better | | **Relevant Assessment Data** | | **Numerical Goal** | **Current Score** |
| EGCO202 Numerical Methods and Application | | 80% | 57.57% |
|  | |  |  |
|  | |  |  |
| **SO1: EGCO202 Numerical Method** | | | | | |
| **Year/Semester: 2017/2** | | | | | |
| Levels | | Student count | % | Pass Count | %Pass |
| 5 | Very Good | 16 | 48.48 | 19 | 57.57 |
| 4 | Good | 1 | 3.03 |
| 3 | Fair | 2 | 6.06 |
| 2 | Poor | 0 | 0.00 | 14 | 42.43 |
| 1 | Very Poor | 14 | 42.43 |
| Total | | 33 | 100.00 | 33 | 100.00 |

After collecting SO review of all courses, all data will be summarized as a concluded table. This table will show the courses that meet standard SO scores. The example of concluded SO review table was shown in Table 4-4.

SO1:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Year** | **Instruments** | **%Pass** | **Weight** | **Weighted Average Score** |
| 2020 | Direct: EGCO 202 Numerical Methods and Applications  EGCO 221 Data Structures and Algorithms  Indirect: Student Exit Survey |  | 40%  40%  20% |  |
| 2019 | Direct: EGCO 202 Numerical Methods and Applications  EGCO 221 Data Structures and Algorithms  Indirect: Student Exit Survey | 57.57  81.00  77.78 | 40%  40%  20% | 70.98 |
| 2018 | Direct: EGCO 202 Numerical Methods and Applications  EGCO 221 Data Structures and Algorithms  Indirect: Student Exit Survey | 75.65 | 40%  40%  20% |  |

SO2:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Year** | **Instruments** | **%Pass** | **Weight** | **Weighted Average Score** |
| 2020 | Direct: EGCO 321 Database Systems  EGCO 332 Embedded Systems  Indirect: Student Exit Survey |  | 40%  40%  20% |  |
| 2019 | Direct: EGCO 321 Database Systems  EGCO 332 Embedded Systems  Indirect: Student Exit Survey | 72.66  81.00  77.78 | 40%  40%  20% | 77.02 |
| 2018 | Direct: EGCO 321 Database Systems  EGCO 332 Embedded Systems  Indirect: Student Exit Survey | 79.13 | 40%  40%  20% |  |

SO3:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Year** | **Instruments** | **%Pass** | **Weight** | **Weighted Average Score** |
| 2020 | Direct: EGCO 392 Project Seminar I  EGCO 495 Capstone Computer Engineering Project  Indirect: Student Exit Survey |  | 30%  50%  20% |  |
| 2019 | Direct: EGCO 392 Project Seminar I  EGCO 495 Capstone Computer Engineering Project  Indirect: Student Exit Survey | 97.37  90.32  78.89 | 30%  50%  20% | 90.15 |
| 2018 | Direct: EGCO 392 Project Seminar I  EGCO 495 Capstone Computer Engineering Project  Indirect: Student Exit Survey | 73.91 | 30%  50%  20% |  |

SO4:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Year** | **Instruments** | **%Pass** | **Weight** | **Weighted Average Score** |
| 2020 | Direct: EGID 300 Philosophy, Ethics, and Law for Engineers  EGCO 392 Project Seminar I  Indirect: Student Exit Survey |  | 40%  40%  20% |  |
| 2019 | Direct: EGID 300 Philosophy, Ethics, and Law for Engineers  EGCO 392 Project Seminar I  Indirect: Student Exit Survey | 97.37  85.56 | 40%  40%  20% |  |
| 2018 | Direct: EGID 300 Philosophy, Ethics, and Law for Engineers  EGCO 392 Project Seminar I  Indirect: Student Exit Survey | 75.65 | 40%  40%  20% |  |

SO5:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Year** | **Instruments** | **%Pass** | **Weight** | **Weighted Average Score** |
| 2020 | Direct: EGCO 341 Software Engineering  EGCO 495 Capstone Computer Engineering Project  Indirect: Student Exit Survey |  | 30%  50%  20% |  |
| 2019 | Direct: EGCO 341 Software Engineering  EGCO 495 Capstone Computer Engineering Project  Indirect: Student Exit Survey | 96.77  80.00 | 30%  50%  20% |  |
| 2018 | Direct: EGCO 341 Software Engineering  EGCO 495 Capstone Computer Engineering Project  Indirect: Student Exit Survey | 78.26 | 30%  50%  20% |  |

SO6:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Year** | **Instruments** | **%Pass** | **Weight** | **Weighted Average Score** |
| 2020 | Direct: EGCO 323 Digital Circuit Design Laboratory  EGCO 495 Capstone Computer Engineering Project  Indirect: Student Exit Survey |  | 30%  50%  20% |  |
| 2019 | Direct: EGCO 323 Digital Circuit Design Laboratory  EGCO 495 Capstone Computer Engineering Project  Indirect: Student Exit Survey | 87.10  84.44 | 30%  50%  20% |  |
| 2018 | Direct: EGCO 323 Digital Circuit Design Laboratory  EGCO 495 Capstone Computer Engineering Project  Indirect: Student Exit Survey | 76.52 | 30%  50%  20% |  |

SO7:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Year** | **Instruments** | **%Pass** | **Weight** | **Weighted Average Score** |
| 2020 | Direct: EGCO 332 Embedded Systems  EGCO 333 Computer Architecture  Indirect: Student Exit Survey |  | 40%  40%  20% |  |
| 2019 | Direct: EGCO 332 Embedded Systems  EGCO 333 Computer Architecture  Indirect: Student Exit Survey | 80.00 | 40%  40%  20% |  |
| 2018 | Direct: EGCO 332 Embedded Systems  EGCO 333 Computer Architecture  Indirect: Student Exit Survey | 79.13 | 40%  40%  20% |  |

**Table 4-4** Overall Measurement Results

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Master Courses** | **SO1** | **SO2** | **SO3** | **SO4** | **SO5** | **SO6** | **SO7** |
| EGCO202 Numerical Methods and Applications | P |  |  |  |  |  |  |
| EGCO221 Data Structures and Algorithms | P |  |  |  |  |  |  |
| EGCO232 Digital Circuit Design Laboratory |  |  |  |  |  | P |  |
| EGID300 Philosophy, Ethics, and Law for Engineers |  |  |  | P |  |  |  |
| EGCO332 Embedded Systems |  |  |  |  |  |  | P |
| EGCO341 Software Engineering |  | P |  |  | P |  |  |
| EGCO392 Project Seminar I |  |  | P |  |  |  |  |
| EGCO495 Capstone Computer Engineering Project |  | P | P |  | P | P | P |
| **Summary** | Pass | Pass | Pass |  | Pass | Pass | Pass |

P = All measurements of a particular SO are satisfied.

NP= Not all measurement outcomes of a particular are satisfied.

According to final evaluation table, all SOs have been achieved. Although all the SOs have been achieved, it is planned that the quality of teaching can be improved by assigning TA to more classes. This is because, besides the lecturers, students can have TAs as another resource for resolving any confusion about class contents. TAs can also assist lecturers on checking homework and exams. It is expected that time takes for giving back the feedback can be shortened. The margin of achieving SOs can be improved.

The results of SO reviews are documented in minute of meeting. Other documents are maintained in physical file and are indexed by SO and course name.

## Continuous Improvement

Annual improvement process and continuous improvement process are shown in Figure 4-1 and Figure 4-2, respectively. This process requires information from stakeholders, surveys, direct measures, and class observation. This information is analyzed and used for creating improvement plans.



**Figure 4-1** Annual Improving Process (Fast Loop)



**Figure 4-2** Continuous Improving Process

Results of assessment and evaluation of student outcomes; feedback form students, alumni, industry are used as information for program improvement. Actions taken to improve Computer Engineering Program are:

1. Curriculum revision (major / minor)

2. Teaching method improvements

3. Laboratory/facilities improvements

4. Student activity improvements

5. Assessment improvements

The department holds monthly departmental meetings on the third Wednesday of every month. The meeting discusses all issues in the department which involves all 3 study programs (Bachelor of Engineering (Thai programs), Bachelor of Engineering (International Program), Master of Computer Engineering). However, the meeting minutes of different programs are reported separately. It is required that all faculties attend at least 80% the meetings (without penalty). Many issues from each program are related and needed to be solved cooperatively. Sharing resources and funding as well as joint student activities for all programs are normal exercise in the department. Good and bad examples from each program can be used to improve overall outcomes. Therefore, proving process of improvements of Bachelor of Engineering may appear in minutes of other programs since some issues are similar and may not be discuss repeatedly.

Example of SO review and suggestion for improving is shown in the following.

**SO1. An ability to identify, formulate and solve complex engineering problems by applying principles of engineering, science, and mathematics.**

**Passing criterion >= 70%**

PI 1-1 Identify and formulate engineering problems

PI 1-2 Solve problems by applying mathematic and engineering knowledge

=====================================================================

PI 1-1 Identify and formulate engineering problems

PI 1-2 Solve problems by applying mathematic and engineering knowledge

**EGCO202 Numerical Methods and Applications**

**Final Exam**

|  |
| --- |
|  |

| **Student No.** | **PI 1-1** | **PI 1-2** |
| --- | --- | --- |
| 1 | 1 | 1 |
| 2 | 1 | 1 |
| 3 | 1 | 1 |
| 4 | 1 | 0 |
| 5 | 0 | 0 |
| 6 | 3 | 2 |
| 7 | 3 | 3 |
| 8 | 2 | 3 |
| 9 | 5 | 5 |
| 10 | 4 | 5 |
| 11 | 1 | 0 |
| 12 | 2 | 2 |
| 13 | 1 | 0 |
| 14 | 1 | 0 |
| 15 | 2 | 0 |
| 16 | 1 | 2 |
| 17 | 2 | 2 |
| 18 | 3 | 3 |
| 19 | 3 | 3 |
| 20 | 5 | 5 |
| 21 | 1 | 1 |
| 22 | 0 | 0 |
| 23 | 0 | 0 |
| 24 | 1 | 1 |
| 25 | 1 | 1 |
| 26 | 1 | 2 |
| 27 | 5 | 5 |
| 28 | 2 | 3 |
| 29 | 3 | 3 |
| 30 | 1 | 1 |
| 31 | 0 | 0 |
| 32 | 0 | 0 |
| 33 | 2 | 1 |
| 34 | 1 | 1 |
| 35 | 3 | 4 |
| Number of Pass | 10 | 11 |

PI 1-1: Attainability = 10/35 = 28.5% **Not Attainable**

PI 1-2: Attainability = 11/35 = 31.4% **Not Attainable**

**SO1 Conclusion**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **PI** | **Attainability** | **Reason** | **Remedial Action** | **Action plan** | **Measurements** |
| 1-1 | 28.5%  (not attainable) | Student do not understand the concept of mathematical modelling | Increase foundation mathematics and mathematical modelling | Next semester | Next semester |
| Student do not familiar with the problem of balancing chemical equations | Provide the description of the problem. | Next semester | Next semester |
| 1-2 | 31.4%  (not attainable) | This question is related to the previous questing. | Break down the question that do not related to the previous question | Next semester | Next semester |
| Wrong calculation | Using Gaussian Elimination with Partial Pivoting | Next semester | Next semester |

Annually, Computer engineering department also holds a departmental seminar/meeting (usually off-campus) to discuss all issues concerned including SOs & PEOs reviews, curriculum review, teaching concerns and class scheduling and management.

# CRITERION 5. CURRICULUM

## Program Curriculum

1. Complete Table 5-1 that describes the plan of study for students in this program including information on course offerings in the form of a recommended schedule by year and term along with maximum section enrollments for all courses in the program for the last two terms the course was taught. If there is more than one curricular path or option for a program, a separate Table 5-1 should be provided for each path or option.State whether the institution operates on quarters or semesters.

* Table 5-1 describes the plan of study for students in this program including information on course offerings in the form of a recommended schedule by year and term along with maximum section enrollments for all courses in the program for the last two terms the course was taught.

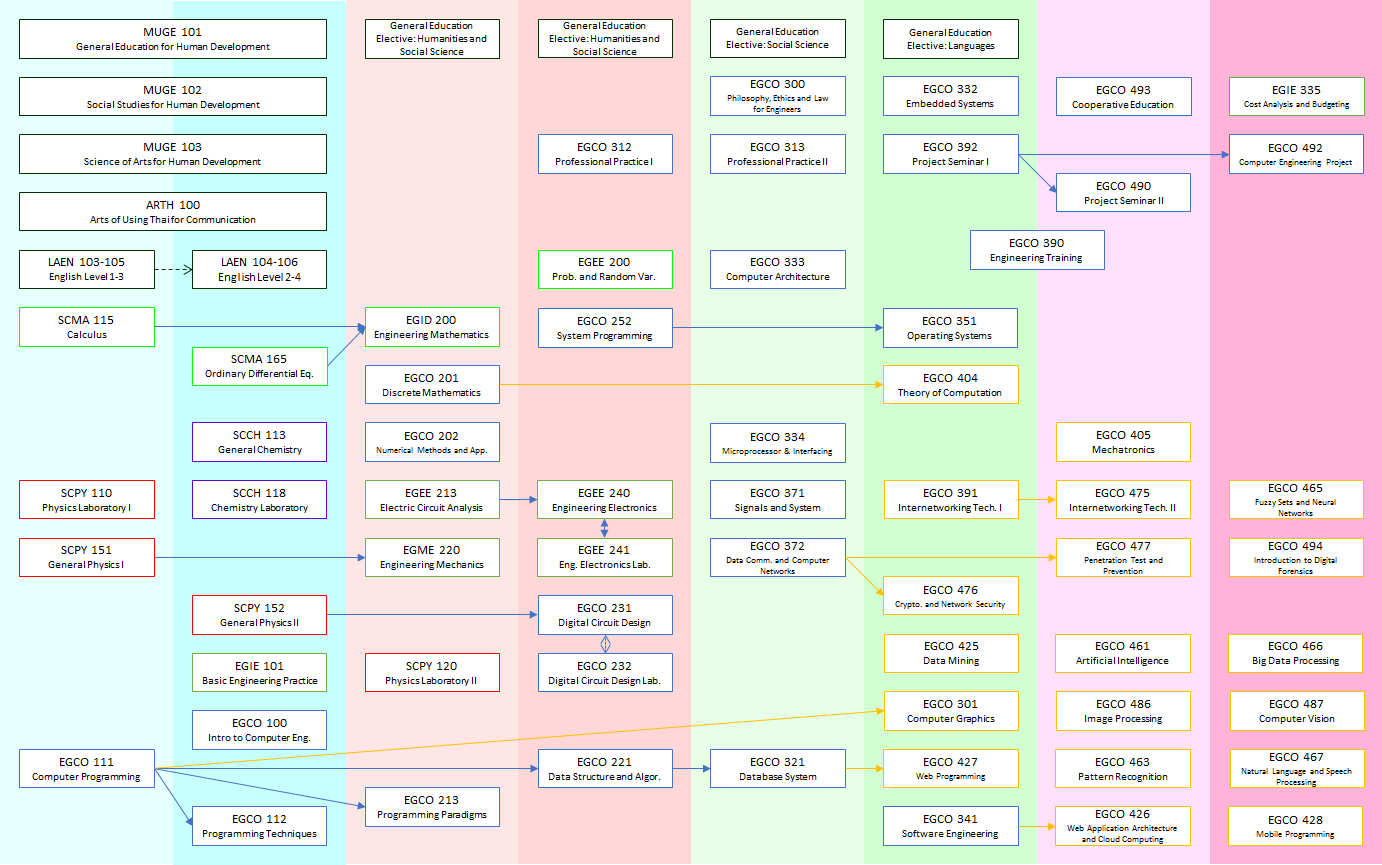
## Table 5-1 Curriculum

**Computer Engineering Program**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Course  (Department, Number, Title)  List all courses in the program by term starting with the first term of the first year and ending with the last term of the final year. | | Indicate Whether Course is Required, Elective or a Selected Elective by an R, an E or an SE.1 | *Subject Area (Credit Hours)* | | | | Last Two Terms the Course was Offered:  Year and,  Semester, or  Quarter | Maximum Section Enrollment  for the Last Two Terms the Course was Offered2 |
| Math & Basic Sciences | | Engineering Topics  Check if Contains Significant Design (√) | Other |
| Year 1 Semester 1 | | | | | | | | |
| MUGE101 General Education for Human Development | | R |  | |  | 2 | 2018-1, 2018-2 | - |
| MUGE102 Social Studies for Human Development | | R |  | |  | 3 | 2018-1, 2018-2 | - |
| MUGE103 Science of Arts for Human Development | | R |  | |  | - | 2018-1, 2018-2 | - |
| LAEN103-105 English Level 1-3 | | R |  | |  | 3 | 2018-1, 2018-2 | - |
| SCMA115 Calculus | | R | 3 | |  |  | 2017-1, 2018-1 | - |
| SCPY110 Physics Laboratory I | | R | 1 | |  |  | 2017-1, 2018-1 | - |
| SCPY151 General Physics I | | R | 3 | |  |  | 2017-1, 2018-1 | - |
| EGCO111 Computer Programming | | R |  | | 3 |  | 2017-1, 2018-1 | 1 |
| EGCO100 Introduction to Computer Engineering | | R |  | | 1 |  | 2018-1 | 1 |
| Year 1 Semester 2 | | | | | | | | |
| MUGE101 General Education for Human Development | | R |  | |  | - | 2018-1, 2018-2 | - |
| MUGE102 Social Studies for Human Development | | R |  | |  | - | 2018-1, 2018-2 | - |
| MUGE103 Science of Arts for Human Development | | R |  | |  | 2 | 2018-1, 2018-2 | - |
| LAEN104-106 English Level 2-4 | | R |  | |  | 3 | 2018-1, 2018-2 | - |
| SCCH115 General Chemistry | | R | 3 | |  |  | 2017-2, 2018-2 | - |
| SCCH118 Chemistry Laboratory | | R | 1 | |  |  | 2017-2, 2018-2 | - |
| SCMA165 Ordinary Differential Equations | | R | 3 | |  |  | 2017-2, 2018-2 | - |
| SCPY120 Physics Laboratory II | | R | 1 | |  |  | 2017-2, 2018-2 | - |
| SCPY152 General Physics II | | R | 3 | |  |  | 2017-1, 2018-1 | - |
| EGIE101 Basic Engineering Practice | | R |  | | 2 |  | 2017-2, 2018-2 | 1 |
| EGCO112 Programming Techniques | | R |  | | 3 |  | 2017-2, 2018-2 | 1 |
| Year 2 Semester 1 | | | | | | | | |
| ARTH100 Art of Using Thai for Communication | | R |  | |  | 3 | 2018-1, 2018-2 | - |
| EGME220 Engineering Mechanics | | R |  | | 3 |  | 2017-1, 2018-1 | 1 |
| EGCO200 Mathematics for Computer Engineering | | R | 3 | |  |  | 2017-1, 2018-1 | 1 |
| EGCO201 Discrete Mathematics | | R | 3 | |  |  | 2017-1, 2018-1 | 1 |
| EGEE213 Electric Circuit Analysis | | R |  | | 3 |  | 2017-1, 2018-1 | 1 |
| EGCO202 Numerical Methods and Applications | | R | 3 | |  |  | 2017-1, 2018-1 | 1 |
| EGCO213 Programming Paradigms | | R |  | | 3 |  | 2017-1, 2018-1 | 1 |
| Year 2 Semester 2 | | | | | | | | |
| General Education Elective: Humanities and Social Science | | SE |  | |  | 2 | 2018-1, 2018-2 | - |
| ARTH100 Art of Using Thai for Communication | | R |  | |  |  | 2018-1, 2018-2 | - |
| EGEE200 Probability and Random Variables | | R | 3 | |  |  | 2017-2, 2018-2 | 1 |
| EGEE240 Engineering Electronics | | R |  | | 3 |  | 2017-2, 2018-2 | 1 |
| EGEE241 Engineering Electronics Laboratory | | R |  | | 1 |  | 2017-2, 2018-2 | 1 |
| EGCO203 Statistics for Computer Engineering | | R | 2 | |  |  | - | - |
| EGCO221 Data Structures and Algorithms | | R |  | | 3 |  | 2017-2, 2018-2 | 1 |
| EGCO231 Digital Circuit Design | | R |  | | 3 ✓ |  | 2017-2, 2018-2 | 1 |
| EGCO232 Digital Circuit Design Laboratory | | R |  | | 1 ✓ |  | 2017-2, 2018-2 | 1 |
| EGCO252 System Programming | | R |  | | 3 |  | 2017-2, 2018-2 | 1 |
| Year 3 Semester 1 | | | | | | | | |
| General Education Elective: Humanities and Social Science | | SE |  | |  | 2 | 2018-1, 2018-2 | - |
| EGID300 Philosophy, Ethics, and Law for Engineers | | R |  | |  | 1 | 2017-1, 2018-1 | 1 |
| EGCO321 Database Systems | | R |  | | 3 ✓ |  | 2017-1, 2018-1 | 1 |
| EGCO333 Computer Architecture | | R |  | | 3 |  | 2017-1, 2018-1 | 1 |
| EGCO334 Microprocessor and Interfacing | | R |  | | 3 |  | - | - |
| EGCO341 Software Engineering | | R |  | | 3 |  | 2017-1, 2018-1 | 1 |
| EGCO371 Signals and Systems | | R |  | | 3 |  | 2017-1, 2018-1 | 1 |
| EGCO372 Data Communication and Computer Networks | | R |  | | 3 |  | 2017-1, 2018-1 | 1 |
| Year 3 Semester 2 | | | | | | | | |
| General Education Elective: Languages | | SE |  | |  | 3 | 2018-1, 2018-2 | 1 |
| EGCO332 Embedded Systems | | R |  | | 3 |  | 2017-2, 2018-2 | 1 |
| EGCO343 Software Design | | R |  | | 3 ✓ |  | - | - |
| EGCO351 Operating Systems | | R |  | | 3 |  | 2017-2, 2018-2 | 1 |
| EGCO392 Project Seminar I | | R |  | | 1 ✓ |  | 2017-2, 2018-2 | 1 |
| EGCO/EGEE Engineering Elective | | SE |  | | 3 |  | 2018-1, 2018-2 | 1 |
| EGCO Computer Engineering Elective | | SE |  | | 3 |  | 2018-1, 2018-2 | 1 |
| Year 3 Semester 3 | | | | | | | | |
| EGCO390 Engineering Training | | R |  | | 1 |  | 2017-3, 2018-3 | 1 |
| Year 4 Semester 1 | | | | | | | | |
| EGCO490 Project Seminar II | | R |  | | 1 |  | 2017-1, 2018-1 | 1 |
| EGCO Computer Engineering Elective | | SE |  | | 3 |  | 2018-1, 2018-2 | - |
| EGCO Computer Engineering Elective | | SE |  | | 3 |  | 2018-1, 2018-2 | - |
| Free Elective | | E |  | |  | 3 | 2018-1, 2018-2 | - |
| Year 4 Semester 2 | | | | | | | | |
| EGIE335 Cost Analysis and Budgeting | | R |  | |  | 3 | 2017-2, 2018-2 | 1 |
| EGCO495 Capstone Computer Engineering Project | | R |  | | 3 ✓ |  | 2017-2, 2018-2 | 1 |
| Free Elective | | E |  | |  | 3 | 2018-1, 2018-2 | - |
| TOTALS (in terms of semester credit hours) | |  | 32 Hours | 77 Hours | | 33 Hours |  |  |
| Total must satisfy minimum credit hours | Minimum Semester Credit Hours | | 30 Hours | 45 Hours | |  |  |  |
|  | |  |  | |  |  |  |

1. **Required** courses are required of all students in the program, **elective** courses (often referred to as open or free electives) are optional for students, and **selected elective** courses are those for which students must take one or more courses from a specified group.
2. For courses that include multiple elements (lecture, laboratory, recitation, etc.), indicate the maximum enrollment in each element. For selected elective courses, indicate the maximum enrollment for each option.

Instructional materials and student work verifying compliance with ABET criteria for the categories indicated above will be required during the campus visit.



**Figure 5-1** Prerequisite Structure of the Program

1. Describe how the curriculum aligns with the program educational objectives.

* Table 5-2 lists all course of the computer engineering program and its support with the Computer Engineering program objectives.

1. Describe how the curriculum and its associated prerequisite structure support the attainment of the student outcomes.

* Each of the Computer Engineering courses in the curriculum has a set of Course Learning Outcomes (CLOs). The CLOs are related to the student outcomes considering that each CLO will help the students in attaining the abilities required at the time of graduation. This relationship of the CLOs of a course with the SOs is expressed as a CLO-SO map is given in Table 5-3.

1. Attach a flowchart or worksheet that illustrates the prerequisite structure of the program’s required courses.

* Prerequisite structure of the program’s required courses is shown in Figure 5-1. Arrows indicate prerequisite relationship of the subjects where the beginnings of the arrows are the prerequisite subjects for the subjects that the arrows pointed to.

1. Describe how the program meets the requirements in terms of hours and depth of study for each subject area (Math and Basic Sciences, Engineering Topics, and General Education) specifically addressed by either the general criteria or the program criteria.

* Computer Engineering curriculum consists of 32 credit hours of mathematics as shown in Table 5-1.
* Computer Engineering curriculum consists of 32 credit hours of mathematics and basic science, 77 credits hours of core engineering topics and 33 credit hours of general education. As shown in Table 5-1.
* Each subject in the Computer Engineering curriculum is aligned to PEO as shown in Table 5-2.
* Each subject in the Computer Engineering curriculum is aligned to SO as shown in Table 5-3.
* In the Math and Basic Sciences group, there are subjects such as EGCO200 (Mathematics for Computer Engineering) which is the foundation of the mathematics related to computer engineering. This is followed up by EGCO201 (Discrete Mathematics) which is the important subject for logics and circuits. There is also EGCO202 (Numerical Methods and Applications) which is useful in many engineering fields.
* In the Core Engineering subjects, they cover a wide variety of topics related to computer engineering. For example, EGCO333 (Computer Architecture) lay the foundation for the understanding of computer hardware. EGCO372 (Data Communication and Computer Networks) is the core subject in the network field. And EGCO332 (Embedded Systems) is the combination of hardware/software to interface with the physical world.
* For the general education area, there are subjects such as EGID300 (Philosophy, Ethics and Laws for Engineers) that introduces students to the more societal side of engineering.

1. Describe the broad education component and how it complements the technical content of the curriculum and how it is consistent with the program educational objectives.

* The major design experience will take place in the Computer Engineering project courses (EGCO 491 and EGCO 495). The projects require students to use their engineering knowledge and skills to design and build a piece of hardware and/or software that can function at an acceptable level. Combining two courses, students have approximately one year to complete the task. Progress reports, an oral presentation, a poster presentation is evaluated and graded at the end of the courses.
* The broad education component is well rounded and complements the technical components to achieve the program educational outcomes and program educational objectives of the Computer Engineering program. There are many subjects that cover a broad range of topics that should cover the interests of many students. Example includes: MUGE101 (General Education for Human Development) MUGE102 (Social Studies for Human Development) MUGE103 (Science of Arts for Human Development). There are also subjects from the languages such as ARTH100 (Art of Using Thai for Communication). Students can choose any subject from this group to complement their major subjects and enhance their learning experience.

1. Describe the major design experience that prepares students for engineering practice. Describe how this experience is based upon the knowledge and skills acquired in earlier coursework and incorporates appropriate engineering standards and multiple design constraints.

* The major design experience will take place in the Computer Engineering project courses (EGCO 491 and EGCO 495). The projects require students to use their engineering knowledge and skills to design and build a piece of hardware and/or software that can function at an acceptable level. Combining two courses, students have approximately one year to complete the task. Progress reports, an oral presentation, a poster presentation is evaluated and graded at the end of the courses.
* Computer Engineering curriculum give design experience to students. For example, students gain elementary design experience in course EGCO 231 Digital Circuit Design, EGCO 321 Database Systems and EGCO 252 System. Students gain relatively advanced design experience in courses such as EGCO 332 Embedded Systems, EGCO 341 Software Engineering and EGCO 372 Data Communication and Computer Networks
* In final year, students gain their major experience in engineering field, EGCO 495 Capstone Computer Engineering Project. Students are allowed to form their own teams from two to three students. Senior projects must be approved by the faculty member. The Capstone Projects Committee and the faculty member supervising the project ensure that the project is indeed capstone and incorporates engineering standards and realistic constraints such as economic, environmental, sustainability, ethical, security and social considerations.

1. If the program allows cooperative education to satisfy curricular requirements specifically addressed by either the general or program criteria, describe the academic component of this experience and how it is evaluated by the faculty.

* A cooperative education can substitute 2 elective courses. After completing all courses, students may take cooperative education that requires a student to work at a company for 4-6 months. A supervisor assigned by the department and a supervisor from the company are co-responsible for monitoring and evaluating the work of the student. The supervisor from computer engineering department will visit the work site to do the evaluation.
* The Computer Engineering with the COOP option provides students with real-life Cooperative professional development. During 6 months (from the middle of May to middle of August) the students engage in a company while being assigned an academic COOP advisor in addition to an industry COOP supervisor. The student is exposed to the profession of computer engineering in the industry through its multidisciplinary teams and wider engineering perceptive. In addition to a COOP plan the student is jointly evaluated at the end of the COOP by both the supervisor at the company and a faculty member of the program. Upon completion, students gain innovative and global perception of computer engineering profession which guides them in finishing their engineering education and deciding about their future career.

1. Describe the materials that will be available for review during and/or prior to the visit to demonstrate achievement related to this criterion. (See 2020-2021 APPM Section I.E.5.b.(2))

* Course syllabi
* Sample student works
* Assessment material
* Senior project reports and presentations
* Recent graduates’ transcripts

## Course Syllabi

# In Appendix A of the Self-Study Report, include a syllabus for each course used to satisfy the mathematics, science, and discipline-specific requirements required by Criterion 5 or by any applicable program criteria.

# CRITERION 6. FACULTY

## Faculty Qualifications

Expertise of Computer Engineering staff covers the following area

* Digital Forensics
* Computer Security
* Artificial Intelligent
* Signal and Image Processing
* Computer Network
* Computation and algorithm
* Software development
* Embedded system

List of staffs and area of research are following:

1. Assoc. Prof. Dr. Pisit Phokharatkul

Fuzzy application, image processing application, pattern recognition, mobile communication

1. Asst. Prof. Dr. Konglit Hunchangsith

Wireless mesh networks, MIMO, network coding cross-layer protocol

1. Assoc. Prof. Dr. Rangsipan Marukatat

Data mining, classification, parallel computation, algorithms

1. Assoc. Prof. Dr. Suratose Tritilanunt

Network security, computer attacks, digital forensics

1. Asst. Prof. Thanadol Pritranan

Parallel computation architectures

1. Dr. Noppadol Wanichworanant

Computer network, digital forensic, computer security network security

1. Dr. Lalita Narupiyakul

Natural language processing, healthcare application, web service

1. Asst. Prof. Dr. Tanasanee Phienthrakul

Machine learning, pattern recognition, evolutionary computation, time series analysis

1. Dr. Mingmanas Sivaraksa

Data visualization, bioinformatics, dimensionality reduction

1. Dr. Vasin Suttichaya

Cryptography, computer security, Artificial immune system

1. Lect. Kanat Poolsawasd

Web services, enterprise service bus

1. Asst. Prof. Dr. Narit Hnoohom

Digital watermarking, Digital image processing, Artificial Intelligence

1. Dr. Konlakorn Wongpatikaseree

Human Behavior Analysis, Activity Recognition, Smart Home, Embedded System, Intelligent System, Speech Recognition, Ontology

1. Dr. Sumeth Yuenyong

Signal, Image Processing, Neural Network, Machine Learning, Pattern Recognition, Data Mining

Table 6-1 and Table 6-2 summarize the faculty qualifications. Appendix B also contains the curricula vitae of the program faculty.

## Faculty Workload

Table 6-2 shows the Faculty Workload Summary during 2016-2018 (the academic year prior to the ABET visit). The teaching assignments are designed to accommodate individual interests and skills, while maintaining accountability and a reasonable level of balance. The head of the department is expected to teach but with a reduction in teaching load. All faculty members spend 100% of their time towards three areas: Teaching, Research or Scholarship, and Services (department level as well as the university level).

Teaching performance of the Engineering faculty is evaluated directly and indirectly through MU student evaluations, peer review (especially when a faculty member is going for promotion from Assistant to Associate or from Associate to Full Professor), and teaching evaluations as part of performance, planning and review of the faculty conducted by the head of the department.

In term of research and scholarship performance, faculty members are expected to demonstrate through a variety of ways such as (a) peer reviewed journal publications; (b) peer reviewed conference publications; (c) presentations at local, national, and international meetings; (d) chairing and organizing sessions/conferences; (e) additional scholarly work in terms of chapter/book writing, instructional materials, patents and other non-peer reviewed work; and (f) funded grants from local and federal agencies.

Faculty members are also expected to commit to service/social activities to the department, the university, the professional community, and to external community. These are demonstrated through continuous participation in committee work, accreditation and curriculum matters, recruitment efforts, retention efforts, student advising and career counseling, leadership roles, and outreach activities.

## Faculty Size

Currently, the computer Engineering program consisted of 13 full-time and one-part time lecturers. There are 4 technicians looking after laboratory equipment and maintaining computer and network system.

The number of faculty is sufficient to accommodate the current level of teaching, student-faculty interaction, research, service activities, professional development and communications with industrial partners. However, thirteen is the minimum number required to operate two bachelor programs and one master program. Currently, the department is aiming to recruit more highly qualified staff. Table 6.1 summarizes faculty qualifications.

## Professional Development

Staff (academic and supporting staff) are encouraged to identify their own developmental needs. Some funding (on average about 20,000 per person) is allocated for staff training each year. Individuals are able to propose their desired training. If the trainings are identified to be useful for teaching and learning in computer engineering, they are usually approved. The highlights of the professional development activities for all department faculty can be found in the Appendix B, in the resumes.

## Authority and Responsibility of Faculty

The Computer engineering program faculty has the primary authority and responsibility for developing, revising, and implementing curriculum issues. However, the program educational objectives, outcomes, and curriculum have to satisfy the needs of industry, students/parents, college/university administration, accreditation bodies and the Council of Engineering Dean of Thailand and the Office of the Higher Education Commission guidelines. Before proposing a new development or revision, program faculty seek and consider input from the students, graduates, employers, Industry Advisory Board (IAB) members and accreditation bodies. The faculty dean also advises on program educational objectives, outcomes, and curriculum issues, with an eye to Thai government policies and university administration requirements.

## Table 6-1. Faculty Qualifications

**Computer Engineering Program**

| Faculty Name | Highest Degree Earned- Field and Year | Rank 1 | Type of Academic Appointment2  T, TT, NTT | FT or PT3 | Years of Experience | | | Professional Registration/ Certification | Level of Activity4  H, M, or L | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Govt./Ind. Practice | Teaching | This Institution | Professional Organizations | Professional Development | Consulting/summer work in industry |
| Assoc. Prof. Dr. Pisit Phokharatkul | D.Eng (Electrical Engineering) | ASC | TT | PT | 31 | 26 | 26 |  | L | L | L |
| Asst. Prof. Dr. Konglit Hunchangsith | Ph.D. (Information Technology) | AST | TT | FT | 24 | 24 | 24 |  | L | M | L |
| Assoc. Prof. Dr. Rangsipan Marukatat | Ph.D. (Computer Science) | ASC | TT | FT | 16 | 16 | 16 |  | L | M | L |
| Assoc. Prof. Dr. Suratose Tritilanunt | Ph.D. (Information Technology) | ASC | TT | FT | 18 | 18 | 18 | GIACGCFA  GIACGCFE | L | M | M |
| Asst. Prof. Thanadol Pritranan | M.Sc. (Computation) | AST | TT | FT | 25 | 25 | 25 |  | L | L | L |
| Dr. Noppadol Wanichworanant | Ph.D. (Electrical Engineering) | I | TT | FT | 19 | 13 | 13 | SANS | L | L | L |
| Dr. Lalita Narupiyakul | Ph.D. (Computer Science) | I | TT | FT | 12 | 9 | 9 | SANS | L | M | M |
| Asst. Prof. Dr. Tanasanee Phienthrakul | Ph.D. (Computer Engineering) | AST | TT | FT | 10 | 10 | 10 |  | L | M | L |
| Dr. Mingmanas Sivaraksa | Ph.D. (Information Engineering) | I | TT | FT | 10 | 10 | 10 |  | L | M | L |
| Dr. Vasin Suttichaya | Ph.D. (Computer Science) | I | TT | FT | 16 | 16 | 16 | CFHI | L | M | L |
| Lect. Kanat Poolsawasd | MS (Information Technology Management System) | I | TT | FT | 19 | 19 | 19 |  | L | L | M |
| Asst. Prof. Dr. Narit Hnoohom | Ph.D. Computer Engineering) | AST | TT | FT | 12 | 12 | 6 |  | L | M | M |
| Dr. Konlakorn Wongpatikaseree | Ph.D. (Information Science) | I | TT | FT | 3 | 3 | 3 |  | L | M | M |
| Dr. Sumeth Yuenyong | Ph.D. (Engineering in Communication and Integrated Systems) | I | TT | FT | 4 | 4 | 2 |  | L | M | L |

Instructions: Complete table for each member of the faculty in the program. Add additional rows or use additional sheets if necessary. Updated information is to be provided at the time of the visit.

1. Code: P = Professor ASC = Associate Professor AST = Assistant Professor I = Instructor A = Adjunct O = Other

2. Code: TT = Tenure Track T = Tenured NTT = Non-Tenure Track

3. FT = Full Time Faculty or PT = Part Time Faculty, at the institution.

4. The level of activity, high, medium or low, should reflect an average over the three years prior to the visit.

## Table 6-2. Faculty Workload Summary

**Name of Program**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Faculty Member (name) | PT or FT1 | Classes Taught (Course No./Credit Hrs.) Term and Year2 | Program Activity Distribution3 | | | % of Time Devoted  to the Program5 |
| Teaching | Research or Scholarship | Other4 |
| Assoc. Prof. Dr. Pisit Phokharatkul | PT | EGCO201 3(3-0-6) sem2 | 40% | 20% | 40% | 5% |
| Asst. Prof. Dr. Konglit Hunchangsith | FT | EGCO371 3(3-0-6) sem1, EGCO372 3(3-0-6) sem1, EGCO111 3(2-2-5) sem2, EGCO342 3(3-0-6) sem2, EGCI206 4(4-0-8) sem1,2, EGCI312 1(0-2-1) sem1,2 | 40% | 20% | 40% | 60% |
| Assoc. Prof. Dr. Rangsipan Marukatat | FT | EGCO221 3(3-0-6) sem1, EGCO425 3(3-0-6) sem2, EGCI213 4(4-0-8) sem1, EGCO213 3(3-0-6) sem1, EGCI305 4(4-0-8) sem2, EGCO312 1(0-3-1) sem2, EGCI425 4(4-0-8) sem2 | 40% | 40% | 20% | 50% |
| Assoc. Prof. Dr. Suratose Tritilanunt | FT | EGCI100 1(0-2-1) sem1,2, EGCI372 4(4-0-8) sem1,2, EGCO476 3(3-0-6) sem1, EGCI4764 (4-0-8) sem2, EGCI477 4(4-0-8) sem2 | 40% | 20% | 40% | 50% |
| Asst. Prof. Thanadol Pritranan | FT | EGCO333 3(3-0-6) sem1, EGCO351 3(3-0-6) sem2, EGCI351 4(4-0-8) sem1,2, EGCO111 3(2-2-5) sem2 | 40% | 20% | 40% | 50% |
| Dr. Noppadol Wanichworanant | FT | EGCO252 3(3-0-6) sem2, EGCO391 3(2-2-5) sem2, EGCO4753 (2-2-5) sem1, EGCI252 4(4-0-8) sem1,2, EGCI474 4(3-2-7) sem2, EGCI475 4(3-2-7) sem1 | 40% | 20% | 40% | 50% |
| Dr. Lalita Narupiyakul | FT | EGCO428 3(2-2-5) sem1, EGCO427 3(2-2-5) sem2, EGCO341 3(3-0-6) sem2, EGCI341 4(4-0-8) sem1, EGCI428 4 (4-0-8) sem1, EGCO313 1(0-3-1) sem1 | 40% | 30% | 30% | 50% |
| Asst. Prof. Dr. Tanasanee Phienthrakul | FT | EGCO111 3(2-2-5) sem1,2, EGCO312 1(0-3-1) sem2, EGCO461 3(3-0-6) sem2, EGCI111 4(3-2-7) sem2 | 40% | 30% | 30% | 60% |
| Dr. Mingmanas Sivaraksa | FT | EGCO111 3(2-2-5) sem1, EGCO112 3(2-2-5) sem2, EGCO232 1(0-3-1) sem2, EGCO463 3(3-0-6) sem1, EGCI111 4(3-2-7) sem1, EGCI212 4 (4-0-8) sem2 | 40% | 20% | 40% | 50% |
| Dr. Vasin Suttichaya | FT | EGID200 3(3-0-6) 1) sem1, EGCI201 4 (4-0-8) sem1,2, EGCI2214 (4-0-8) sem2, EGCO2023 (3-0-6) sem2, EGCO494 3(3-0-6) sem2 | 40% | 30% | 30% | 50% |
| Lect. Kanat Poolsawasd | FT | EGCO321 3(3-0-6) sem1, EGCO231 3(3-0-6) sem2, EGCI341 4 (4-0-8) sem2, EGCO342 3(3-0-6) sem2 | 40% | 20% | 40% | 50% |
| Asst. Prof. Dr. Narit Hnoohom | FT | EGCO312 1(0-3-1) sem2, EGCO301 3(3-0-6) sem1, EGCO4863 (3-0-6) sem1, EGCO111 3(2-2-5) sem2 | 40% | 40% | 20% | 50% |
| Dr. Konlakorn Wongpatikaseree | FT | EGCI332 4 (4-0-8) sem2, EGCO111 3(2-2-5) sem1, EGCO332 3(3-0-6) sem2 | 40% | 40% | 20% | 50% |
| Dr. Sumeth Yuenyong | FT | EGCO1113(2-2-5) sem1,2, EGCO312 1(0-3-1) sem2 | 40% | 30% | 30% | 50% |

1. FT = Full Time Faculty or PT = Part Time Faculty, at the institution
2. For the academic year for which the Report is being prepared.
3. Program activity distribution should be in percent of effort in the program and should total 100%.
4. Indicate sabbatical leave, etc., under "Other."
5. Out of the total time employed at the institution.

# CRITERION 7. FACILITIES[[1]](#footnote-1)

## A. Offices, Classrooms and Laboratories

**Offices**

The program together with Computer Engineering department is housed in the Faculty of Engineering Building I, II and III. The Department office complex is located on the second floor of the Building III. All Computer Engineering faculty members have offices in the second floor, close to the class rooms, labs, and meeting rooms. The staff office is currently filled to capacity with one faculty member. Other office spaces in the department are being utilized for additional faculty and graduate assistants

**Classrooms**

The Faculty of Engineering has one auditorium or theater-like classroom that seats 360 students on the fourth floor of the Building III. There are also many classrooms available in the three building that seat 218, 152, 80, 42, and 10-20 seats as shown in the table below.

**Table 7-1** Classrooms availability at the Faculty of Engineering, Salaya Campus.

|  |  |
| --- | --- |
| Room Size (seats) | Quantity (rooms) |
| 360 | 1 |
| 218 | 3 |
| 152 | 3 |
| 72-80 | 8 |
| 42 | 11 |
| 12-20 | 2 |

The Computer Engineering Department has one meeting room. Some of the Computer Engineering department primary classrooms also function as laboratories, which allow students to continue on lab experiments in the same room when the lecture session of the class is delivered.

All classrooms are designed to accommodate 40 students. They equipped with an instructor’s PC, network access, educational software (such as MS Office, MATLAB etc.) required for courses taught in the room, and teaching apparatus including audio amplifiers projectors, and projector screens. Laboratory rooms also have multiple equipment/documentation cabinets to store lab tools and related lab test equipment and materials.

Rooms 6274, 6275 and 6276 are the primary teaching rooms for lecture courses. The rooms have work stations and a seating capacity of 40 students.

**Laboratory facilities**

The following is the list of laboratories under the Computer Engineering department. The following laboratories are located at Building II and III.

- The Digital Forensics Innovation and Training Center (DFIT) (309/1, 309/2, 310)

- Digital Forensic Laboratory (309/1)

- Computer Network Laboratory (Cisco Academy) (309/2)

- Computer Laboratory (310)

- Digital Circuit Laboratory (6273)

- Microprocessor and Embedded System Laboratory (6273)

**The Digital Forensics Innovation and Training Center (DFIT)**

DFIT provides computer-based evidence investigation, examination, identification, preservation, recovery, and analysis of data stored, transmitted, or produced by a computer system or computer network. Our major goal is to research and develop new innovation of digital forensic equipment and academic researches. Moreover, our center could provide some assistances and consults to law enforcement agencies, government agencies, as well as private companies.

The center is used for under-graduated students and master degree students who are interested in the major of digital forensics and computer network security. Under graduate courses that utilize the center includes EGCO 476: Introduction to Cryptography and Network Security

Digital Forensic Laboratory (309/1)

The laboratory is fully equipped with standard digital forensics devices including both hardware and software used in the area of computer forensics, network forensics, and mobile forensics. Some examples of equipment are a set of digital forensic disk duplicator, a set of digital forensic write blocker, a set of computer forensic workstation, a data center room and evidence storage room, a set of licensed software for digital evidence investigation, examination, identification, preservation, recovery, and analysis

Computer Network Laboratory (Cisco Academy) (309/2)

The Computer Network Laboratory is a section in DFIT center that is used for students to study computer networks (EGCO372 Data Communications and Computer Network, EGCO375 Internetworking I and EGCO475 Internetworking II)

The lab provides laboratory stations that equipped with routers, network switches, and personal computers with Cisco Packet Tracer programs. The laboratory gives students hand on experiences on connecting and configuring network equipment as well as learning about computer networks using software simulations.

**Embedded Laboratory & Digital Circuit Laboratory (6273)**

Embedded laboratory has 40 desktop PCs with Windows 10 operating system, UPS, and 23 inches LCD monitors. For the development board and circuit, Raspberry Pi 3 Model B (45 boards), NodeMCU ESP8266 (45 boards), memory storage, power supply, LED, button, and basic sensors (Temperature sensor, Force sensor, or Accelerometer sensor) are provided for teaching the embedded system course (EGCO 332). In addition, network switch is provided for simulating the internet of things application.

There are also 40 sets of digital circuit experiment kids. A kid is a hardware unit consists of a breadboard, signal generator, DC power supplies, seven segment displays, LEDs. The equipment is for Digital Circuit Design and Digital Circuit Design Laboratory classes (EGCO231 and EGCO 232)

## B. Computing Resources

At Mahidol University, the computing services and communication infrastructure for academic, research and administrative purposes are provided by the Division of Information Technology (MUIT). For the Faculty of Engineering, the computer network is maintained by the staff of Information Technology unit and is interconnected all departments in three building. The computing resources (workstations, servers, storage, networks including software) are available in the computer laboratories for teaching and learning activities. There are two computer rooms with 40 seats in Building I and the other three computer rooms with 40 seats in the Department of Computer and Mechanical Engineering. Wireless network access is available in all academic areas. High speed connection to Internet is provided for faculty and student use. The adequacy of these facilities is to support the scholarly and professional activities of the students and faculty in the program. Computers are provided in all department laboratories.

**Table 7-2** Departmental computing resource

|  |  |  |
| --- | --- | --- |
| Lab | Location | Facilities |
| 6272 | 2nd floor of EG Building 3 | 40 Mac Mini personal computers with OSX operating system |
| 6273 | 2nd floor of EG Building 3 | 40 desktop personal computers with Windows operating system |
| 309/1 | 3rd floor of EG Building 2 | 20 desktop personal computers with Windows operating system |
| 309/2 | 3rd floor of EG Building 2 | 20 desktop personal computers with Windows operating system |
| 310 | 3rd floor of EG Building 2 | 30 Mac Mini personal computers with OSX operating system |

## C. Guidance

Students are introduced to the laboratory equipment and laboratory rules in the first class by a technician and/or the instructor.

## D. Maintenance and Upgrading of Facilities

A technician is assigned to take care of each lab. Lab equipment are checked and maintained by the technician who is responsible. This is done daily before classes begin to ensure usability. He is also responsible for opening and closing the lab. Computers are set to be replaced every 5-6 years. Budget plans are submitted two years before the spending. Other lab equipment has no specific time for replacements. The plan for the replacement or upgrading is requested by the technician or the instructors.

## E. Library Services

Computer engineering has not allocated specific space for library (space limited). However, students can request and borrow senior-project report books (so call “the black books”). These black books are stored in the department. Other texts and papers can be obtained at the Salaya-campus main library. Each year, the department sends requests to the main library to store particular text books. Nevertheless, the department provides high speed network and internet access via Mahidol gateway and private ISP gateway. Students can access electronic publications via Mahidol network.

Salaya Campus is the hub of the Mahidol University Library and Knowledge Center (MULKC), which contains an extensive collection of over 1,100,000 books, theses, research reports and bound journals, 1,051 printed journals, 39,000 electronic journals, 71,000 electronic books, as well as 20,000 Thai and English-language audio-visual materials. The Central Library has hundreds of computer terminals and multi-media viewing library equipment. It also offers a full range and specialized services including online reference services, multi-database searching and document delivery service. There are 25 branch libraries in the Library Automation system. These are located in various academic departments on each campus, but are all connected to the Central Library by the computer database MULINET.

The branch libraries maintain extensive book, journal and textbook collections in their respective fields of study and offer a full range of services, including electronic database searching and inter-library loans. Some Faculties and Institutes maintain their own libraries. These include the largest collection of medical and public health books and periodicals in Thailand.

The Faculty of Engineering has no own library but an annual budget line item is allocated from which the department can request specific books, databases and other library resources. Most Mahidol University library functions, including access to research databases are available on-line to Engineering students and faculty.

## F. Overall Comments on Facilities

Each year, no more than 40 students are accepted to the program. All laboratories in the department can accommodate 40 students. That is one student per one lab station. Each lab has one technician that is responsible for opening, closing, checking and maintaining the lab equipment. Lab and safety guidance are introduced in the first class of each semester.

# CRITERION 8. INSTITUTIONAL SUPPORT

## Leadership

A program director and the head of the department are the two leaders that’s responsible for managing and leading the program. However, it is the department culture that major decisions regarding direction of the program must be made and agreed by all faculties. The dean has a clear intention and expectation that the Computer engineering program obtain ABET accreditation. The president of Mahidol university pledges to support partial budget for the accreditation process.

With or without ABET accreditation, computer engineering department determines to continuously improve quality of all Computer engineering degree programs. Among all the responsibilities held by the faculties (teach, research, educational service, etc.), it is clear to all computer engineering staff that teaching is our first priority. For instance, cancelling classes without makeup for doing research is unacceptable. Students are treated as adults (not children), so their needs, opinions and time are respect. The above are stated because it cannot be said that it is a common practice in Thai education. Creating environment for learning by creating feeling of fair and respect for ones opinions is promoted and practiced. It is emphasized (by ourselves) to ourselves.

High portion of department income (with permission from administrative boards) is allocated for upgrading and maintaining facilities each year.

## Program Budget and Financial Support

1. Describe the process used to establish the program’s budget and provide evidence of continuity of institutional support for the program. Include the sources of financial support including both permanent (recurring) and temporary (one-time) funds.

There are several sources of income:

- Budget from the government (uncertain and unlikely).

- Income from Undergraduate students (Thai program): The department receives a portion of student registrations (one portion goes to the university, another goes to the faculty).

- Income from teaching Computer engineering subjects for non-computer-engineering students (EGCO342)

- Income from Bachelor of Engineering (International Program)

- Income from Master of Engineering program.

- Income from research fund (3% of individual research fund is deducted into departmental income)

The department is willing to spend to maintain/improve quality of the program so that student outcomes can be achieved.

However, spending of our income is restricted by the Faculty. The upper limit on spending of departmental income is set using PA (Performance Agreement) not how much the income. The PA is mainly emphasized on research outcomes. It means that the income may be high, but allowable spending could be low (restricted by PA).

1. Describe how teaching is supported by the institution in terms of graders, teaching assistants, teaching workshops, etc.

Department would like to assist instructors by providing teaching assistants/graders. However, paying for teaching assistances is discouraged by the Faculty (despite spending within yearly allowance limit). Under current circumstance, it can be said that teaching assistances are not sufficient.

1. To the extent not described above, describe how resources are provided to acquire, maintain, and upgrade the infrastructures, facilities, and equipment used in the program.
2. Assess the adequacy of the resources described in this section with respect to the students in the program being able to attain the student outcomes.

Computing and laboratory equipment are adequate. Because of small number of student acceptance each year (40 or less), one lab-station per one student can be maintained. Overall, it can be said with confidence that student outcomes can be attained. However, the improvement can be made by providing teaching assistance/graders to the instructors particularly for the laboratory classes.

## Staffing

Current number of staffs is adequate to run and maintain quality of the program. However, the number of academic staff (thirteen) is the minimum that’s required to officially maintain our 3 programs (2 Bachelor degree programs and 1 Master degree program). Moreover, increasing expectation and requirement from the University and the Faculty increases overall workload of the department. It is clearly seen that it is essential to increase the number of academic staffs.

## Faculty Hiring and Retention

University regulation poses that a new academic staff must pass a standard English test with IELTS score of 6.0 or equivalent. He/she must also earn a Doctorate degree. The recruitment process and selection criteria involve all academic staff in EGCO. The criteria are discussed in departmental meetings. Then, individual candidate is scheduled to meet with all EGCO staff for an informal introduction and discussion. A teaching demonstration by the candidate is given in English on a specific topic recommended by the department. The department holds a meeting to make a recommendation to the selection committee (consisting of the Dean, the Head of Department and an academic staff) for hiring or not hiring the candidate.

Performance management including rewards and recognition is implemented to motivate and support education, research, and service. Mahidol University imposes a just and transparent performance management system on all its units. In each administration level, the immediate supervisor discusses annual performance agreement (PA) with individual staff before the period of appraisal. Key performance indicators (KPIs) must be identified for each agreed task. The staff performance is evaluated twice a year by the appraisal committee according to this PA, and the results are accumulated to yield annual salary raise. Feedbacks on strengths and areas for improvement are also given to the appraisee. In case of any dispute, the staff can appeal to the next level supervisor, who must follow the university regulations to investigate and resolve such dispute [exhibit 03-02].

Because salaries are raised once a year with limited budget, the salary of each academic staff is raised based on relative performance to others (not absolute performance). Job descriptions of all members are similar in the types of tasks to be performed: teaching, researching, providing academic services, and maintaining Thai culture and tradition. However, the load distribution among the four types of tasks may vary person to person. Scores are given to each EGCO member in proportion to teaching load, quantity and quality of publications, and budget (from research grants and academic service projects) contributed to the department. The raise process includes the following steps:

1. Performance evaluation and scoring concepts are agreed by all members.

2. Appraisal committee are nominated and selected.

3. At the end of a fiscal year, scores of each member are calculated according to the PA.

4. Raises are determined, based on the calculated scores, by the appraisal committee.

Furthermore, a lump sum money is rewarded by EG faculty for journal publications with reputable publishers and for international conference presentations.

## Support of Faculty Professional Development

EGCO staff is encouraged to identify their own development needs. Some funding (about 20,000 Baht per person on average) is allocated for staff training each year. Individuals are able to propose their desired training. If the trainings are identified to be useful, they are usually approved.

The support staff take a number of training to improve their professional skills. For example, the administrative officers attend EG workshops on administrative protocols. They are trained to use information systems related to their tasks and encouraged to take English courses. The computer information analysts take courses and workshops related to computer technology. In particular, they take turns to attend the national Workshop on UniNet Network and Computer Application (WUNCA), where they learn the latest technology in hardware, software, and network to support education. Besides these, the staff may propose other training that will benefit their tasks.

The senior staff of EGCO are strongly backed to develop their routines to research (R2R) in order to advance their careers. As a result, they have produced research papers and presented their findings at national academic conferences.

# PROGRAM CRITERIA

Breadth and Depth

* Computer Engineering program provides both breadth and depth in knowledge. Students will learn the general education such as foreign languages and sociology. There are basic sciences and engineering that provide for 1st-2nd year students. They can apply these backgrounds for other courses in 3rd-4th year of study. Moreover, they may should to learn the topics that they are interested. For the depth of computer engineering knowledge, students can choose to study in some fields such as network and security, software development, or intelligence systems.
* Computer Engineering program provides both breadth and depth in knowledge as described in Criterion 5. There are basic sciences and engineering that provide for 1st-2nd year students. As can be seen in Table 5-1, the subjects that students study during the first two years includes mathematics: EGCO 200 (Mathematics for Computer Engineering), EGCO 201 (Discrete Mathematics), EGCO 202 (Numerical Methods and Application) and EGCO 203 (Statistics for Computer Engineering). They also study basic computer programming courses such as EGCO 111 (Computer Programming) EGCO 112 (Programming Techniques) and EGCO 213 (Programming Paradigms). Furthermore, the program also has basic electronic courses such as EGEE213 (Electric Circuit Analysis) EGEE 240 (Engineering Electronics) and EGCO 231 (Digital Circuit Design). Students can then apply these backgrounds for other courses in 3rd-4th year of study. As upper level undergraduate engineering students, they can take courses such as EGCO 343 (Software Design), EGCO 332 (Embedded System) and EGCO 351 (Operating Systems). In addition to these courses, student can choose to study other topics through technical electives and interaction with other students and industry professionals during the two-semester capstone EGCO 392 (Project Seminar I) and (EGCO 495) Capstone Computer Engineering Project.

Probabilities and Statistics

* Computer Engineering program contains EGEE200 Probability and Random Variables.

The Computer Engineering program satisfies ABET program criteria.

* Satisfies minimum credit hour for Mathematics and basic sciences (show in Table 5-1).

The curriculum for programs containing the modifier “computer” in the title must include discrete mathematics.

* The Computer Engineering program contains EGCO201 Discrete Mathematics.

Senior Project Advising

* All students are assigned a faculty advisor for the undergraduate engineering project. The project topic is approved beforehand and is based on its potential to enhance the student’s knowledge. The faculty advisor interacts with the student through meetings, emails, phone calls, and visits to the industry. They also read preliminary and final drafts of the student’s work. Sample student project will be available for the ABET team during the accreditation visit. It has been part of the department’s culture for faculty to have an “open-door” policy for student visits. The primary role of mentoring encompasses general non-curriculum related guidance to student concerns on transition to college, employment perspective, and professional development, etc. Although there is no structured system for these activities, our department prides itself in creating an informal and comfortable social atmosphere in which students can routinely communicate with faculty outside classrooms.

**APPENDICES**

# Appendix A – Course Syllabi

1. Course number and name

EGCO202 Numerical Methods and Applications

1. Credits and contact hours

3 (3-0-6) (Lecture-Lab-Self-study hours)

Contact hours: Wednesday 13.00

1. Instructor’s or course coordinator’s name

Dr. Vasin Suttichaya

1. Text book, title, author, and year

* Numerical Methods, J. Dauglas Faires, and Richard L. Burden.
* Numerical Methods for Scientists and Engineers, R.W. Hamming.
* Numerical Analysis and Algorithms, Pradip Niyogi.
* A Theoretical Introduction to Numerical Analysis, Victor S. Ryaben’kii, Semyon V. Tsynkov.

1. Specific course information
   1. Study about the fundamental principles of digital computing and the implications for algorithm accuracy and stability, the numerical method for root finding algorithms, interpolation, numerical differentiation/integration, and solving system of linear equations.
   2. Prerequisites and co-requisites are not required.
   3. Required course
2. Specific goals for the course
   1. The students will be able to explain the numerical methods, able to apply the numerical methods for solving mathematical problems, and able to apply the numerical methods for solving engineering problems
   2. This course contributes to SO1: an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
3. Brief list of topics to be covered

* Mathematical preliminaries and error analysis (3 hours)
* Solution of equations in one variable (9 hours)
* Interpolation and Polynomial approximation (9 hours)
* Numerical differentiation and integration (6 hours)
* Initial-value problems for ordinary differential equations (6 hours)
* Linear algebra and Eigenvalues (6 hours)
* Solving system of linear equations (6 hours)

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1. Course number and name

EGCO221 Data Structures and Algorithms

1. Credits and contact hours

3 (3-0-6) (Lecture-Lab-Self-study hours)

Contact hours: Thursday 10.00-12.00

1. Instructor’s or course coordinator’s name

Assoc. Prof. Rangsipan Marukatat, Ph.D.

1. Text book, title, author, and year
   1. Text book

* T. H. Corman, C. E. Leiserson, R. L. Rivest, and S. Stein. Introduction to algorithms (2nd edition). MIT Press, 2002.
* M. A. Weiss. Data structures and algorithm analysis in Java (3rd edition). Pearson, 2011.
  1. Other supplemental materials
* Oracle. Java Platform, Standard Edition 8 API Specification https://docs.oracle.com/javase/8/docs/api/overview-summary.html

1. Specific course information
   1. Analysis of algorithms; abstract data type; linear data structures: linked lists, stacks, queues; non-linear data structures: trees, hash tables, graphs; sorting and searching algorithms; recursion, divide and conquer, dynamic programming, greedy algorithms; introduction to NP-completeness
   2. Prerequisites: EGCO111 Computer Programming
   3. Required course
2. Specific goals for the course
   1. The student will be able to:

* Explain the properties and data manipulation methods of various data structures
* Analyze and compare the efficiency of algorithms
* Use appropriate data structures and algorithms to solve problems
  1. This course contributes to SO 1: an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.

1. Brief list of topics to be covered

* Review of fundamental mathematics, algorithm analysis, asymptotic runtime   
  (6 hours)
* Linear data structures: linked list, stacks, queues (3 hours)
* Trees: binary tree, binary search tree, AVL trees, heaps (6 hours)
* Review of OOP, programming with linear data structures in Java (6 hours)
* Searching, hash tables (3 hours)
* Graphs and graph algorithms (6 hours)
* Programming with non-linear data structures and graphs in Java (6 hours)
* Sorting algorithms, recursion, divide and conquer (3 hours)
* Optimization problems: dynamic programming, greedy algorithms (3 hours)
* NP completeness (3 hours)

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1. Course number and name

EGCO232 Digital Circuit Design Lab

1. Credits and contact hours

1 (0-3-1) (Lecture-Lab-Self-study hours)

1. Instructor’s or course coordinator’s name

Dr. Mingmanas Sivaraksa

1. Text book, title, author, and year

* **Tocci, Ronald J., Widmer Neal S., Moss. Gregory L.,** Digital Systems, **Principles and Applications** 11th edition, Pearson Edition, 2010
* **Tocci, Ronald J., Widmer Neal S., Moss. Gregory L.,** Student Lab Manual A desing Approach for Digital Systems**, Principles and Applications** 11th edition, Pearson Edition, 2010

1. Specific course information
   1. Laboratory experiments related to Digital Circuit Design course. Experimental topics are Introduction to Digital Systems Lab, Basic Gates’ Operations, Boolean algebra, Design of Adder and Subtractor Circuits, Encoder and Decoder Circuits, Multiplexer and Demultiplexer Circuits, Design of Sequential Circuits
   2. Co-requisite: EGCO 231
   3. Required course
2. Specific goals for the course
   1. The student will be able to develop and conduct experiment in digital circuit with different patterns, such as combination circuit and sequential circuit. The student will be able to apply knowledge to analyze and interpret output from the system and produce into summarized report for evaluation.
   2. This course contributes to SO6: Develop and conduct appropriate experimentation, analyze and interpret data from living and non-living system, and use engineering judgment to draw conclusions.
3. Brief list of topics to be covered

* Introduction to Digital Circuit equipment and Safety Procedure (3 hours)
* Basic Digital Circuit Experiments (3 hours)
* Basic gates (9 hours)
* Algebraic Circuit (6 hours)
* Midterm Examination (3 hours)
* Encoder- Decoder (3 hours)
* Multiplexer- Demultiplexer (3 hours)
* Flop-Flop (6 hours)
* Counter (6 hours)
* Register (3 hours)
* Digital-to-Analog and Analog-to-Digital (3 hours)

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1. Course number and name

EGCO332 Embedded System

1. Credits and contact hours

3 credits, 45 hours

1. Instructor’s or course coordinator’s name

Dr. Konlakorn Wongpatikaseree

1. Text book, title, author, and year

* Tammy Noergaard, Embedded Systems Architecture: A Comprehensive Guide for Engineers and Programmers, Newnes, 2005.
* Edward Ashford Lee and Sanjit Arunkumar Seshia, Introduction to Embedded Systems, A Cyber-Physical Systems Approach, 2011
* Qing Li, Caroline Yao, Real-Time Concepts for Embedded Systems, CRC Press; 1st edition, 2003

1. Specific course information
   1. Embedded system design and development process, Microprocessor architecture, Real-time embedded system, Hardware & software tools for embedded system, High-level language programming for embedded system, Advanced peripheral interfacing; DAC and ADC converters, Sensors and signal conditioners, Design and prototype embedded products
   2. Prerequisites and co-requisites are not required.
   3. Required course
2. Specific goals for the course
   1. The student will be able to:

* understand Embedded system concept.
* design and write program for embedded system.
* create a prototype embedded product.
  1. This course contributes to SO7: an ability to acquire and apply new knowledge as needed, using appropriate learning strategies

1. Brief list of topics to be covered

* Introduction to Embedded System
* Microprocessor Architecture
* Real-time Embedded System
* Finite State Machine
* Hardware & Software Tools
* C language programming for embedded systems
* Sensor and Actuator
* Display and Motor
* Web Server
* Internet of Things

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1. Course number and name

EGCI 341 Software Engineering

1. Credits and contact hours

3 (3-0-6) (Lecture-Lab-Self-study hours)

1. Instructor’s or course coordinator’s name

Instructor: Dr. Lalita Narupiyakul

Course coordinator: Dr. Lalita Narupiyakul

1. Text book, title, author, and year
   * + Software Engineering 10th Edition, Ian Sommerville, 2015
     + Beginning Software Engineering, Rod Stephens, 2015
     + Essentials of Software Engineering, Frank Tsui, Orlando Karam, Barbara Bernal, 2016
2. Specific course information
   1. Software life cycle; need and specification; large-scale software development; scheduling, developing, constructing, testing and maintenance of software system; object-oriented analysis and design; software reuse; documentation; management of software project; case study of software system in the market.
   2. Prerequisites and co-requisites are not required.
   3. Required course
3. Specific goals for the course
   1. The student will be able to:

* explain software life-cycle.
* write software requirements and define the constraints.
* design a basic software system and define the software components based on the software architectures.
* demonstrate to solve the problems by using the fundamental of software testing, software project planning and software cost estimation.
* apply their knowledges to solve the case-study in the real software industries.
  1. This course contributes to:

SO2: an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors

SO5: an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives

1. Brief list of topics to be covered

* Introduction to Software Engineering
* Software Process
* Software Requirement
* Software Analysis
* Software Design
* Software Architecture
* Software Components and Software Reuses
* Software Testing
* Software Project Management
* Software Cost Estimation

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1. Course number and name

EGCO392 Project Seminar I

1. Credits and contact hours

1 (0-2-2) (Lecture-Lab-Self-study hours)

1. Instructor’s or course coordinator’s name

Dr. Vasin Suttichaya

1. Text book, title, author, and year

* Publications from:

IEEE. http://ieeexplore.ieee.org/Xplore

ScienceDirect. http://www.sciencedirect.com

1. Specific course information
   1. Seminar and discussion on topics in computer engineering, supervised by the faculty. Introduction to research methodology. Implement a simple test case to presentation and discussion of interesting topics in computer engineering.
   2. Prerequisites and co-requisites are not required.
   3. Required course
2. Specific goals for the course
   1. Students understand the steps required to carry out projects and are capable of making presentations and communicating their ideas effectively.
   2. This course contributes to SO3: an ability to communicate effectively with a range of audiences
3. Brief list of topics to be covered

* Information searching
* Research methodology and ethics in research
* Presentations
* Discussions on project topics

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1. Course number and name

EGCO495 Capstone Computer Engineering Project

1. Credits and contact hours

3 (0-9-3) (Lecture-Lab-Self-study hours)

1. Instructor’s or course coordinator’s name

Asst. Prof. Tanasanee Phienthrakul, Ph.D.

1. Text book, title, author, and year

* Publication from:

IEEE. http://ieeexplore.ieee.org/Xplore

ScienceDirect. http://www.sciencedirect.com/

SpringerLink. http://www.springerlink.com/home/main.mpx

1. Specific course information
   1. Capstone computer engineering projects that incorporate the knowledge gained from various courses in this curriculum on order to develop as a work piece and controlled by teachers in the department; project must be completed; a complete project report and an oral examination is re-quired.
   2. Prerequisites: EGCO392 Project Seminar I
   3. Required course
2. Specific goals for the course
   1. The student will be able to:
   * apply engineering knowledge to develop a computer engineering project that concretes in objectives and scopes
   * use skill, knowledge, and suitable tools to solve computer engineering problems effectively
   * design experiments, conduct experiments, interpret, analyze, and conclude experimental results to evaluate effectiveness of project
   * analyze trends and effects of project that may impact to people, social, environment, culture, etc. in both local area and globalization
   * present project to variety of audients by choosing the suitable methods for both oral presentation and documentation
   * report a document to present data, steps of works, and results from project completely and documents are in an acceptable standard.
   1. This course contributes to:

SO2: an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors

SO3: an ability to communicate effectively with a range of audiences

SO5: an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives

SO6: an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions

SO7: an ability to acquire and apply new knowledge as needed, using appropriate learning strategies

1. Brief list of topics to be covered

* Introduction to project development and documentation
* Design experiments and analysis
* Presentation techniques
* Presentation and discussion on project topics

# Appendix B – Faculty Vitae

1. Name

Asst. Prof. Dr. Konglit Hunchangsith

1. Education

* Ph.D. (Information Technology)

School of Information Technology and Electrical Engineering,

The University of Queensland, Queensland, Australia. Jul. 2012

* Master of Science in Engineering (Electrical Engineering)

University of Pennsylvania, Philadelphia, Pennsylvania, USA Dec. 1995

* Bachelor of Science (Electrical Engineering) with specialization in Signal Processing

University of California Irvine, Irvine, California, USA Mar. 1994

1. Academic experience

* Faculty of Engineering, Mahidol University, Thailand (1996-Present)
  + Department of Computer Engineering (2004 – Present)
    - Head of Department: Computer Engineering Department (2015-Present & 2006-2007)
    - Program Director: Bachelor of Computer Engineering International program, Faculty of Engineering & International College, Mahidol University (2012-2014)
    - Head of Faculty Information System committee (2000-2002)
  + Department of Electrical Engineering (1996 – 2004)
    - Deputy Head of Department: Electrical Engineering Department (1999 – 2001)

1. Non-academic experience

## Consultant: Gave Consultancy to the ModernSoft Co.Ltd, Bangkok Thailand

## on developing a banking database system using PROGRESS for TU Savings and Credit Cooperative Limited. (1996 – 1998)

1. Certifications or professional registrations

* Cisco Certified Network Associate Routing and Switching (CCNA)
* Cisco Certified Network Associate Wireless (CCNA Wireless)

Sept 2013- Sept 2016

1. Current membership in professional organizations

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1. Honors and awards

* National ICT Australia (NICTA) Top-up Scholarship Jul 2009 - Feb 2012
* The Royal Thai Government Scholarship Sept 2007 - Feb 2012
* The Royal Thai Government Scholarship Sept 1994 - Dec 1995
* TASEAP Mechatronics Fellowship (Australia) Mar 1999 - May 1999

1. Service activities (within and outside of the institution)

* Happy Universities Project (2014-2016)

1. Briefly list the most important publications and presentations from the past five years – title, co-authors if any, where published and/or presented, date of publication or presentation

* K. Hunchangsith, M.E. Biakowski, M. Portmann, W.L. Tan, ‘Analytical Model for Approximating Node Throughputs in Wireless Mesh Networks,’ International Journal of Communication Systems (IJCS), Wiley Vol. 7 Issue 5 pp. 750-762 2014.

1. Briefly list the most recent professional development activities

* MU-HDP (Mahidol University Head of Department Development Program) 2017
* MU-EDP (Mahidol University Executive Development Program) 2015

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Name:

Konlakorn Wongpatikaseree

Education

D.Eng. Information Science, Japan Advanced Institute of Science and Technology 2013

M.Eng. Information and Communication Technology for Embedded Systems, Sirindhorn International Institute of Technology, Thammasat University 2010

B.Sci. Computer Science, Computer Science, Thammasat University 2008

Academic Rank: Lecturer

Academic Experience:

Institution: Mahidol University

Rank: Lecturer

Title: Faculty Member

Dates: 2016 - present

Full Time or Part Time: Full time

Institution: Japan Advanced Institute of Science and Technology

Rank: Post-doctoral

Title: Faculty Member

Dates: 2014 - 2016

Full Time or Part Time: Full time

Certifications or Professional Registrations: None

Membership in Professional Organizations:

Membership in Artificial Intelligence Association of Thailand (AIAT)

Honors and Awards:

* Best in-use track paper award at 2nd Joint International Semantic Technology Conference (JIST 2012), Nara, Japan 2012

Service Activities:

* Local Organizing Committee of the 4th Joint International Semantic Technology conference (JIST) (2014)
* Session Chair at The International Workshop on Landslide Risk Assessment and Management for ASEAN Member States (2017)

• Session Chair at The Joint International Symposium on Artificial Intelligence and Natural Language Processing (iSAI-NLP 2017)

• Program Committee at the 13th International IEEE Conference on Signal Image Technology and Internet Based Systems (SITIS 2017)

* Local Organizing Committee at RoboCup Asia-Pacific 2017

Selected Publications and Presentations of the Last Five Years:

1. Konlakorn Wongpatikaseree, Azman Osman Lim, Mitsuru Ikeda, and Yasuo Tan, “High Performance Activity Recognition Framework for Ambient Assisted Living in The Home Network Environment”, IEICE Transactions on Communication, Vol. E97-B, No. 9, pp. 1766-1778, September 2014
2. Marut Buranarach, Thepchai Supnithi, Ye Myat Thein, Konlakorn Wongpatikaseree, Taneth Ruangrajitpakorn, Napat Suksom, Thayalak Rattanasawad, Azman Osman Lim, Yasuo Tan, and Anunchai Assawamakin, “OAM: An Ontology Application Management Framework for Simplifying Ontology-based Semantic Web Application Development,” in International Journal of Software Engineering and Knowledge Engineering (IJSEKE), 2015
3. Konlakorn Wongpatikaseree, Promprasit Kanka, Arunee Ratikan, “Developing Smart Farm and Traceability System for Agricultural Products using IoT Technology”, In 17th IEEE/ACIS International Conference on Computer and Information Science (ICIS 2018), Singapore, June 6-8, 2018
4. Promprasit Kanka, Arunee Ratikan, Konlakorn Wongpatikaseree, “Hydroponic Farming Analysis in Greenhouse Environment using IoT Technology”, In Workshop on Artifcial Intelligence and Internet of Things (AI2OT), Bangkok, Thailand, November 17-19, 2017
5. Yoshiki Makino, Konlakorn Wongpatikaseree, Takashi Okada, Hoaison Nguyen, Yuto Lim, Yasuo Tan, “Development of Home Simulation with Thermal Environment and Electricity Consumption”, In 7th International Conference on Information and Communication Technology for Embedded Systems (ICICTES2016), Bangkok, Thailand, March 20-22, 2016
6. Konlakorn Wongpatikaseree, Hideaki Kanai, and Yasuo Tan, “Context-aware Posture Analysis in a Workstation-oriented Office Environment,” In 5th International Conference on Digital Human Modeling and Applications in Health, Safety, Ergonomics and Risk Management (DHM 2014), LNCS 8529, Springer, pp. 148-159, Crete, Greece, 22-27 June 2014
7. Konlakorn Wongpatikaseree, Azman Osman Lim, and Yasuo Tan, “A Context-aware Information in Smart Home for Health Recommendation Service based on CARE Architecture,” In: 2nd Asian Conference on Information System (ACIS 2013), Phuket, Thailand, 31 Oct – 2 Nov. 2013
8. Konlakorn Wongpatikaseree, Junsoo Kim, Yoshiki Makino, Azman Osman Lim, and Yasuo Tan, “Architecture for Organizing Context-Aware Data in Smart Home for Activity Recognition System”, In Proceedings of The First International Conference on Distributed, Ambient and Pervasive Interactions (DAPI 2013), LNCS 8028, Springer, Las Vegas, USA, 21-26 July 2013.

Most Recent Professional Development Activities:

Attended a workshop entitled “Internet of Things Protocol and Dashboard on Google Cloud Platform using Node.js”, December 26 – 27, 2017.

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1. Name

Dr. Lalita Narupiyakul

1. Education – degree, discipline, institution, year

* Doctor of Philosophy (Computer Science), Dalhousie University, Halifax, Nova Scotia, Canada, 2007.
* Doctor of Philosophy (Computer and Electrical Engineering), King Mongkut’s University of Technology Thonburi (KMUTT), Bangkok, Thailand, 2007.
* Master of Engineering (Computer Engineering), King Mongkut’s University of Technology Thonburi (KMUTT), Bangkok, Thailand, 1999.
* Bachelor of Science (Mathematics), Mahidol University, Bangkok, Thailand, 1997.

1. Academic experience – institution, rank, title (chair, coordinator, etc. if appropriate), when (ex. 2002-2007), full time or part time

* Faculty of Engineering, Mahidol University, Thailand, Lecturer, 2010-Now, Full time
* Faculty of Business and IT, University of Ontario Institute of Technology, Canada, Research Assistant, 2009, Full-time
* Faculty of Business and IT, University of Ontario Institute of Technology, Canada, Post-doctoral Fellow, 2008-2009, Full time
* Faculty of Computer Science, Dalhousie University, Research Assistant, 2003-2007, Part time.

1. Non-academic experience – company or entity, title, brief description of position, when (ex. 2008-2012), full time or part time
2. Certifications or professional registrations

* SANS Certificate: Web Application Penetrate Testing

1. Current membership in professional organizations

* Secretariat, Integrative Computational Bio-Science Center, Mahidol University, Thailand

1. Honors and awards
2. Service activities (within and outside of the institution)

* Innovation Hubs: Smart City, A MU-Tram Tracking System supported by Council of University Presidents of Thailand (CUPT)

1. Briefly list the most important publications and presentations from the past five years – title, co-authors if any, where published and/or presented, date of publication or presentation

* Tanramluk D\*, Narupiyakul L, Akavipat R, Gong S, Charoensawan V. MANORAA (Mapping Analogous Nuclei Onto Residue And Affinity) for identifying protein-ligand fragment interaction, pathways and SNPs. Nucleic Acids Res. 2016 Jul 8;44(W1):W514-21. doi: 10.1093/nar/gkw314.
* Chinrungrueng J.\*, Kovavisaruch L., Narupiyakul L. and Wongpatikaseree K. (2018), "Open Traffic Data Exchange and Collaborative Platform," In IEEE Proceeding of 2018 International Joint Symposium on Artificial Intelligence and Natural Language Processing (iSAI-NLP), Pattaya, Thailand, 2018, pp. 1-4.
* Srisrisawang N., Narupiyakul L.\* (2019) Sleep Posture Recognition for Bedridden Patient. In: Kim K., Kim H. (eds) Mobile and Wireless Technology 2018. ICMWT 2018. Lecture Notes in Electrical Engineering, vol 513. Springer, Singapore
* Narupiyakul L., Sanghlao S., Yimwadsana B.\* (2018) An Indoor Navigation System for the Visually Impaired Based on RSS Lateration and RF Fingerprint. In: Mokhtari M., Abdulrazak B., Aloulou H. (eds) Smart Homes and Health Telematics, Designing a Better Future: Urban Assisted Living. ICOST 2018. Lecture Notes in Computer Science, vol 10898. Springer, Cham
* Nitikorn Srisrisawang, Lalita Narupiyakul,\*, A Comparison between Skeleton and Bounding Box Models for Falling Direction Recognition, the proceeding of ICCICSP2017 published by the Society of Photographic Instrumentation Engineers (SPIE), Juju, South Korea, 25-26 September 2017.
* Karnsomchit A.,Suttichaya V., Narupiyakul L\*, Call Log Analysis Using Longest Common Subsequence, Proceeding of the Joint International Symposium on Artificial Intelligence and Natural Language Processing (iSAI-NLP 2017), 27-29 August 2017, Huahin, Thailand.
* Longtong Y, Narupiyakul L\*. Suspect Tracking Based on Call Logs Analysis and Visualization. Proceeding of the IEEE International Computer Science and Engineering Conference (IEEE ICSEC 2016), 14-17 December 2016, Chiang Mai, Thailand.
* Maturongpituck A., Bunpetch N., Tatvichai A., Narupiyakul L.\*, Mobile Sample Allocation and Management System for BioBank, The 3rd International Conference on Mobile and Wireless Technology (ICMWT2016). Publish in Lecture Notes in Electrical Engineering: Mobile and Wireless Technology, Springer, 2016.

1. Briefly list the most recent professional development activities

* Microsoft Thailand, “Azure AI Day Workshop”, April 26, 2019

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1. Name

Mingmanas Sivaraksa

1. Education – degree, discipline, institution, year

* Doctor of Philosophy (Information Engineering),Aston University , Birmingham, UK 2009
* Bachelor of Engineering (Computer), King Mongkut Institute of Technology Lardkrabang, Bangkok, Thailand, 2004.

1. Academic experience – institution, rank, title (chair, coordinator, etc. if appropriate), when (ex. 2002-2007), full time or part time

(2009-2018) Faculty of Engineering, Mahidol University, Lecturer, Full time.

1. Non-academic experience – company or entity, title, brief description of position, when (ex. 2008-2012), full time or part time

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1. Certifications or professional registrations

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1. Current membership in professional organizations

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1. Honors and awards

-

1. Service activities (within and outside of the institution)
2. Briefly list the most important publications and presentations from the past five years – title, co-authors if any, where published and/or presented, date of publication or presentation

Journal

* Sivaraksa, M., Prudtipongpun, V., Buakeaw, W., and Rattanapongsen, T.Indoor Navigation System: An Application on Android DevicesJournal of Intelligent Informatics and Smart Technology (Volume 1, September 2016)

Conference Proceeding

* Petchprink Numprasanthai and Mingmanas Sivaraksa Partial Fingerprint Matching with SURF and MSER, The 14th National Conference on Computing and Information Technology (NCCIT 2018), Chiang Mai, Thailand.
* Variant Annotation and Clinical interpretation software for Cancer (VARCIN): Report generating software for targeted therapy method International Workshop on Image, Information, and Intelligent Applications, 2016 (pp 33-45)
* Prudtipongpun, V., Buakeaw, W., Rattanapongsen, T. and Sivaraksa, M., 2015, November. Indoor Navigation System for Vision-Impaired Individual: An Application on Android Devices. In Signal-Image Technology & Internet-Based Systems (SITIS), 2015 11th International Conference on (pp. 633-638). IEEE.
* Somboonying, A. and Sivaraksa, M. Forest Fire Management and Risk prediction System in Chiangmai provice: The 8th National Conference on Computing and Information Technology (NCCIT 2012), 9-10 May 2012, KMUTNB, Bangkok, Thailand.
* Saeting, P. and Sivaraksa M. A comparative study f maximizing sell benefit,The International Computer Science and Engineering Conference (ICSEC 2012), 17-19 October 2012, Pattaya, Thailand.

1. Briefly list the most recent professional development activities

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1. Name:

Narit Hnoohom

2. Education

Ph.D. Computer Engineering Chulalongkorn University 2013

M.S.Tech.Ed. Computer Technology King Mongkut's University of Technology North Bangkok 2004

B.Sc. Computer Science King Mongkut's University of Technology North Bangkok 1999

3. Academic Rank: Lecturer

4. Academic Experience:

Institution: Mahidol University

Rank: Lecturer

Title: Faculty Member

Dates: 2013 – present

Full Time or Part Time: Full time

Non-Academic Experience: None

Certifications or Professional Registrations: None

Membership in Professional Organizations:

1. Membership in Artificial Intelligence Association of Thailand (AIAT)
2. Membership in Electrical Engineering/Electronics, Computer, Telecommunications and Information Technology Association of Thailand (ECTI)

Honors and Awards:

Best Paper Award in Proceedings of the workshops at the 14th Pacific Rim International Conference on Artificial Intelligence, August 22-26, 2016, Phuket, Thailand

Service Activities:

Editorial assistant in Journal of Intelligent Informatics and Smart Technology, Thailand (JIIST)

Selected Publications and Presentations of the Last Five Years:

1. Suppanut Nateeraitaiwa and Narit Hnoohom, "Treating Height Phobias using a Smartphone Virtual Reality System", Journal of Intelligent Informatics and Smart Technology (JIIST) ISSN 2586-9167, volume 3, April, 2018.
2. Narit Hnoohom and Mahasak Ketcham, "The Decision Support System on Selection of the Suitable Screen Printing Mesh Based Data Mining", Far East Journal of Mathematical Sciences (FJMS) ISSN 0972-0871, volume 98, Issue 8, pp. 999-1019, 2015.
3. Pisit Phokharatkul, Narit Hnoohom, Somchai Biansoongnern, Sawaeng Gerdpratoom and Saikaew Klinkum, "An Elephant Warning System via The Mobile Communication and Computer Networks", Kasem Bundit Engineering Journal, volume 7, No. 1 January-June 2017, pp. 206-222, 2017.
4. Narit Hnoohom and Sasithorn Tippanun, "Automatic Price Calculation of Consumer Products using SURF with Texture Matching", the 1st International Conference on the Northern Section of Electrical Engineering/Electronics, Computer, Telecommunications and Information Technology (ECTI-NCON 2018), Chiang Rai, Thailand, February 25 – 28, 2018.
5. Narit Hnoohom and Sumeth Yuenyong, "Thai Fast Food Image Classification Using Deep learning", the 1st International Conference on the Northern Section of Electrical Engineering/Electronics, Computer, Telecommunications and Information Technology (ECTI-NCON 2018), Chiang Rai, Thailand, February 25 – 28, 2018.
6. Narit Hnoohom, Anuchit Jitpattanakul, Pattha Inluergsri, Preeyapron Wongbudsri, and Warinya Ployput, "Multi-Sensor based Fall Detection and Activity Daily Living Classification by using Ensemble Learning", the 1st International Conference on the Northern Section of Electrical Engineering/Electronics, Computer, Telecommunications and Information Technology (ECTI-NCON 2018), Chiang Rai, Thailand, February 25 – 28, 2018.
7. Narit Hnoohom, Sakorn Mekruksavanich and Anuchit Jitpattanakul, "Human Activity Recognition using Triaxial Acceleration Data from Smartphone and Ensemble Learning", the 13th International Conference on Signal-Image Technology & Internet-Based Systems (SITIS 2017), Jaipur, India, 4-7 December 2017.
8. Narit Hnoohom and Anuchit Jitpattanakul, “Comparison of Ensemble Learning Algorithms for Cataract Detection from Fundus Images”, the 21st International Computer Science and Engineering Conference (ICSEC 2017), Bangkok, Thailand, November 15-18, 2017.
9. Narit Hnoohom and Suppanut Nateeraitaiwa, "Virtual reality-based smartphone application for animal exposure", the second International Conference on Digital Arts, Media and Technology (ICDAMT 2017), Chiang Mai, Thailand, March 1-4 2017.
10. Narit Hnoohom and Pawarit Akepitaktam, "Light Predictions from unmanned aerial vehicle imagery", the second International Conference on Digital Arts, Media and Technology (ICDAMT 2017), Chiang Mai, Thailand, March 1-4 2017.
11. Narit Hnoohom and Ratikanlaya Tanthuwapathom, "Classification of diabetic retinopathy stages using image segmentation and an artificial neural network", Trends in Artificial Intelligence: PRICAI 2016 Workshops, Lecture Notes in Computer Science, Springer, vol. 10004, pp. 47-54, 2016.
12. Narit Hnoohom and Thanchanok Thanapattherakul, "Image Problem Classification for Dashboard Cameras", the 12th International Conference on Signal-Image Technology & Internet-Based Systems (SITIS 2016), Naples, Italy, November 28 November - 1 December 2016.
13. Narit Hnoohom, Chanathip Sriyapai and Mahasak Ketcham, “Robust Watermarking for Medical Image Authentication Based on DWT with QR code in Telemedicine”, Advances in Natural Language Processing, Intelligent Informatics and Smart Technology - SNLP-2016, Advances in Intelligent Systems and Computing, Springer, vol. 684, pp. 185-195, 2018.
14. Narit Hnoohom, Narumol Chumuang, and Mahasak Ketcham, "Thai handwritten verification system on documents for the investigation", the 11th International Conference on Signal-Image Technology & Internet-Based Systems (SITIS 2015), Bangkok, Thailand, November 23 - 27, 2015.
15. Worakarn Sirisatitwong and Narit Hnoohom, "Automate Counting of the Malaria Gametocyte Phase on Red Blood Cells", the 1st IEEE International Symposium on Artificial Intelligence for ASEAN Development (ASEAN-AI 2018), Phuket, Thailand, 26-27 March 2018.
16. Sumeth Yuenyong, Narit Hnoohom and Konlakorn Wongpatikaseree, "Automatic detection of knives in infrared images", the 1st International Conference on the Northern Section of Electrical Engineering/Electronics, Computer, Telecommunications and Information Technology (ECTI-NCON 2018), Chiang Rai, Thailand, February 25 – 28, 2018.
17. Sakorn Mekruksavanich, Narit Hnoohom and Anuchit Jitpattanakul, "Smartwatch-based Sitting Detection with Human Activity Recognition for Office Workers Syndrome", the 1st International Conference on the Northern Section of Electrical Engineering/Electronics, Computer, Telecommunications and Information Technology (ECTI-NCON 2018), Chiang Rai, Thailand, February 25 – 28, 2018.

Most Recent Professional Development Activities:

Attended a workshop entitled “Internet of Things Protocol and Dashboard on Google Cloud Platform using Node.js”, December 26 – 27, 2017.

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1. Name

Noppadol Wanichworanant

Education:

* Ph.D., Electrical Engineering, Wichita State University, USA, 2003
* M.S., Electrical Engineering, Wichita State University, USA, 1998
* B.Sc., Industrial Chemistry, King Mongkut’s Institute of Technology Ladkrabang, Thailand, 1994

Academic Experience:

* Mahidol University, Faculty of Engineering, Department of Computer Engineering, Lecture, 2006-Present, Full Time
* Mahidol University, Faculty of Graduate Studies, Deputy Dean for Information Technology, 2017-Present
* Mahidol University, Faculty of Engineering, Deputy Dean for Information Technology, 2008-2011

Non-Academic Experience:

* Shin Satellite PLC., Thailand, Senior Engineer, Development of TCP Accelerator over Satellite Communication, 2004-2005
* Precision Winding, Inc., USA, Software Engineer, Software Development for Embedded System, 1999-2002
* National Metal and Materials Technology Center, Thailand, System Administrator, Administration of IT System, 1994-1995

Certifications:

* GIAC Web Application Penetration Tester (GWAPT), SANS Institute, USA
* GIAC Reverse Engineering Malware (GREM), SANS Institute, USA
* EC-Council Certified Security Analyst V.8 (ECSA), EC-Council, USA
* Cisco Certified Academy Instructor (CCAI), Cisco Systems, Inc, USA
* Cisco Certified Network Associate (CCNA), Cisco Systems, Inc, USA

Service Activities:

* Remote Camera Control System Project for Department of Special Investigation, Ministry of Justice, 2015-2016
* National Crisis Management Information System Project for Office of National Security Council, 2010-2012
* National Land and Resource Management Master Plan Project for Office of Natural Resources and Environmental Policy and Planning, Ministry of Natural Resources and Environment, 2010-2011
* Information System for Management of Special Southern Provincial Development Project for Office of the National Economic and Social Development Board, 2010-2011
* National Crisis Management Exercise Evaluation Project for Office of National Security Council, 2010
* Information Technology Management and Development of Information Technology Master Plan Project for Department of Trade Negotiations, Ministry of Commerce, 2008
* National Crisis Management Center Master Plan Project for Office of National Security Council, 2006-2007

Publications:

* Parallel Multi-Pattern Matching Algorithms for Digital Forensics, Nuttapol Puknah and Noppadol Wanichworanant, Proceeding of the 7th National Conference Nakhon Pathom Rajabhat University, Thailand, March 2015

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1. Name

Assoc. Prof. Dr. Rangsipan Marukata

2. Education

2003 Ph.D. (Computer Science), University of Edinburgh, UK.

1997 M.Sc. (Computer Science), University of Edinburgh, UK.

1995 B.Sc. (Statistics, Information Technology), Chulalongkorn University, Thailand.

3. Academic experience

2003-present Associate Professor (full time), Faculty of Engineering, Mahidol University.

Publication

* Mongkon Youngtanurat and Rangsipan Marukatat, Web service system for exchanging latex trading data and predicting latex volume, Journal of Thai Interdisciplinary Research, Vol 12, No. 2, March-April 2017, pp. 8-13.
* Rangsipan Marukatat, Author Identification of Thai Online Messages Using Support Vector Machine and Decision Tree (in Thai), The Journal of KMUTNB, Vol. 25, No. 1, January-April 2015 pp. 103-111.
* Rangsipan Marukatat, Nutthapon Chinchaipong, Sirapop Prechalertpririya, Tweets of Thailand: a tweet retrieval system for domestic tourism in Thailand, Proceedings of the 12th International Conference on Digital Information Management (ICDIM 2017), Fukuoka, Japan, September 2017, pp. 323-326.
* Rangsipan Marukatat, A retweet prediction of Thai tweets, Proceedings of the IEEE Advanced Information Management, Communicates, Electronic and communication Control Conference (IMCEC 2016), Xian, China, October 2016, pp. 1000-1003.
* Mongkon Youngtanurat and Rangsipan Marukatat, Handling class imbalance in latex volume prediction by meteorological conditions, Proceedings of the International Conference on Information and Social Science (ISS 2016), Sapporo, Japan, June 2016, pp. 58-68.
* Rangsipan Marukatat and Siravich Khongrod, An evaluation of writeprint matching method to identify the authors of Thai online messages, Proceedings of the 16th IEEE/ACIS International Conference on Software Engineering, Artificial Intelligence, Networking and Parallel/Distributed Computing (SNPD 2015), Takamatsu, Japan, June 2015, pp. 193-197.
* Rangsipan Marukatat, Robroo Somkiadcharoen, Ratthanan Nalintasnai, and Tappasarn Aramboonpong, Authorship attribution analysis of Thai online messages, Proceedings of the International Conference on Information Science and Applications (ICISA 2014), Seoul, Korea, May 2014, pp. 283-286.
* Rangsipan Marukatat, Chapter 4: Computer-crime related laws (in Thai). Cryptography in Information Technology and Communication Systems (1st ed), Office of The National Broadcasting and Telecommunications Commission (NBTC), 2015, pp. 105-119.

Professional development activities

* Basic R Programming (15-17 August 2017), Software Park, Thailand

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1. Name

Sumeth Yuenyong

2. Education

D.Eng Communication and Integrated Systems Tokyo Institute of Technology 2014

M.Eng Communication and Integrated System Tokyo Institute of Technology 2011

M.Eng Information and Communication Technology for Embedded Systems

Sirindhorn International Institute of Technology, Thammasat University 2010

B.Eng Electrical Engineering Sirindhorn International Institute of Technology,

Thammasat University 2005

3. Academic Rank: Lecturer

4. Academic Experience:

Institution: Mahidol University

Rank: Lecturer

Title: Faculty Member

Dates: 2017 - present

Full Time or Part Time: Full time

Institution: Shinawatra University

Rank: Lecturer

Title: Faculty Member

Dates: 2014 - 2017

Full Time or Part Time: Full time

5. Non-Academic Experience:

Company: Fabrinet

Title: Engineer

Description: Programming/maintenance of surface mount technology machines

Dates: 2005 - 2008

6. Certifications or Professional Registrations: None

7. Membership in Professional Organizations:

Membership in Artificial Intelligence Association of Thailand (AIAT)

8. Honors and Awards:

* Best presentation (section) award at The Joint International Symposium on Artificial Intelligence and. Natural Language Processing (iSAI-NLP 2017), Hua Hin, Thailand, August 2017
* Best presentation (section) award at Pacific Rim International Conference on Artificial Intelligence (PRICAI 2016), Phuket, Thailand

9. Service Activities:

* Taught a special programming course for “Computer Olympic” track high school students. at Kanjanapisek Witthayalai NakornPhathom School.
* Served as reviewer for Neurocomputing, Computer in Biology and Medicine and Neural Computing and Applications

Selected Publications and Presentations of the Last Five Years:

1. Yuenyong, Sumeth and Akinori Nishihara. “Evolutionary pre-training for CRJ-type reservoir of echo state networks.” Neurocomputing 149 (2015): 1324-1329.
2. Yuenyong, Sumeth and Akinori Nishihara. “A hybrid gradient-based and differential evolution algorithm for infinite impulse response adaptive filtering.” International Journal of Adaptive Control and Signal Processing 28, 10 (2014): 1054-1064.
3. Ahmed Muktar Omar, Jian Qu, Sumeth Yuenyong, “Automatic Transliteration of Proper Names from Somali to English.” Thammasat International Journal of Science and Technology, Vol. 21, No. 4, pp. 17-25, 2016.
4. Gangyi Hu, Sumeth Yuenyong, “The human body edge detection of infrared image with IGA\_CNN algorithm.” Thammasat International Journal of Science and Technology, Vol. 21, No. 1, pp. 46-58, 2016.
5. Narit Hnoohom and Sumeth Yuenyong, "Thai Fast Food Image Classification Using Deep learning", the 1st International Conference on the Northern Section of Electrical Engineering/Electronics, Computer, Telecommunications and Information Technology (ECTI-NCON 2018), Chiang Rai, Thailand, February 25 – 28, 2018.
6. Sumeth Yuenyong, Narit Hnoohom and Konlakorn Wongpatikaseree, "Automatic detection of knives in infrared images", the 1st International Conference on the Northern Section of Electrical Engineering/Electronics, Computer, Telecommunications and Information Technology (ECTI-NCON 2018), Chiang Rai, Thailand, February 25 – 28, 2018.
7. Sumeth Yuenyong and Jian Qu. “Generating Synthetic Training Images for Deep

Reinforcement Learning of a Mobile Robot.” The Joint International Symposium on Artificial Intelligence and. Natural Language Processing (iSAI-NLP 2017), Hua Hin, Thailand, August 2017.

1. Yuenyong, Sumeth. "On the Gradient-Based Sequential Tuning of the Echo State Network Reservoir Parameters." Pacific Rim International Conference on Artificial Intelligence (PRICAI 2016), Phuket, Thailand, Springer International Publishing, 2016.
2. Yuenyong Sumeth, “An Experiment on Subspace Learning for Echo State Network”, In Proceeding of The Seventh International Conference on Information and Communication Technology for Embedded Systems (ICICTES 2016), Bangkok Thailand, March 20-22, 2016.
3. Yuenyong Sumeth, “Fast and Effective Tuning of Echo State Network Reservoir Parameters Using Evolutionary Algorithms And Template Matrices”, 19th International Computer Science and Engineering Conference (ICSEC) Chiang Mai, Thailand, 23-26 November, 2015
4. Yuenyong, Sumeth and Akinori Nishihara. “Training recurrent neural network for nonlinear adaptive channel equalization with differential evolution.” In Proceedings of 2013 RISP International Workshop on Nonlinear Circuits, Communication and Signal Processing. Vol. 1, No. 1, April 2013, pp. 409-411.

Most Recent Professional Development Activities:

Attended a workshop entitled “Internet of Things Protocol and Dashboard on Google Cloud Platform using Node.js”, December 26 – 27, 2017.

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Name

Assoc.Prof. SURATOSE TRITILANUNT, PhD

GIAC GCFA, GIAC GCFE, GIAC GPEN, E|CSA v9, CHFI v9, C|EH v9, ECIH   
CCNA, CCNA (Security)

* Education
* PhD. (Information Security): Queensland University of Technology, Brisbane, Australia
* M. Eng (Computer), King Mongkut’s University of Technology Thonburi, Thailand
* B. Eng (Electrical), Mahidol University, Thailand
* Work Experience

1. 2010-2014 / 2016-Present: Head of Digital Forensic Innovation and Training Center (DFIT), Department of Computer Engineering, Faculty of Engineering, Mahidol University, Thailand
2. 2011-2016: Program Vice Chairman: Master of Computer Engineering, Faculty of Engineering, Mahidol University, Thailand
3. 2017-Present: Associate Professor: Department of Computer Engineering, Faculty of Engineering, Mahidol University, Thailand
4. 2014-Present: Guest Lecturer: Department of Computer Engineering, Faculty of Engineering, King Mongkut’s University of Technology Thonburi, Thailand
5. 2012-Present: Guest Lecturer: Department of Information Technology, Faculty of Information Technology, Makanakorn University of Technology, Thailand

* Academic Services and Researches

1. Project Director “Developing Security System by using Risk Analysis Process in the Hospital’s Information System”, Logistics Fund, National Science and Technology Development Agency (NSTDA), Year 2013

* Security and Vulnerability Assessment on Hospital Information System at HRH Princess MahaChakriSirindhorn Medical Center, Srinakharinwirot University, Thailand
* Security and Vulnerability Assessment on Hospital Information System at Golden Jubilee Medical Center, Mahidol University, Thailand
* Security and Vulnerability Assessment on Hospital Information System at Mettapracharak Hospital, Nakornpathom, Thailand
* Security and Vulnerability Assessment on Hospital Information System at Chulabhorn Hospital, Bangkok, Thailand

1. Project Director “USB Flash Drive for Digital Evidence Acquisition from Random Access Memory (RAM) and Registry of Windows”, Cyber Security Research Fund, National Research Council of Thailand (NRCT), Year 2014
2. Researcher “Research and Development of Information Security Assessment Scheme for the Royal Thai Army”, Cyber Security Research Fund, National Research Council of Thailand (NCRT), Year 2014

* Security and Vulnerability Assessment on Information System at Royal Thai Army, Bangkok, Thailand

1. Guest Speaker for the Computer and Network Security topic, and Digital Forensics: Evidence Acquisition and Analysis Techniques topic at

* Crime Suppression Division Thailand, Royal Thai Police
* Technology Crime Suppression Division Thailand, Royal Thai Police
* Royal Thai Army (RTA)
* Anti-Money Laundering Office (AMLO)
* Department of Special Investigation (DSI)
* Central Institute of Forensic Science Thailand (CIFS), Ministry of Justice, Thailand
* Ministry of Information and Communication Technology, Thailand
* Office of The Attorney General, Thailand
* Courts
* Area of Specialization
* Digital Forensics: Digital Evidence Acquisition and Analysis
* Security and Penetration Testing in Network/Information System
* Cryptography
* Computer and Network Security Design and Analysis
* Detection of Network Distributed Denial of Service Attacks
* Computer Network Attacks Modeling and Simulation
* Professional Certification and Training
* SANS GIAC GCFA: Advanced Computer Forensic Analysis and Incident Response
* SANS GIAC GCFE: Computer Forensic Investigations -- Windows in-depth
* SANS GIAC GPEN: Network Penetration Testing and Ethical Hacking
* Ec-Council Certified Security Analyst version 9 (E|CSA)
* Ec-Council Certified Hacking Forensic Investigator version 9 (CHFI)
* Ec-Council Certified Ethical Hacker version 9 (C|EH)
* Ec-Council Certified Incident Handling (ECIH)
* Cisco Certified Network Associates: CCNA
* Cisco Certified Network Associate: CCNA Security
* Security Training:Computer Security Incident Response Team (CSIRT) at Tokyo, Japan
* Digital Forensic Training:EnCase for Digital evidence analysis at Wisconcin, USA
* Digital Forensic Training: Encase: Network Intrusion Investigation at London, UK
* List of Publication (Past 5 Years)

1. Tritilanunt S., “An Improvement of Secure and Anonymous Smart Card Based User Password Authentication Scheme”. In the Proceedings of 10th International Conference on Computer Science and Information Technology (ICCSIT), Oct 23-25, 2017
2. Tritilanunt S. and Ruaysoongnuen S., "Security Assessment of Information System in Hospital Environment". In the Proceedings of 5th International Conference on Network, Communication, and Computing (ICNCC), Dec. 2016
3. Tritilanunt S., "Analysis of Authentication Protocol for USB Storage Devices using Coloured Petri Nets". Journal of Advances in Computer Networks (JACN), Mar. 2016
4. สุรทศ ไตรติลานันท์ และ สุรพล รวยสูงเนิน "กรณีศึกษา : โมเดลทางด้านเทคนิคสำหรับวิธีการประเมินความเสี่ยงความมั่นคงปลอดภัยในระบบสารสนเทศสำหรับโรงพยาบาล". วารสารวิชาการพระจอมเกล้าพระนครเหนือ, มกราคม 2559
5. S. Laptikultham, and S. Tritilanunt, Modeling and Analysis of Two-factor Authentication Protocol for USB Digital Evidence Acquisition Devices, In the 12th International Joint Conference on Computer Science and Software Engineering (JCSSE 2015), Songkhla, Thailand, July 2015
6. S. Thongjul, and S. Tritilanunt, Analyzing and Searching Process of Username and Password Stored in Random Access Memory (RAM), In the 12th International Joint Conference on Computer Science and Software Engineering (JCSSE 2015), Songkhla, Thailand, July 2015
7. S. Tritilanunt, and A. Tongsrisomboon, Risk Analysis and Security Management of IT Information in Hospital, In International Journal of Computer and Information Technology (ISSN: 2279 – 0764), Volume 04, Issue 02, January 2014.
8. S. Tritilanunt, T. Salakit, and P. Achwacheewanthornkul, IP Traceback System for Denial-of-Service Attacks, In Proceedings of the International Conference on Information Science, Electronics and Electrical Engineering (ISEEE 2014), Japan, Apr 2014.
9. S. Tritilanunt, N. Thanyamanorot, and N. Ritdecha, A Secure Authentication Protocol using HOTP on USB Storage Devices, In Proceedings of the International Conference on Information Science, Electronics and Electrical Engineering (ISEEE 2014), Japan, Apr 2014.
10. A. Tongsrisomboon, S. Tritilanunt and W. Weerawat, Case study: Applying of security risk assessment process for information system in hospital, In Proceedings of the International Computer Science and Engineering Conference (ICSEC 2012), Thailand, 2012.
11. A. Ruangteerarit and S. Tritilanunt, Data Acquisition and Visualization on Mobile Phone for Investigation Application, In Proceedings of the International Computer Science and Engineering Conference (ICSEC 2012), Thailand, 2012.
12. P. Saengkaweelert, N. Kitsawat, W. Amornsan, U. Wiraingam and S. Tritilanunt, Investigating and Analyzing Internet Browser Evidence, In Proceedings of the International Computer Science and Engineering Conference (ICSEC 2012), Thailand, 2012.

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1. Name

Asst. Prof. Dr. Tanasanee Phienthrakul

2. Education – degree, discipline, institution, year

Ph.D. (Computer Engineering), Chulalongkorn University, 2009

M.Sc. (Technology of Information System Management), Mahidol University, 2003

B.Sc. (Mathematics), Mahidol University, 2000

B.Econ., Sukhothai Thammathirat Open University, 2006

B.A. (Marketing), Sukhothai Thammathirat Open University, 2011

3. Academic experience – institution, rank, title (chair, coordinator, etc. if appropriate), when (ex. 2002-2007), full time or part time

Mahidol University, Lecturer, 2009-Now, full time

4. Non-academic experience – company or entity, title, brief description of position, when (ex. 2008-2012), full time or part time

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5. Certifications or professional registrations

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6. Current membership in professional organizations

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7. Honors and awards

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8. Service activities (within and outside of the institution)

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9. Briefly list the most important publications and presentations from the past five years – title, co-authors if any, where published and/or presented, date of publication or presentation

Tanasanee Phienthrakul, "Palm's Lines Detection and Automatic Palmistry Prediction System", Advances in Natural Language Processing, Intelligent Informatics and Smart Technology. Advs in Intelligent Syst., Computing, Vol. 684, pp.208-222, Springer, Cham, 2018.

Tanasanee Phienthrakul, "Nutrition Monitoring System and Activities Logging with Daily Recording and Mobile Accelerometer", Information Technology Management Society Journal (ITMSOC), Transactions on Information Technology Management (ITMSOC-ITM), Vol 2, No 1 (2017), pp.6-13, Jan-Dec 2017.

Tanasanee Phienthrakul, "Clustering Evolutionary Computation for Solving Traveling Salesman Problems", International Journal of Advanced Computer Science and Information Technology (IJACSIT), Volume 3, Issue 3, Page 243-262, 2014 (ISSN: 2296-1739).

Tanasanee Phienthrakul, "Armband Gesture Recognition on Electromyography Signal for Virtual Control", The 10th International Conference on Knowledge and Smart Technology (KST 2018), 31 Jan-3 Feb 2018, Chiangmai, Thailand.

Tanasanee Phienthrakul, "Handwritten Identification with Geometric and Template Features", The 2017 Technology Innovation Management and Engineering Science International Conference (TIMES-iCON 2017), 20-21 November 2017, NakornPathom, Thailand.

Chayun Kongtongvattana and Tanasanee Phienthrakul, "Signature Verification with Chain Code and Geometric Features", 2017 9th International Conference on Machine Learning and Computing (ICMLC 2017), 24-26 February 2017, Singapore.

Nutthaporn Junsomboon and Tanasanee Phienthrakul, "Combining Over-Sampling and Under-Sampling Techniques for Imbalance Dataset", 2017 9th International Conference on Machine Learning and Computing (ICMLC 2017), 24-26 February 2017, Singapore.

Massaya Samnienggam and Tanasanee Phienthrakul, "Centrality Searching on Signal Transduction Pathway for Drug Selection Support System in Targeted Cancer Therapy", IEEE International Computer Science and Engineering Conference (IEEE ICSEC 2016), 14-17 December 2016, ChiangMai, Thailand.

Yunyong Ploengpit and Tanasanee Phienthrakul, "Rock-Paper-Scissors with Myo Armband Pose Detection", IEEE International Computer Science and Engineering Conference (IEEE ICSEC 2016), 14-17 December 2016, ChiangMai, Thailand.

Tanasanee Phienthrakul and Massaya Samnienggam, "Comparative Results of Attribute Reduction Techniques for Thai Handwritten Recognition with Support Vector Machines", The 12th International Conference on Computing and Information Technology (IC2IT 2016), 7-8 July 2016, KhonKaen, Thailand. (Chapter in Recent Advances in Information and Communication Technology 2016, Volume 463 of the series Advances in Intelligent Systems and Computing pp 67-77)

Busaba Ngamwongtrakul and Tanasanee Phienthrakul, "Measuring and Discovering Important Nodes in Co-Authorship Network", The Fifth ICT International Student Project Conference 2016 (ICT-ISPC 2016), 27-28 May 2016, Nakhon Pathom, Thailand.

Tanasanee Phienthrakul, "An Automatic Palmistry Prediction System", The Eleventh International Symposium on Natural Language Processing (SNLP 2016), 10-12 February 2016, Phranakorn Si Ayutthaya, Thailand.

Tanasanee Phienthrakul, "An Ensemble Associated Feature Subset Selection for Classification Problems", The 3rd International Symposium on Computational and Business Intelligence (ISCBI 2015), 7-9 December 2015, Bali, Indonesia.

Tanasanee Phienthrakul and Wanwisa Chevakulmongkol, "Handwritten Recognition on Pali Cards of Buddhadasa Indapanno", The International Computer Science and Engineering Conference (ICSEC 2013), 4-6 September 2013, Bangkok, Thailand.

10. Briefly list the most recent professional development activities

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1. Name Thanadol PRITRANAN
2. Education

Master of Science in Computation, UMIST, Manchester, United Kingdom, 1993

Bachelor of Engineering in Electronics, KMIT Ladkrabang, Bangkok, THAILAND, 1988

1. Academic experience

Department of Computer Engineering, Faculty of Engineering, Chiang Mai University, Assistant Professor, since 1994

Department of Computer Engineering, Faculty of Engineering, Mahidol University, Assistant Professor, since 1992-1994

1. Non-academic experience

Deputy Dean of Faculty of Engineering, Information Technology, Finance and Procurement (2007-2011), full time

Deputy Dean of Faculty of Engineering, Information Technology, Finance and Procurement (2017-present), full time

1. Certifications or professional registrations Council of Engineers Thailand
2. Current membership in professional organizations Council of Engineers Thailand
3. Honors and awards None
4. Service activities (within and outside of the institution)

Head of development team of Information Technology Master Plan for Department of Internal Trade, Ministry of Commerce

Head of development team of Information Master Plan of Land and Soil Resources for Office of Natural Resources and Environmental Policy and Planning, Ministry of of Natural Resources and Environmental

Head of information system development team for supporting administration of 5 southern border provinces, Office of the National Economic and Social Development Council

Consultant of information system development for National Crisis Management Information System, National Crisis Management Center, Office of the National Security Council

Head of development team of design of digital radio communication system for Provincial Electricity Authority of Thailand

1. Briefly list the most important publications and presentations from the past five years – title, co-authors if any, where published and/or presented, date of publication or presentation – Area Prediction for Digital Two-Way Radio Communications Using Irregular Terrain Model (ITM) in a Suburban Area The 29th International Technical Conference on Circuit/Systems Computers and Communications (ITC-CSCC), Phuket, Thailand, July 1-4, 2014
2. Briefly list the most recent professional development activities

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1. Name

Lect. Kanat Poolsawasd

1. Education

Master of Science (Technology of Information System Management)

* 1. Mahidol University, Thailand, 2001

Bachelor of Engineering (Electrical Engineering)

* 1. Mahidol University, Thailand, 1995

1. Academic experience

Faculty of Engineering, Mahidol University, Thailand (2000 – Present)

* 1. Department of Computer Engineering (2004 – Present)
     1. Head of Department: Computer Engineering Department (2009-2015)
     2. Deputy Head of Department: Computer Engineering Department (2007-2009)
  2. Department of Electrical Engineering (2000 – 2004)

1. Non-academic experience

Academic Committee, Software Engineering and Systems, Thai Industrial Standards Institute (2016 – Present)

1. Certifications or professional registrations

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1. Current membership in professional organizations

--

1. Honors and awards

--

1. Service activities (within and outside of the institution)

--

1. Briefly list the most important publications and presentations from the past five years – title, co-authors if any, where published and/or presented, date of publication or presentation

* Chittanut Tacheepan, Kanat Poolsawasd\*, The Effect of Mouse on Speed and Accuracy of Pointing, The 41st Electrical Engineering Conference (EECON-41) 21 – 23 November 2018, Ubon Ratchathani, Thailand.
* Chittanut Tacheepan, Kanat Poolsawasd\*, Performance Evaluation of Mouse and Trackpad using Fitts’ Law, The National Conference on Computing and Information Technology (NCCIT) 5 – 6 July 2018, Chaing Mai, Thailand.

1. Briefly list the most recent professional development activities

MU-EDP (Mahidol University Executive Development Program) 2010

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1. Name

Dr. Vasin Suttichaya

1. Education

Ph.D. (Computer Sciences)

Department of Mathematics and Computer Science, Faculty of Science, Chulalongkorn University, May 2013.

B.Sc. 1st Class Honors (Computer Science)

Department of Mathematics and Computer Science, Faculty of Science, Chulalongkorn University, May 2017.

1. Academic experience

Faculty of Engineering, Mahidol University, Thailand (2013-Present)

1. Non-academic experience

## None

1. Certifications or professional registrations

Computer Hacking Forensic Investigator (CHFI)

1. Current membership in professional organization

Aa

1. Honors and awards

Office of the Higher Education Commission Scholarship Jul 2009 – Feb 2013

1. Service activities (within and outside of the institution)

Lecturer for special program course for Computer Olympic

1. Briefly list the most important publications and presentations from the past five years – title, co-authors if any, where published and/or presented, date of publication or presentation

Journal

Suttichaya V, Bhattarakosol P. Solving the Learning Parity with Noise's Open Question. Inf. Process. Lett. 113(14-16): 562-566 (2013). [5-Year Impact Factor 0.606]

Suttichaya V, Bhattarakosol P. Weight-Adjusting Strong Distinguishing Attack,International Journal of Digital Content Technology and its Applications. [SJR=0.310 - Scopus: 2011]

Conference

Suttichaya V, Liang T, Meemongkolkiat N. Determining Physical Location of Wireless Access Point using Smart Devices. International Joint Symposium on Artificial Intelligence and Natural Language Processing (iSAI-NLP). IEEE; 2018.

Tungjitviboonkun T, Suttichaya V. Complexity Reduction on API Call Sequence Alignment Using Unique API Word Sequence. The 21st International Computer Science and Engineering Conference 2017; 15 Nov 2017 - 18 Nov 2017; King Mongkut’s Institute of Technology Ladkrabang (KMITL) and Electrical Engineering/Electronics, Computer, Telecommunications and Information Technology Association of Thailand (ECTI Thailand). IEEE; 2017. 15–18.

Tubthong P, Suttichaya V. The Fuzzy Scheduling Algorithm for the Parallel Key Searching Problem on Cloud Environment. The 21st International Computer Science and Engineering Conference 2017 (ICSEC2017); 15 Nov 2017 - 18 Nov 2017; King Mongkut’s Institute of Technology Ladkrabang (KMITL) and Electrical Engineering/Electronics, Computer, Telecommunications and Information Technology Association of Thailand (ECTI Thailand). IEEE; 2017. 10–14.

Sirisang W, Suttichaya V. Analyzing SQL Injection Statements Using Common Substructure of Parse Tree. The 21st International Computer Science and Engineering Conference 2017 (ICSEC2017); 15 Nov 2017 – 18 Nov 2017; King Mongkut’s Institute of Technology Ladkrabang (KMITL) and Electrical Engineering/Electronics, Computer, Telecommunications and Information Technology Association of Thailand (ECTI Thailand). IEEE; 2017. 19–23.

Karnsomchit A, Suttichaya V, Narupiyakul L. Call Log Analysis Using Longest Common Subsequence. Proceeding of the Joint International Symposium on Artificial Intelligence and Natural Language Processing (iSAI-NLP 2017), 2017.

Suttichaya V. Desktop Tower Defense is NP-Hard. Proceeding of the 14th Pacific Rim International Conference on Artificial Intelligence (PRICAI2016), 2016.

Suttichaya, V, Bhattarakosol, P. The Alternative Approach for the Strong Distinguishing Attack, Proceeding of 2012 7th International Conference on Computing and Convergence Technology (ICCCT2012), 2012

Suttichaya V, Bhattarakosol P. Enhancing Cryptographic Secure PRBG by Appling Permutation on x2 mod n Generator, Proceedings of 2009 International Conference on Wireless Information Networks & Business Information System (WINBIS 09), 2009.

Suttichaya V, Bhattarakosol P. How to Obtain High Security Over the E-Commerce System. International Conference on e-Business (INCEB), 2008.

Suttichaya V, Bhattarakosol P. Chain Rule Protection over the Internet Using PUGGAD Algorithm. Proceedings of the 2008 International Conference on Computer and Electrical Engineering (ICCEE), p.492-496, 2008.

Bhattarakosol P, Suttichaya V. Multiple Equivalent Scale Scan: An Enhancing Technique for Malware Detection. Proceedings of the Second International Conference on Systems and Networks Communications, p.71-76, 2007.

1. Briefly list the most recent professional development activities

None

# Appendix C – Equipment

Please list the major pieces of equipment used by the program in support of instruction.

**Laboratory**

- Room 6272, 2nd floor of EG Building 3: 40 Mac Mini personal computers with OSX operating system

- Room 6273, 2nd floor of EG Building 3: 40 desktop personal computers with Windows operating system

- Room 309/1, 3rd floor of EG Building 2: 20 desktop personal computers with Windows operating system

- Room 309/2, 3rd floor of EG Building 2: 20 desktop personal computers with Windows operating system

- Room 310, 3rd floor of EG Building 2: 30 Mac Mini personal computers with OSX operating system

**Embedded Laboratory & Digital Circuit Laboratory (6273)**

- Raspberry Pi 3 Model B (45 boards),

- NodeMCU ESP8266 (45 boards), memory storage, power supply, LED, button, and basic sensors (Temperature sensor, Force sensor, or Accelerometer sensor)

- Network switch is provided for simulating the internet of things application

- Fourty sets of digital circuit experiment kids. A kid is a hardware unit consists of a breadboard, signal generator, DC power supplies, seven segment displays, LEDs.

**Computer Network Laboratory (Cisco Academy) (309/2)**

- Twenty-four lab stations, each consists of Cisco network routers, network switches, and a personal computer with Cisco PacketTracer programs.

# Appendix D – Institutional Summary

Programs are requested to provide the following information.

## The Institution

1. Name and address of the institution
2. Name and title of the chief executive officer of the institution
3. Name and title of the person submitting the Self-Study Report.
4. Name the organizations by which the institution is now accredited, and the dates of the initial and most recent accreditation evaluations.

## Type of Control

Description of the type of managerial control of the institution, e.g., private-non-profit, private-other, denominational, state, federal, public-other, etc.

## Educational Unit

Describe the educational unit in which the program is located including the administrative chain of responsibility from the individual responsible for the program to the chief executive officer of the institution. Include names and titles. An organization chart may be included. The educational unit is the administrative unit having academic responsibility for the program(s) being reviewed by a given Commission of ABET.

## Academic Support Units

List the names and titles of the individuals responsible for each of the support units that teach courses required by the program being evaluated, e.g., mathematics, physics, etc.

## Non-academic Support Units

List the names and titles of the individuals responsible for each of the units that provide non-academic support to the program being evaluated, e.g., library, computing facilities, placement, tutoring, etc.

## Credit Unit

It is assumed that one semester or quarter credit normally represents one class hour or three laboratory hours per week. One academic year normally represents at least 28 weeks of classes, exclusive of final examinations. If other standards are used for this program, the differences should be indicated.

## Tables

Complete the following tables for the program undergoing evaluation.

## Table D-1. Program Enrollment and Degree Data

**Name of the Program: Computer Engineering**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Academic Year | | Enrollment Year | | | | | Total  Undergrad | Total  Grad | Degrees Awarded | | | |
|  | 1st | 2nd | 3rd | 4th | 5th | Associates | Bachelors | Masters | Doctorates |
| Current | 2017 | FT | 57 | 74 | 71 | 62 | 6 | 270 |  |  |  |  |  |
| Year | PT |  |  |  |  |  |  |  |  |  |  |
| 1 year prior to current | 2016 | FT | 36 | 36 | 34 | 31 | 1 | 138 |  |  | 30 |  |  |
| year | PT |  |  |  |  |  |  |  |  |  |  |
| 2 years prior to current | 2015 | FT | 36 | 34 | 31 | 28 | 6 | 135 |  |  | 30 |  |  |
| year | PT |  |  |  |  |  |  |  |  |  |  |
| 3 years prior to current | 2014 | FT | 34 | 31 | 28 | 33 | 4 | 130 |  |  | 31 |  |  |
| year | PT |  |  |  |  |  |  |  |  |  |  |
| 4 years prior to current | 2013 | FT | 35 | 28 | 33 | 55 | 9 | 160 |  |  | 59 |  |  |
| year | PT |  |  |  |  |  |  |  |  |  |  |

Give official fall term enrollment figures (head count) for the current and preceding four academic years and undergraduate and graduate degrees conferred during each of those years. The "current" year means the academic year preceding the on-site visit.

FT—full-time

PT—part-time

## Table D-2. Personnel

**Name of the Program**

Year1: 2016-2020

|  |  |  |  |
| --- | --- | --- | --- |
|  | HEAD COUNT | | FTE2 |
| FT | PT |
| Administrative2 | 2 | 0 | 2 | |
| Faculty (tenure-track)3 | 13 | 0 | 13 | |
| Other Faculty (excluding student Assistants) | 0 | 0 | 0 | |
| Student Teaching Assistants4 | 0 | 0 | 0 | |
| Technicians/Specialists | 4 | 0 | 4 | |
| Office/Clerical Employees | 1 | 0 | 1 | |
| Others5 | 0 | 0 | 0 | |

Report data for the program being evaluated.

1. Data on this table should be for the fall term immediately preceding the visit. Updated tables for the fall term when the ABET team is visiting are to be prepared and presented to the team when they arrive.
2. Persons holding joint administrative/faculty positions or other combined assignments should be allocated to each category according to the fraction of the appointment assigned to that category.
3. For faculty members, 1 FTE equals what your institution defines as a full-time load
4. For student teaching assistants, 1 FTE equals 20 hours per week of work (or service).
5. Specify any other category considered appropriate, or leave blank.

## SUBMISSION ATTESTING TO COMPLIANCE

Only the Dean or the Dean’s Delegate can electronically submit the Self-Study Report.

ABET considers the on-line submission as equivalent to that of an electronic signature of compliance attesting to the fact that the program has conducted an honest assessment of compliance and has provided a complete and accurate disclosure of timely information regarding compliance with ABET’s *Criteria for Accrediting Applied and Natural Science Programs* to include the General Criteria and any applicable Program Criteria, and the ABET *Accreditation Policy and Procedure Manual.*

1. Include information concerning facilities at all sites where program courses are delivered. [↑](#footnote-ref-1)