Sirindhorn International Institute of Technology
Thammasat University

2008 Graduate Catalog
and
2007 ANNUAL R & D REPORT
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2008 Graduate Catalog
and
2007 Annual R & D Report

Sirindhorn International Institute of Technology
Thammasat University

A Leading Teaching /Learning and Research Institute
# 2008 Graduate Catalog and 2007 Annual R & D Report

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On January 29, 1992, with initial funding provided by Keidanren and the Federation of Thai Industries (FTI), the Thammasat University Council approved the establishment of bachelor's degree programs in civil, electrical, and industrial engineering, which became the autonomous International Institute of Technology (IIT), Thammasat University, on September 16, 1994, by Thammasat University Council’s special regulation. His Majesty the King graciously granted the name “Sirindhorn International Institute of Technology (SIIT)” to the Institute on June 28, 1996.

Located at the Rangsit Campus of Thammasat University and the Bangkadi Industrial Park, SIIT is privately funded with initial funding provided by FTI and Keidanren. It is envisioned to become a leading international institute of technology for both teaching/learning and research.

1. Academic Programs

Sirindhorn International Institute of Technology (SIIT) offers undergraduate and graduate programs (master and doctoral levels) leading to the Bachelor of Engineering (BEng), Bachelor of Science (BSc), Master of Engineering (MEng), Master of Science (MSc), and Doctor of Philosophy (PhD) in the following areas: Chemical Engineering (ChE), Civil Engineering (CE), Electronics and Communication Engineering (EC), Industrial Engineering (IE), Mechanical Engineering (ME), Computer Science (CS), Information Technology (IT), Engineering Management (EM), and Management Technology (MT).

In the academic year 2007, the total number of SIIT undergraduate students was 2,119. First year students are admitted through the national university entrance selection process, the entrance examination conducted by SIIT, or through evaluations of standardized test scores, such as SAT and GCSE. The Institute also admits transfer students from other universities.

SIIT started graduate programs in engineering and technology leading to master’s and doctoral degrees in 1995 and 1997, respectively. In 2007, SIIT started three new international master’s degree curriculums: Master of Engineering in Engineering Technology; Master of Engineering in Information and Communication Technology for Embedded Systems; and Master of Engineering in Logistics and Supply Chain Systems Engineering. In the academic year 2007, there were 34 master’s degree students and 27 doctoral degree students. Interested individuals should consult the Graduate Catalog and contact the faculty members whose research interests match theirs.

2. Faculty Members

All SIIT full-time faculty members hold doctoral degrees from leading universities around the world. It is a policy of the Institute that faculty members be active in research. Results of their research and development are published in national and international journals, as well as regional and international conference proceedings, and are briefly presented in this report. They are therefore well qualified to provide up-to-date academic instruction to the students.

3. Academic Facilities

To achieve high quality academic services and research, the Institute maintains a conscientious effort to develop facilities of the Library and Information Services Center in addition to advanced laboratories. The SIIT library at Rangsit has a total floor area of 2,518 square meters with a 490-seat capacity. More than 27,000 volumes of publications are available. An SIIT branch library at Bangkadi has a total floor area of 1,200 square meters with a 180-seat capacity. The branch library has more than 7,600 volumes of publications. The library adopted the VTLS integrated library system in July 1995 to facilitate the usage of the Library collection. Computer facilities are also provided for accessing world-wide information resources, electronic journals and online databases.

SIIT at Rangsit has two five-storey buildings, the SIIT main building and the advanced laboratory building, and a small building housing the Environmental Technology Laboratory. There are two new buildings at Bangkadi, in addition to an existing building which is named after Thanpuying Niramol Suriyasat. One is a five-storey building housing the administration offices, and the School of Information and Computer Technology. The other, the “Sirindhralai” Building, is a six-storey building. It accommodates the School of Communications, Instrumentations and Control, School of Management Technology, the Library, the computer center, engineering laboratories, and classrooms.

Since 1996, the Institute has graduated 13 batches of students and the total number of SIIT graduates (as of June 2008) is 3,344: 3,223 Bachelor's Degree, 79 Master's Degree and 42 Doctoral Degree graduates. Most of the graduates are working in industry, while many have chosen to further their studies in leading universities in Australia, Europe, Japan, and the USA.
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Sirindhorn International Institute of Technology
Thammasat University

Vision

To be a leading international institute of technology for both teaching/learning and research.

Missions

1. Primarily to produce high-quality bachelor-degree engineers and related technologists who are able to handle advanced industrial technologies and use English as a working language.

2. To conduct research and development in engineering and related technologies relevant to teaching and modern industries.

During the 9th Japan-Thailand Joint Trade and Economic Committee Meeting held in Kobe, Japan in 1989, the delegates from the Japan Federation of Economic Organizations (Keidanren – now Nippon Keidanren) and the Federation of Thai Industries (FTI) realized that in order to enhance industrial development of Thailand, engineering programs, where all lecture and laboratory courses would be taught in English by highly qualified faculty members with doctoral degrees, needed to be established.

A cooperation agreement among Keidanren, FTI, and Thammasat University was reached in 1992 to establish bachelor degree programs in engineering at Thammasat University with initial funds provided by Keidanren and FTI. After two years of successful operation, the “International Institute of Technology (IIT)” was founded on September 16, 1994. Her Royal Highness Princess Maha Chakri Sirindhorn graciously presided over the Cornerstone Laying Ceremony of a new building at the Rangsit Campus of Thammasat University, using part of the initial fund for the construction. His Majesty King Bhumibol Adulyadej of Thailand graciously granted the Institute a new name, “Sirindhorn International Institute of Technology (SIIT)”, on June 28, 1996.

On October 2, 1997, Her Royal Highness Princess Maha Chakri Sirindhorn graciously presided over the Sirindhorn International Institute of Technology's Inauguration Ceremony of its name and building. In 1999, FTI provided a parcel of land with an existing building at Bangkadi Industrial Park (BKD) for SIIT’s use for 30 years. In June 2001, the former Prime Minister Anand Panyarachun inaugurated a new building at Bangkadi for Information Technology and Computer Science programs.

Her Royal Highness Princess Maha Chakri Sirindhorn graciously presided over the inauguration of the Sirindralai Building at Bangkadi on June 28, 2006. This new six-storey building houses the Electronics and Communication Engineering, Engineering Management, and Management Technology programs, a library, a computer center, laboratories and classrooms.

Thammasat University

Founded in 1934, Thammasat University was originally dedicated to the teaching of humanities and social sciences. The University has produced a large number of graduates who have greatly contributed to the development and progress of the country.

Realizing the significant impact of science and technology on the country’s economic growth, in the 1980’s and 1990’s Thammasat University initiated degree programs in engineering, technologies, physical sciences, and medical sciences at its Rangsit Campus, Pathum Thani.

The Japanese Business Federation (Nippon Keidanren)

Through the merger of several economic and industrial organizations, the Japan Federation of Economic Organizations (Keidanren) was established in August 1946. Keidanren was a private, non-profit economic organization representing virtually all branches of economic activities in Japan. Keidanren maintained close contact with both public and private sectors at home and abroad, and endeavored not only to find practical solutions to economic problems but also to contribute to the sound development of the economics of Japan and countries around the world.

In May 2002, Keidanren merged with Nikkeiren (Japan Federation of Employer's Associations) to become Nippon Keidanren (The Japanese Business Federation).
Headed by internationally distinguished leaders of the Japanese business community, Nippon Keidanren plays an active and influential role towards the achievement of harmonious economic prosperity for all mankind.

The Federation of Thai Industries

Formerly known as the Association of Thai Industries (ATI), the Federation of Thai Industries (FTI) came into existence on December 29, 1987. It was a transformed body of ATI, which was created in 1967. FTI is an industrial private sector that brings together industrial leaders to promote Thailand's socio-economic development. The main objectives of FTI are to represent Thai manufacturers at both national and international levels, to help promote and develop industrial enterprises, to work with the government in setting up national policies, and to offer consulting services to members.

FTI is a full-service organization that cooperates with the government to help mobilize Thai industries to reach international markets. It acts as a “match-maker” between foreign industrialists and Thai resources which combine the financial strength, planning ability, and persuasive power of Thailand’s industrialists.

Sirindhorn International Institute of Technology

Sirindhorn International Institute of Technology (SIIT) offers undergraduate and graduate programs (master and doctoral levels) leading to the Bachelor of Engineering (BEng), Bachelor of Science (BSc), Master of Engineering (MEng), Master of Science (MSc), and Doctor of Philosophy (PhD) in the following areas: Chemical Engineering (ChE), Civil Engineering (CE), Electronics and Communication Engineering (EC), Industrial Engineering (IE), Mechanical Engineering (ME), Computer Science (CS), Information Technology (IT), Engineering Management (EM), and Management Technology (MT).

At the present time, the Institute has established both faculty member and student exchange programs with a number of universities in Asia, Australia, Europe, and North America. These programs allow not only faculty members to collaborate with their counterparts in research projects but also students to have an opportunity to take engineering courses at those universities. Additionally, invitations to visit and teach SIIT courses are regularly extended to qualified foreign professors under such programs.

Although it is a unit of Thammasat University, SIIT is financially and administratively separate from the central university system. SIIT’s policies and operations are guided and supervised by the Board of Trustees which consists of representatives from Thammasat University, FTI, and Nippon Keidanren, and scholars appointed by the university. In addition, the Academic Review Committee (ARC) comprising reputable scholars in various fields provides guidance and recommendations on academic and research matters. The Institute, headed by the Director, consists of administrative divisions, a library and information services center, academic schools, and Department of Common and Graduate Studies (CGS).

The Campuses of SIIT

Operations of SIIT are carried out at two locations: Rangsit Campus of Thammasat University and at Bangkadi, Pathum Thani.

Rangsit Campus

Campus and Transportation

The Rangsit Campus of Thammasat University (TU), is located approximately 20 kilometers north of the Bangkok International Airport (Don Muang), at km # 41 on Paholyothin Road (northbound). The campus can be conveniently reached by car via a multi-lane divided superhighway (Paholyothin), the Chaengwattana-Bangsai Expressway, and both outer East-Ring and West-Ring Highways. It can also be reached by buses No. 29, 39, and 510 (both air-conditioned and non air-conditioned). The nearest train station, the Thammasat Station, is near the northwest corner of the Rangsit Campus.

Facilities

Air-Conditioned SIIT Buildings

SIIT has two five-story buildings located at the Rangsit Campus. The first building is the main building with an area of almost 10,000 m², housing offices and classrooms. The first floor and a section of the second floor are occupied by the Library and Information Services Center, with an excellent collection of up-to-date textbooks, magazines,
and journals. SIIT’s academic programs and faculty members’ offices, as well as the Computer Center, are located on the second and third floors. Classrooms of various sizes are on the third, fourth, and fifth floors of the building.

The second SIIT building, adjacent to the first one, is a five-story advanced laboratory building with a total area of about 3,000 m$^2$. It was dedicated by Keidanren and FTI to SIIT on October 6, 1998. The Advanced Laboratory Building houses laboratories for conducting senior projects of fourth-year students, research work of graduate students, and research projects of faculty members.

**Computer Center**

SIIT Computer Center is located on the third floor of SIIT building. The center is equipped with microcomputers in four separate rooms, two of which are used mainly for instruction purpose on programming, mathematical problem solving, engineering graphic design and professional report preparation, while the other rooms are used by students for general computing purposes. Up-to-date software packages are installed via servers on the local area network allowing students to become proficient with their applications. The local area network system supports both academic and administrative chores which include the library’s computer-based services, e-learning/instruction, finance, and the internal mailing system for faculty members and staff. There are a number of servers for academic purposes in various programs. The local area network is connected to the Internet via the Thammasat-Rangsit fiber optic backbone. Students, faculty members and staff are provided with an individual e-mail address and service. Dial-up service is also available. Information on the Institute can be viewed from the official web page at www.siit.tu.ac.th.

**Library and Information Services Center**

The Library and Information Services Center is located on the first and second floors of the main building. The Library has an excellent collection of textbooks (in science and engineering), conference proceedings, reports, technical magazines, and journals. Electronic access to several international databases is provided. The Library also has a computerized search system to assist students in locating their information sources.

Students who would like to study by themselves or in groups will find it convenient to study in the Library. Individual study areas and group study areas are located both on the first and second floors. For group discussion, students can meet and discuss in the group study rooms on the second floor which provide maximum privacy and minimum interference.

Furthermore, students can use the main TU library, which is also located at the Rangsit Campus, for their study and literature searches on social sciences and humanities.

**First-Aid Room**

The SIIT first-aid room is situated on the ground floor of the main building. It is staffed during office hours by a fully qualified nurse. The nurse can assist with minor medical problems and, for more serious cases, can arrange timely transfer to Thammasat University Hospital.

**Hospitals**

Thammasat University Hospital, located at the Rangsit Campus, provides outpatient, inpatient, and emergency medical services, as well as other health care services such as X-ray, physical examination, and dental care. Physicians, nurses, and medical interns are available 24 hours a day. Students are eligible to receive discounts for room charges and services.

There are also several private hospitals near the Navanakorn Industrial Estate which is only a 5-minute drive from the Rangsit Campus.

**Student Activities Center**

A spacious student activities center is adjacent to the main building. There is a range of facilities available for student use including air-conditioned meeting rooms, and a food and drink area.

Student activities are coordinated by the student committee under the supervision of the Assistant Director for Student Affairs. All student activities must conform to the SIIT and TU regulations.

**University Bookstore**

The TU Bookstore at the Rangsit Campus is well stocked with publications and magazines in both Thai and English languages. Textbooks used in individual courses can be purchased at the University Bookstore at competitive prices. Stationery and office supplies are also available.
Post Office

The Thammasat-Rangsit Post Office is located on the first floor of the Administration (Dome) Building. The post office offers complete postal services such as regular mail service, express mail service (EMS), registered mail service, package service, and money orders during business hours.

Convenience Stores

Students living in the dormitories will find that shopping is quite convenient. The 7-Eleven store and TU CO-OP store are located on campus. The 7-Eleven store is open 24 hours a day.

Cafeterias and Canteens

Several cafeterias and canteens can be found throughout the Rangsit Campus. A variety of food is offered by vendors at reasonable prices, both on weekdays and weekends. Adjacent to the SIIT building is a cafeteria which serves both SIIT students and students of the Faculty of Engineering (Thai Program).

Additionally, there are two canteens inside the SIIT main building (on the first floor) and student activities center selling snacks and beverages.

Banking Services

For banking services such as cash withdrawal and balance inquiries, students can conveniently use the automated teller machines (ATM) which are located at various locations on campus and at the SIIT main building. For full services, students can go to the on-campus branch offices of Bangkok Bank, Krung Thai Bank, and Thai Military Bank. Other banks with branches near the campus are Kasikorn Bank, Siam City Bank, and Siam Commercial Bank.

Dormitories

The Rangsit Campus has on-campus dormitories for male and female students. Over 5000 living units are available to accommodate students, faculty members, and university staff. Within walking and short-driving distances, many private dormitories can be found. These are co-ed dormitories, as well as dormitories with separate buildings for male and female students. Air-conditioned units with bathrooms are also available.

Sports Facilities

The Rangsit Campus has a wide range of sporting facilities for students including swimming pools and practice fields for soccer, basketball, volleyball and tennis, all of which are in the vicinity of the student dormitories. Areas for indoor sports such as badminton and table tennis are provided in the indoor gymnasiums.

Other than sports activities, students may choose to exercise by biking, jogging, etc., especially in the morning since the air is very refreshing.

Bangkadi Campus

In 1999, FTI, with co-operation from Toshiba Thailand Co., Ltd., and Mitsui & Co. (Thailand), Ltd., provided 5.6 rai of land with an existing office building in the Bangkadi Industrial Park for SIIT’s use for a period of 30 years. Later, SIIT purchased two more parcels of land in the industrial park with areas of 4 rai and 5 rai. The existing building was renovated and a new building was constructed. The two buildings have a combined area of approximately 3,300 m$^2$. The Computer Science and Information Technology programs moved to these new facilities in June 2002.

Another 6-story building with an area of 6,452 m$^2$ was completed in October 2004. Her Royal Highness Princess Maha Chakri Sirindhorn graciously granted the use of the name “Sirindhralai” for this new building and graciously presided over the inauguration of this new building on June 28, 2006. It houses the Electronics and Communication Engineering program, the Engineering Management program, and the Management Technology program, the library, the computer center, classrooms, and laboratories.

Bangkadi Campus is equipped with a complete computer/networking infrastructure. There are network access points in almost every room in the campus’ buildings which connect to the Rangsit Campus by a high-speed connection (Wimax system) and connect directly to the Internet with speeds up to 9 Mbps bandwidth. Students can easily access the Internet either from their laptops, using wireless hotspots in every building, or from the computers in both the library and the computer laboratory. There are two computer laboratories for instruction and students’ use.
The Library at Bangkadi is located on the 3rd floor of the Sirindhralai Building. The Library has an excellent collection of textbooks, technical books, conference proceedings, reports, technical magazines and journals in the fields of electronics and communication, instrumentation and control systems, computer science, information technology, engineering management, and management technology. Computer facilities are provided for accessing the library database, online databases and full-text journals, and for self-study. The library also provides wireless facilities for students to access the Internet and online information sources with their personal notebooks.

Students may obtain services related to course registration, academic records, and financial matters at the Bangkadi Campus. Shuttle buses between the Rangsit and Bangkadi campuses are provided on a regular basis.

In addition, the recently completed SIIT Hall of Residence at Bangkadi has two five-story buildings, one for male residents and one for female residents. There are 72 rooms on the 2nd - 5th floors, which can accommodate up to 144 residents. Common rooms, internet rooms, a fitness center, a canteen, and a launderette are located on the first floor, with a convenient store nearby.

**SIIT Graduate Programs**

**General Information**

Sirindhorn International Institute of Technology offers international graduate programs as follows:

- Master of Engineering in Engineering Technology
- Master of Engineering in Information and Communication Technology for Embedded Systems (ICTES)
- Master of Engineering in Logistics and Supply Chain Systems Engineering (LSCSE)
- Master of Science in Engineering or Technology
- Doctor of Philosophy in Engineering or Technology

**Application Form**

Application form and letter of recommendation form may be downloaded from the website http://www.siit.tu.ac.th. They are also available from:

Admissions Division
Sirindhorn International Institute of Technology
Thammasat University - Rangsit Campus
P.O.Box 22, Thammasat-Rangsit Post Office
Pathum Thani 12121, Thailand.

Tel. +66 (0) 2 986 9009, (0) 2 564 3226 (Ext. 1520)
Fax. +66 (0) 2 986 9106, 2 986 9112-3
E-mail: graduate@siit.tu.ac.th
http://www.siit.tu.ac.th

**Application fee:** 500 Baht (or 15 US dollars)

Candidates must complete an application form and submit their application documents to the Admissions Division at the above address.

**Application Deadline:**
- The last week of April for June Semester
- The last week of September for November Semester

**Interview**

All candidates who have received notification of interview after having submitted their application forms shall be interviewed by at least three faculty members. The interview is conducted in English.
Fees

The institute reserves the right to revise its charges for tuition and education support fees and to establish other fees as may be required by increased educational costs.

**Tuition Fee**

The tuition fee which includes charges for instruction and academic advice is **3,000 Baht per credit**.

**Education Support Fees**

The fees include services other than instruction, such as library, publications, thesis support, computing facility, counseling and placement, but do not cover the cost of damage to or loss of university property. The fees are charged at the following rates:

- **Regular semester:** **44,800 Baht per semester** (or 32,300 Baht if register ≤ 6 credits)
- **Summer session:** **22,000 Baht for summer session** (or 15,750 Baht if register ≤ 3 credits).
- **Status maintaining:** **4,800 Baht per semester**.

The total tuition and education support fee per semester is approximately 72,000 Baht for 9 credit hours.

Other fees such as late payment fee, late registration fee, and fine for overdue books may be charged.

**Financial Aid**

Internal and external scholarships are available each year to a number of students. For additional information, please contact the school heads or faculty members in the area of your interest.

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**Academic Policies and Procedures**

**Semester Period**

- First Semester: June - October
- Second Semester: November - March

**Academic Regulations**

**Registration**

A full-time student may register from 6 to 12 credits per regular semester and no more than 6 credits in summer.

A student who does not register to take any course in a semester must pay the "Student Status" maintaining fee.

**Evaluation of Academic Performance**

The academic performance of students on a taught course is measured by the grade point average (GPA) system or equivalent. The following grades are used:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Point</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>4.0</td>
<td>Excellent</td>
</tr>
<tr>
<td>B+</td>
<td>3.5</td>
<td>Very Good</td>
</tr>
<tr>
<td>B</td>
<td>3.0</td>
<td>Good</td>
</tr>
<tr>
<td>C+</td>
<td>2.5</td>
<td>Fair</td>
</tr>
<tr>
<td>C</td>
<td>2.0</td>
<td>Poor</td>
</tr>
<tr>
<td>D</td>
<td>1.0</td>
<td>Very Poor</td>
</tr>
<tr>
<td>F</td>
<td>0.0</td>
<td>Inadequate</td>
</tr>
<tr>
<td>S</td>
<td>-</td>
<td>Satisfactory</td>
</tr>
<tr>
<td>U</td>
<td>-</td>
<td>Unsatisfactory</td>
</tr>
</tbody>
</table>
Master of Engineering in Engineering Technology (International Program)

Curriculum Title
Master of Engineering in Engineering Technology (International Program)

Degree Title
Master of Engineering (Engineering Technology)

Applicants’ Qualifications
1. The applicant must hold a bachelor’s degree in engineering, science or a related field that is accepted by The SIIT Executive Committee.
2. The applicant must have a cumulative GPA of at least 2.75 or sufficient relevant research or work experience as specified by The SIIT Executive Committee.
3. The applicant must submit an official score of one of the following English language tests:
   • TU-GET,
   • TOEFL (official or institutional),
   • IELTS, or
   • an English test conducted by SIIT.

   The score must not be older than two years from the date on which it was issued to the date of the application for admission to the program.

Admission Requirements
1. The applicant must pass a selection interview conducted by an SIIT Committee consisting of at least 3 faculty members.
2. Admission to the program requires approval by the SIIT Executive Committee.

   Remark: Students who have inadequate knowledge in some areas, may be required to take additional courses in those areas.

Academic System
1. All courses are conducted in English. An academic year is divided into 2 semesters. Each semester consists of 16 weeks. Courses may be offered for a summer semester of at least 6 weeks duration. The total number of lecture hours required for the summer semester is the same as that for the regular semester. Enrollment for summer courses is optional.
2. Curriculum
   2.1 Study Plan
   The syllabus consists of prescribed coursework (24 credits) and thesis (15 credits). A total of 39 credits is required for completion of the program.

   2.2 Thesis
   2.2.1 A student can register for a thesis after he or she has studied for at least 2 regular semesters or has gained 12 credits with a minimum cumulative GPA of 3.00.

   2.2.2 Thesis Committee
   The Thesis Committee consists of the thesis advisor, who is a faculty member of SIIT, as the chairperson, the thesis co-advisor (if appointed), and one or more members. There must be at least one member who is not affiliated with SIIT. The total number of the committee members who are not the thesis advisor or co-advisor must not be less than the total number of the thesis advisor and co-advisor. In addition, the number of committee members from SIIT must not be less
than the number of external committee members. The Thesis Committee is appointed by the SIIT Executive Committee.

2.2.3 Thesis Final Defense Committee
The Thesis Final Defense Committee consists of the same members as the Thesis Committee. However, the defense must be chaired by a thesis committee member who is not the advisor or co-advisor.

2.2.4 External Examiner
The external examiner must be appointed by the SIIT Executive Committee.

Period of Study
The maximum period of study to complete the program is 4 academic years.

Registration
The student must enroll in courses and/or register for a thesis totaling at least 6 credits but not more than 12 credits per semester.

Academic Performance Evaluation and Graduation

1. Evaluation of Academic Performance

1.1 A credit will be earned only if the grade is “S” or not lower than grade “C”. Grade “D” or “F” will be included in the calculation of the grade point average of each semester and for the cumulative grade point average.

1.2 Any student, who gets grade “U”, “D” or “F” in a compulsory taught course, can re-enroll in that course only one more time. His or her student status will be terminated if he or she still fails to obtain grade “S” or at least “C” for the course in the second enrollment.

1.3 Thesis assessment is classified into 2 grades:
   • S (Satisfactory)
   • U (Unsatisfactory).

   Students must get grade “S” for their theses.

2. Graduation Requirements
To graduate, students must meet the following minimum requirements:

2.1 Twenty-four credits of taught courses required by the curriculum with an accumulative GPA of at least 3.00. In addition, the grade of each of these courses must be at least “C”.

2.2 Fifteen credits of thesis work and passing a thesis defense.

2.3 Approval of the thesis by the external examiner and the thesis committee.

2.4 At least one paper on thesis findings has been accepted for publication in a national journal approved by the Academic Review Committee of SIIT, or at least two papers have been accepted for publication in international conference proceedings.

2.5 Have satisfied one of the following English proficiency requirements:
   • A TOEFL (official or institutional) score of at least 550 (paper-based), or 213 (computer-based), or 79 (internet-based), or
   • An IELTS score of at least 6.0, or
   • A TU-GET score of at least 550.

Curriculum

1. Total credits requirement
A total of 39 credits is required for completion of the program.

2. Structure and Components
2.1 Core Courses 24 Credits
   2.1.1 Compulsory Courses 9 Credits
   2.1.2 Specialized Courses 12 Credits
      from one of the following five majors of study, i.e.,
      1. Chemical Engineering
      2. Civil Engineering
      3. Electrical Engineering
      4. Industrial Engineering and Manufacturing Systems
      5. Mechanical Engineering
   2.1.3 Elective Courses 3 Credits

2.2 Master's Thesis 15 Credits

Total 39 Credits

3. Course Coding System

Sirindhorn International Institute of Technology sets up the course as follows:

3.1 Subject code consists of letters and numbers.

3.2 ICT  indicates subjects in Information and Communication Technology for Embedded Systems.
SE   indicates subjects in Supply Chain System Engineering and Logistics Program.
ET   indicates subjects in Engineering Technology Program.
ES   indicates basic subjects.

3.3 Numbers are composed of 3 digits.
   • The first unit-place-digit indicates the order of subject.
   • The tenth-place-digit indicates the subject group.
   • The hundredth-place-digit indicates the graduate program.

4. List of courses in the curriculum

4.1 Core Courses, 24 credits

4.1.1 Compulsory Courses, 9 credits

<table>
<thead>
<tr>
<th>Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ES805</td>
<td>Research Methodology</td>
<td>2(2-0-6)</td>
</tr>
<tr>
<td>ES806</td>
<td>Research Seminar</td>
<td>1(0-3-1)</td>
</tr>
<tr>
<td>ET601</td>
<td>Computer-Aided Engineering</td>
<td>3(3-0-9)</td>
</tr>
<tr>
<td>ET600</td>
<td>Numerical Methods for Engineers</td>
<td>3(3-0-9)</td>
</tr>
<tr>
<td>or</td>
<td>ICT600 Computational Mathematics</td>
<td>3(3-0-9)</td>
</tr>
<tr>
<td>or</td>
<td>SE600 Decision Making and Optimization</td>
<td>3(3-0-9)</td>
</tr>
</tbody>
</table>

4.1.2 Specialized Courses, 12 credits from one of the following majors

4.1.2.1 Major: Chemical Engineering

<table>
<thead>
<tr>
<th>Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ET610</td>
<td>Special Topic in Chemical Engineering</td>
<td>3(3-0-9)</td>
</tr>
<tr>
<td>ET611</td>
<td>Current Topics in Chemical Engineering</td>
<td>3(3-0-9)</td>
</tr>
<tr>
<td>ET61x</td>
<td>Technical Elective</td>
<td>3(3-0-9)</td>
</tr>
</tbody>
</table>

4.1.2.2 Major: Civil Engineering

<table>
<thead>
<tr>
<th>Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ET620</td>
<td>Special Topic in Civil Engineering</td>
<td>3(3-0-9)</td>
</tr>
<tr>
<td>ET621</td>
<td>Current Topics in Civil Engineering</td>
<td>3(3-0-9)</td>
</tr>
<tr>
<td>ET62x</td>
<td>Technical Elective</td>
<td>3(3-0-9)</td>
</tr>
</tbody>
</table>
4.1.2.3 Major: Electrical Engineering

<table>
<thead>
<tr>
<th>Code</th>
<th>Course Title</th>
<th>Credits (lecture-practice-self study hrs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ET630</td>
<td>Special Topic in Electrical Engineering</td>
<td></td>
</tr>
<tr>
<td>ET631</td>
<td>Current Topics in Electrical Engineering</td>
<td>3(3-0-9)</td>
</tr>
<tr>
<td>ET63x</td>
<td>Technical Elective</td>
<td>3(3-0-9)</td>
</tr>
<tr>
<td>ET64x</td>
<td>Technical Elective</td>
<td>3(3-0-9)</td>
</tr>
</tbody>
</table>

4.1.2.4 Major: Industrial Engineering and Manufacturing Systems

<table>
<thead>
<tr>
<th>Code</th>
<th>Course Title</th>
<th>Credits (lecture-practice-self study hrs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ET640</td>
<td>Special Topic in Industrial Engineering and Manufacturing Systems</td>
<td>3(3-0-9)</td>
</tr>
<tr>
<td>ET641</td>
<td>Current Topics in Industrial Engineering and Manufacturing Systems</td>
<td>3(3-0-9)</td>
</tr>
<tr>
<td>ET64x</td>
<td>Technical Elective</td>
<td>3(3-0-9)</td>
</tr>
<tr>
<td>or</td>
<td>SE611-7</td>
<td></td>
</tr>
<tr>
<td>ET64x</td>
<td>Technical Elective</td>
<td>3(3-0-9)</td>
</tr>
<tr>
<td>or</td>
<td>SE611-7</td>
<td></td>
</tr>
</tbody>
</table>

4.1.2.5 Major: Mechanical Engineering

<table>
<thead>
<tr>
<th>Code</th>
<th>Course Title</th>
<th>Credits (lecture-practice-self study hrs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ET650</td>
<td>Special Topic in Mechanical Engineering</td>
<td></td>
</tr>
<tr>
<td>ET651</td>
<td>Current Topics in Mechanical Engineering</td>
<td>3(3-0-9)</td>
</tr>
<tr>
<td>ET65x</td>
<td>Technical Elective</td>
<td>3(3-0-9)</td>
</tr>
<tr>
<td>ET66x</td>
<td>Technical Elective</td>
<td>3(3-0-9)</td>
</tr>
</tbody>
</table>

4.1.3 Elective Course, 3 Credits

<table>
<thead>
<tr>
<th>Code</th>
<th>Course Title</th>
<th>Credits (lecture-practice-self study hrs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ET6xx</td>
<td>Technical Elective</td>
<td>3(3-0-9)</td>
</tr>
<tr>
<td>or</td>
<td>SE611-7</td>
<td></td>
</tr>
</tbody>
</table>

4.2 Master’s Thesis

<table>
<thead>
<tr>
<th>Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ES800</td>
<td>Master's Thesis</td>
<td>15</td>
</tr>
</tbody>
</table>

Course Descriptions

Compulsory Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ES800</td>
<td>Master’s Thesis</td>
<td>15</td>
</tr>
</tbody>
</table>
| ES805 | Research Methodology              | 2(2-0-6)| Concept of scientific and technological research; Statistics for research planning and research study; Data collection and data analysis; Interpretations, conclusions and recommendations of research results.
| ES806 | Research Seminar                  | 1(0-3-1)| Student-faculty interaction on advanced research topics.
| ET600 | Numerical Methods for Engineers   | 3(3-0-9)| Programming concepts and techniques; Modern programming languages and computational tools for engineering problems; Numerical methods as applied to practical engineering problems; Introduction to finite element methods.
| ET601 | Computer-Aided Engineering        | 3(3-0-9)| Computational methods for engineering modeling and simulation; Geometric modeling; Grid generation; Finite element methods; Finite volume methods; Applications of numerical methods to advanced engineering problems.
ICT600  Computational Mathematics  3(3-0-9)
Set theory; Relations; Formal proof methods; Finite automata; Regular expressions; Context-free grammar; Pushdown automata; First order logic; Theories related to counting, graphs and networks; Interplay between continuous models and their solution via discrete processes; Vector spaces, basis, dimension, eigenvalue problems, diagonalization, inner products, unitary matrices; Introduction to applied statistics and its application to intelligent systems; Introduction to supervised statistical learning including discrimination methods.

SE600  Decision Making and Optimization  3(3-0-9)
Fundamental optimization tools for quantitative analysis to develop modeling and decision-making skill in management sciences; Linear programming; Integer programming; Nonlinear programming; Goal programming; Game theory; Markov chains; Queuing theory and decision analysis techniques; Advanced topics in optimization.

Specialized Courses/Elective Courses

ET610  Special Topic in Chemical Engineering  3(3-0-9)
An in-depth study on a topic of interest in the field of Chemical Engineering such as advanced reactor design, advanced process analysis, biochemical process design, principles of coal-fired power plant, advanced transport phenomena, advanced thermodynamics, and automatic control process.

ET611  Current Topics in Chemical Engineering  3(3-0-9)
A study on current interests in the field of Chemical Engineering such as nanotechnology, genetic engineering, biochemical engineering, polymer science and engineering, fuel cell and solar cell design, and alternative chemical energy resources.

ET612  Advanced Thermodynamics for Chemical Engineering  3(3-0-9)
Review of basic concepts and definitions, the first-law and energy, the second law and entropy; Availability equation for control mass/energy applications; Energy analysis of engineering cycles and Thermoeconomics; Thermodynamics of multi component and multiphase chemical system, chemical reaction equilibrium, non-ideal solution system.

ET613  Advanced Transport Phenomena  3(3-0-9)
Review on the constitutive equations of momentum, energy and mass transfer; Development of microscopic and macroscopic of momentum, energy and mass transfer equations for chemical engineering applications including non-Newtonian fluid flow and unsteady state system for momentum, energy and mass transfer.

ET614  Advanced Chemical Kinetics and Reactor Design  3(3-0-9)
Modeling and design of batch and continuous reactors via the concept of chemical kinetics and mass and energy balances including multiphase reactor design; Concept of catalysis including homogeneous and heterogeneous catalysis, support material synthesis and enzyme catalysis.

ET615  Genetic Engineering  3(3-0-9)
Basic mechanisms of genetic information and regulation of DNA replication, transcription, and translation; Methods and applications of genetic engineering, including gene manipulation and transfer techniques in prokaryotes; Emphasis on applications of recombinant DNA technology in the elucidation of gene functions and enhancing the activity of enzymes.

ET616  Advances in Polymer Science and Technology  3(3-0-9)
Thermodynamics of polymer solution and blends; Specific interactions in polymer multi-component, especially hydrogen bonding and its characterization employing Fourier Transform Infrared (FTIR) spectroscopy; Biocompatible polymers; Degradable polymers.

ET617  Petrochemical Technology  3(3-0-9)
Primary raw materials for petrochemistry; Fundamental chemistry, reactions and separations involved in the value-added processing of refinery products such as ethylene, butylenes, sulfur, medium heating value gas, etc; Use of petrochemical properties in the engineering design and operation of petroleum value-added processes; Chemistry and concerns of petrochemical pollutants.

ET618  Biochemical Engineering Fundamentals  3(3-0-9)
Overview of biological basics; Major metabolic pathways; Metabolic stoichiometry and energetics; Kinetics of substrate utilization, product formation, and biomass production in cell cultures; Transport phenomena in bioprocess systems; Selection, scale-up, operation, and control of bioreactors; Recovery and purification of products.

ET620  Special Topic in Civil Engineering  3(3-0-9)
An in-depth study on a topic of interest in the field of Civil Engineering such as computational methods in civil engineering, advanced structural analysis and design, advanced foundation engineering, maintenance of structures, and construction materials.
ET621  Current Topics in Civil Engineering  3(3-0-9)
A study on current interests in the field of Civil Engineering.

ET622  Finite Element Methods  3(3-0-9)
Review of variational principles; The Ritz method; Weighted residual methods; Interpolation and shape functions;
Natural coordinate systems; Generic finite element formulation for linear elasticity; Numerical integrations;
Standard element shape functions; Applications of finite element methods; Programming of finite element methods.

ET623  Advanced Structural Analysis  3(3-0-9)
Structural modeling concepts; Static and kinematic requirements for structural systems; Discrete modeling of
structural systems; Matrix force and matrix displacement methods; Direct stiffness method; Numerical methods and
solution techniques appropriate to discrete structural systems; Numerical techniques for large-scale structural
systems.

ET624  Advanced Structural Design  3(3-0-9)
Structural design concepts; Advanced topics on ultimate limit state design and serviceability design of structures;
Fatigue design of structures; Design of high-rise buildings; Design of long-span bridges.

ET625  Foundation Design and Analysis  3(3-0-9)
Site Investigation; Immediate settlements; Bearing capacity of footings; Eccentric foundations; Settlement analysis;
Piled foundations; Foundations on difficult soils; Earth pressure problems including retaining walls and sheet pile
structures.

ET626  Inspection, Maintenance and Retrofit of Concrete Structures  3(3-0-9)
Damage of concrete structures; Types of damage—mechanisms of deterioration; Inspection—inspection methods,
visual inspection; Tests—nondestructive tests, partially destructive tests, chemical tests, corrosion tests, cores,
load tests; Protection and repair—materials and methods for protection and repair, special techniques;
Strengthening.

ET627  Engineering Cost and Financial Management  3(3-0-9)
Economic decisions; Capital Rationing for investment in projects; Cost estimation—design cost estimation,
construction cost estimation, total cost of engineering projects; Cash flow forecasting and budgetary control;
Business financing and financial performance; Advanced financial management; Project Financing.

ET628  Construction Management Information Systems  3(3-0-9)
Information systems; Information technology; Information generation and utilization for the management of
construction projects; Integration of construction management software; Conceptual modeling and knowledge-
based models.

ET630  Special Topic in Electrical Engineering  3(3-0-9)
An in-depth study on a topic of interest in the field of Electrical Engineering such as digital communication systems,
telecommunication networks, network planning and design.

ET631  Current Topics in Electrical Engineering  3(3-0-9)
A study on current interests in the field of Electrical Engineering.

ET632  Data Communication Networks  3(3-0-9)
Fundamentals of data communications and networking; Layered network architectures and protocols; Data
transmission and coding; Error detection and correction; Local and wide area networks; Internetworking, routing,
and switching; Queueing theory; Cryptography and network security.

ET633  Network Planning and Management  3(3-0-9)
Fundamentals of computer and communication network planning, design, and management; Graph theory and
queuing theory for network design; Network design problems and optimization; Network planning and design tools;
Network management standards and protocols.

ET634  Optical Communication Systems  3(3-0-9)
Fundamentals of optical signals and modern optical devices; Wavelength division multiplexing; Optical
communication systems and networks; Optical network architectures; Analysis and design of optical
communication systems.

ET635  Digital Signal Processing in Communication Systems  3(3-0-9)
Multirate signal processing; QMF filter bank design; LPC speech coding; Subband image coding; Channel
estimation/equalization; Power spectral estimation; Fundamental of adaptive filtering; Basic DSP hardware
implementation.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ET636</td>
<td>Digital Communication System Design</td>
<td>3(3-0-9)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Digital transmission principles; Digital modulation techniques—ASK, FSK, PSK; Channel coding design—convolutional code, turbo code; Channel modeling; Synchronization; Transceiver design; Fundamentals of multiple access systems—CDMA, OFDM.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ET640</td>
<td>Special Topic in Industrial Engineering and Manufacturing Systems</td>
<td>3(3-0-9)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>An in-depth study on a topic of interest in the field of Industrial Engineering and Manufacturing Systems such as fundamental planning and control concepts for production management and supply chains, organization of the planning, scheduling and control functions, inventory management &amp; control systems and methodologies (MRP, MRPII, ERP, OPT, JIT).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ET641</td>
<td>Current Topics in Industrial Engineering and Manufacturing Systems</td>
<td>3(3-0-9)</td>
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<tr>
<td></td>
<td>A study on current interests in the field of Industrial Engineering and Manufacturing Systems such as design, automation, and integration of supporting systems in the manufacturing environment including flexible manufacturing systems, robotics, automated material handling systems and automated inspection systems.</td>
<td></td>
<td></td>
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<tr>
<td>ET642</td>
<td>Quality Management</td>
<td>3(3-0-9)</td>
<td></td>
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<tr>
<td></td>
<td>Concept of advanced quality management theory; Tools and techniques for quality improvement including SPC, six sigma, measurement system analysis, FMEA, QFD, design of experiment; Quality management system (ISO 9000)—auditing and certification; Quality economic and performance measures.</td>
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<td></td>
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<tr>
<td>ET643</td>
<td>Manufacturing Strategy</td>
<td>3(3-0-9)</td>
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<tr>
<td></td>
<td>Role and context of manufacturing strategy; Interaction of manufacturing strategy and other company strategies; Strategic decisions within operations; System approach to strategy formulation and manufacturing system design; Cellular manufacturing concept; Make/buy analysis, sourcing and subcontracting; Manufacturing control and information systems; Company performance evaluation.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ET644</td>
<td>Simulation Modeling and Analysis</td>
<td>3(3-0-9)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Understanding the role of modeling and simulation in the development and improvement of business processes; Methodology and modeling; Conduct of a simulation study; Hands-on exercise of a particular software package and its application in a practical context.</td>
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<td></td>
</tr>
<tr>
<td>ET645</td>
<td>Advanced Manufacturing Processes</td>
<td>3(3-0-9)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fundamental knowledge, principles, applications, and economics of advanced manufacturing processes including electrical-discharge machining, electrochemical machining, high speed machining, laser beam machining, and water-jet machining; Adhesive and elastic bonding technologies; Principles and applications of rapid prototyping.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ET646</td>
<td>Design of Operations Facilities and Systems</td>
<td>3(3-0-9)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Strategic issues in the location of business in a global environment; Modern methods applied to facility layout and location design; Material handling and integrated production systems; Warehousing and logistics; Quantitative approaches to location and layout modeling; Computer-aided layout design; Personnel issues in layout design; Design for next generation manufacturing and services.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ET647</td>
<td>Advanced Materials and Processes</td>
<td>3(3-0-9)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Metallic materials with enhanced performance characteristics; Metal alloys; Near net shape forming processes for metals; Advanced ceramic materials—their applications and processing; New engineering polymers; Polymer composite matrix and fiber reinforcement; Polymer composite fabrication techniques; Design techniques for anisotropic composites.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ET650</td>
<td>Special Topic in Mechanical Engineering</td>
<td>3(3-0-9)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>An in-depth study on a topic of interest in the filed of Mechanical Engineering such as advanced refrigeration and cryogenics, solar design methods and applications, energy resources and technologies, principles of gas-fired power plant, air-conditioning system design, steam boiler and furnace technology, fuzzy &amp; neural control, mechatronics, and automatic control.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ET651</td>
<td>Current Topics in Mechanical Engineering</td>
<td>3(3-0-9)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>A study on current interests in the field of Mechanical Engineering such as advanced technologies for energy management in buildings, energy-economic modeling and policy analysis, bio-energy conversion, and applied soft computing in mechanics.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ET652</td>
<td>Power Plant Engineering and Emissions</td>
<td>3(3-0-9)</td>
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<tr>
<td></td>
<td>Fossil fuels—properties, classification, world reserves; Fossil fuel-fired power plants; Fuels and combustion; Combustion methods and boiler classifications; Boiler and power plant efficiencies and fuel consumption; Formation of major pollutants (CO₂, NOₓ, SO₂, and PM) in boiler furnaces—effects of fuel properties, boiler design and operating conditions; Trace elements and PAHs from firing fossil fuels; Emission control in power plants; Assessment of major emissions from boilers and power plants.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
ET653 Optimization Methods in Mechanical Engineering 3(3-0-9)
Principles and algorithms in development of optimization problems in mechanical engineering; Methods of solving
optimization problems—conventional multi-variable techniques, genetic algorithm, simulated annealing method,
linear programming, etc.; Computer-aided optimization and applications.

ET654 Advanced Heat Transfer 3(3-0-9)
Laminar forced convection in circular, non-circular, annular cross-sectioned conduits; Turbulent forced convection
over ducts and flat plates; Boiling and condensation; Analytical techniques and numerical methods for solving heat
conduction problems; Conduction problems including heat sources and geometric factors; Radiation heat
transfer—radiation from clouds and gases.

ET655 Biomass for Heat and Power 3(3-0-9)
Biomass characteristics and availability; Potential for biomass utilization in heat and power generation; Biomass
combustion analysis; Boilers and gasifiers; Power generating equipment and processes; Cogeneration;
Performance analysis; Financial evaluation of biomass projects; Emissions calculation and control methods.

ET656 Computational Fluid Dynamics 3(3-0-9)
The basic concept of fluid flow; Introduction to numerical analysis—finite difference methods, finite volume
methods, techniques for solving linear equation systems, etc.; Application of CFD methods to solving the wave
equation, the heat equation, Laplace’s equation, Burgers’ equation and simple forms of the Navier-Stokes
equations; Commercial CFD software.

ET657 Energy Modeling 3(3-0-9)
Energy consumption and supply balance; Energy matrix; Thailand sectorial energy consumption; Energy supply
and intermediate energy forms; Principles of model building; Model types; Construction of projection functions;
Data requirements; Sensitivity and model verification; Policy analysis and choice of models; Linkage with other
national models—macro-economic, population planning and agricultural models.

SE611 Procurement Logistics 3(3-0-9)
Overview of the procurement and purchasing activities in a supply chain; Supplier evaluation and selection; Pricing,
negotiation, contracts; Outsourcing; Multiple sourcing; Just-in-time procurement; Inventory management; Buying
decisions and plans; Cost analysis; Purchase agreements; E-procurement; Real-time internet-based e-supply
chains; Reverse logistics and customer services; Supply chains for financing; Purchasing analysis of capital
equipment; Institutional and government purchases.

SE612 Laws and Regulations in Logistics 3(3-0-9)
Logistics systems and legal framework for the domestic and international movement of goods; Operational
characteristics of providers for exporting and importing services; Effects of government trade policies on global
logistics.

SE613 Transportation Systems Design and Analysis 3(3-0-9)
Characteristics of various modes of domestic and international transportations; Vehicle types; Urban, air, ocean,
highway, pick-up and delivery systems; Scheduling; Factors that influence transport demand; Costs; Market
structures; Carrier pricing; Carrier operating and service characteristics and their influence on other supply chain
costs and supply chain performance such as routes; labor; competition.

SE614 Warehouse Design and Operations 3(3-0-9)
Fundamental operations in warehousing including roles of warehousing, layout and facility design, warehouse
technology such as bar codes, radio frequency identification (RFID) for inventory control systems, modern
warehouse operations, classifying products, materials handling, racking and shelving, automated storage and
retrieval systems (AS/RS), aisle width decision; Information technology for warehouse operations; Health and
safety issues.

SE615 Operations Scheduling 3(3-0-9)
Sequencing and scheduling activities including: static and dynamic problems; deterministic and stochastic models,
single machine processing; Parallel machine processing; Flow-shop and job-shop scheduling; Project scheduling;
Workforce scheduling; Exact and heuristic solution methods and applications in logistics and supply chain systems.

SE616 Design of Experiments in Supply Chain Systems 3(3-0-9)
Fundamental of Design of Experiment; Simple experiment design, factorial, fractional factorial experiments;
ANOVA analysis, model adequacy analysis, mixed level designs, response surface methodology and Taguchi
design; Review of successful experimentation in Supply Chain Management practices.

SE617 Accounting and Financial Management for Logistics and Supply Chain Systems 3(3-0-9)
Profitability, liquidity; Analysis and interpretation of published financial statements; Cost behavior analysis; Profit,
volume analyses; Budget preparation and control; Standard costing; Divisional, segmental performance
measurement; Capital investment; Risk and uncertainty analysis; Effects of inflation and taxation; Introduction to
computer based financial modeling; Good corporate governance.
Master of Engineering in Information and Communication Technology for Embedded Systems (International Program)

Curriculum Title
Master of Engineering in Information and Communication Technology for Embedded Systems (International Program)

Degree Title
Master of Engineering (Information and Communication Technology for Embedded Systems)

Applicants’ Qualifications
1. The applicant must hold a bachelor’s degree in engineering, science or a related field that is accepted by the SIIT Executive Committee.
2. The applicant must have a cumulative GPA of at least 2.75 or sufficient relevant research or work experience as specified by the SIIT Executive Committee.
3. The applicant must submit an official score of one of the following English language tests:
   • TU-GET,
   • TOEFL (official or institutional),
   • IELTS, or
   • an English test conducted by SIIT.

   The score must not be older than two years from the date on which it was issued to the date of the application for admission to the program.

Admission Requirements
1. The applicant must pass a selection interview conducted by an SIIT Committee consisting of at least 3 faculty members.
2. Admission to the program requires approval by the SIIT Executive Committee.

   Remark: Students who have inadequate knowledge in some areas, may be required to take additional courses in those areas.

Academic System
1. All courses are conducted in English. An academic year is divided into 2 semesters. Each semester consists of 16 weeks. Courses may be offered for a summer semester of at least 6 weeks duration. The total number of lecture hours required for the summer semester is the same as that for the regular semester. Enrollment for summer courses is optional.

2. Curriculum
   2.1 Study Plan
   The syllabus consists of prescribed coursework (24 credits) and thesis (15 credits). A total of 39 credits is required for completion of the program.

   2.2 Thesis
   2.2.1 A student can register for a thesis after he or she has studied for at least 2 regular semesters or has gained 12 credits with a minimum cumulative GPA of 3.00.

   2.2.2 Thesis Committee
   The Thesis Committee consists of the thesis advisor, who is a faculty member of SIIT, as the chairperson, the thesis co-advisor (if appointed), and one or more members. There must be at
least one member who is not affiliated with SIIT. The total number of the committee members who are not the thesis advisor or co-advisor must not be less than the total number of the thesis advisor and co-advisor. In addition, the number of committee members from SIIT must not be less than the number of external committee members. The Thesis Committee is appointed by the SIIT Executive Committee.

2.2.3 Thesis Final Defense Committee
The Thesis Final Defense Committee consists of the same members as the Thesis Committee. However, the defense must be chaired by a thesis committee member who is not the advisor or co-advisor.

2.2.4 External Examiner
The external examiner must be appointed by the SIIT Executive Committee.

Period of Study
The maximum period of study to complete the program is 4 academic years.

Registration
The student must enroll in courses and/or register for a thesis totaling at least 6 credits but not more than 12 credits per semester.

Academic Performance Evaluation and Graduation
1. Evaluation of Academic Performance
   1.1 A credit will be earned only if the grade is “S” or not lower than grade “C”. Grade “D” or “F” will be included in the calculation of the grade point average of each semester and for the cumulative grade point average.
   1.2 Any student, who gets grade “U”, “D” or “F” in a compulsory taught course, can re-enroll in that course only one more time. His or her student status will be terminated if he or she still fails to obtain grade “S” or at least “C” for the course in the second enrollment.
   1.3 Thesis assessment is classified into 2 grades:
       - S (Satisfactory)
       - U (Unsatisfactory).
       Students must get grade “S” for their theses.

2. Graduation Requirements
To graduate, students must meet the following minimum requirements:
   2.1 Twenty-four credits of taught courses required by the curriculum with an accumulative GPA of at least 3.00. In addition, the grade of each of these courses must be at least “C”.
   2.2 Fifteen credits of thesis work and passing a thesis defense.
   2.3 Approval of the thesis by the external examiner and the thesis committee.
   2.4 At least one paper on thesis findings has been accepted for publication in a national journal approved by the Academic Review Committee of SIIT, or at least two papers have been accepted for publication in international conference proceedings.
   2.5 Have satisfied one of the following English proficiency requirements:
       - A TOEFL (official or institutional) score of at least 550 (paper-based), or 213 (computer-based), or 79 (internet-based), or
       - An IELTS score of at least 6.0, or
       - A TU-GET score of at least 550.

Curriculum
1. Total credits requirement
A total of 39 credits is required for completion of the program.
2. Structure and Components

2.1 Core Courses 24 Credits

2.1.1 Compulsory Courses 15 Credits

2.1.2 Compulsory Elective Courses 3 Credits

2.1.3 Technical Elective Courses 6 Credits

2.2 Master's Thesis 15 Credits

Total 39 Credits

3. Course Coding System

Sirindhorn International Institute of Technology sets up the course as follows:

3.1 Subject code consists of letters and numbers.

3.2 ICT indicates subjects in Information and Communication Technology for Embedded Systems.

3.3 SE indicates subjects in Supply Chain System Engineering and Logistics Program.

3.4 ET indicates subjects in Engineering Technology Program.

3.5 ES indicates basic subjects.

3.3 Numbers are composed of 3 digits.

- The first unit-place-digit indicates the order of subject.
- The tenth-place-digit indicates the subject group.
- The hundredth-place-digit indicates the graduate program.

4. List of courses in the curriculum

4.1 Core Courses, 24 credits

4.1.1 Compulsory Courses, 15 credits

<table>
<thead>
<tr>
<th>Code</th>
<th>Course Title</th>
<th>Credits (lecture-practice-self study hrs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ES805</td>
<td>Research Methodology</td>
<td>2(2-0-6)</td>
</tr>
<tr>
<td>ES806</td>
<td>Research Seminar</td>
<td>1(0-3-1)</td>
</tr>
<tr>
<td>ICT700</td>
<td>Software for Embedded Systems</td>
<td>3(3-0-9)</td>
</tr>
<tr>
<td>ICT710</td>
<td>Software Design Exercise for Embedded Systems</td>
<td>3(2-3-7)</td>
</tr>
<tr>
<td>ICT720</td>
<td>Hardware for Embedded Systems</td>
<td>3(3-0-9)</td>
</tr>
<tr>
<td>ICT730</td>
<td>Hardware Design Exercise for Embedded Systems</td>
<td>3(2-3-7)</td>
</tr>
</tbody>
</table>

4.1.2 Compulsory Elective Courses, 3 credits

<table>
<thead>
<tr>
<th>Code</th>
<th>Course Title</th>
<th>Credits (lecture-practice-self study hrs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ET600</td>
<td>Numerical Methods for Engineers</td>
<td>3(3-0-9)</td>
</tr>
<tr>
<td>ICT600</td>
<td>Computational Mathematics</td>
<td>3(3-0-9)</td>
</tr>
<tr>
<td>SE600</td>
<td>Decision Making and Optimization</td>
<td>3(3-0-9)</td>
</tr>
</tbody>
</table>

4.1.3 Technical Elective Courses, 6 credits

<table>
<thead>
<tr>
<th>Code</th>
<th>Course Title</th>
<th>Credits (lecture-practice-self study hrs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICT740</td>
<td>Communication</td>
<td>3(3-0-9)</td>
</tr>
<tr>
<td>ICT750</td>
<td>Signal Processing</td>
<td>3(3-0-9)</td>
</tr>
<tr>
<td>ICT760</td>
<td>Intelligence Processing</td>
<td>3(3-0-9)</td>
</tr>
<tr>
<td>ICT770</td>
<td>Environment and Control Systems</td>
<td>3(3-0-9)</td>
</tr>
<tr>
<td>ICT780</td>
<td>Current Topics in Embedded Systems</td>
<td>3(3-0-9)</td>
</tr>
<tr>
<td>ICT781</td>
<td>Advanced Topics in Embedded Systems</td>
<td>3(3-0-9)</td>
</tr>
<tr>
<td>ICT782</td>
<td>Selected Topics in Embedded Systems</td>
<td>3(3-0-9)</td>
</tr>
<tr>
<td>ICT790</td>
<td>Current Topics in Information and Communication Technology</td>
<td>3(3-0-9)</td>
</tr>
<tr>
<td>ICT791</td>
<td>Advanced Topics in Information and Communication Technology</td>
<td>3(3-0-9)</td>
</tr>
<tr>
<td>ICT792</td>
<td>Selected Topics in Information and Communication Technology</td>
<td>3(3-0-9)</td>
</tr>
</tbody>
</table>

4.2 Master's Thesis

<table>
<thead>
<tr>
<th>Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICT800</td>
<td>Master's Thesis</td>
<td>15</td>
</tr>
</tbody>
</table>
Course Descriptions

Compulsory Courses

ES805  Research Methodology  2(2-0-6)
Concepts of scientific and technological research; Statistics for research planning and research study; Data collection and data analysis; Interpretations, conclusions and recommendations of research results.

ES806  Research Seminar  1(0-3-1)
Student-faculty interaction on advanced research topics.

ICT700  Software for Embedded Systems  3(3-0-9)
Software programming; embedded operating systems and middle-wares such as ITRON or embedded linux; verification and testing for embedded Systems; software issues in the design of embedded systems; microcontroller architectures and peripherals; compilers and debuggers; timer and interrupt systems; interfacing of devices; software issues in communications and networking.

ICT710  Software Design Exercise for Embedded Systems  3(2-3-7)
Overview of hardware tools (training board, JTAG interface) and software development tools (compiler, linker, debugger); software project management techniques and tools: UML, test plan, test automation, CASE; embedded operating systems: services and APIs; software development project: requirement analysis, software detailed and test case design, software coding and testing, software documentation; FPGA prototype board using sample application; FPGA logic; VHDL/verilog programming; project planning, system specification design, software coding; software implementation and verification on FPGA prototype board.

ICT720  Hardware for Embedded Systems  3(3-0-9)
Basic digital system design; processor architecture design; VLSI design methodologies; hardware concepts on microcontroller architectures and peripherals; device interface; hardware for communications and networking.

ICT730  Hardware Design Exercise for Embedded Systems  3(2-3-7)
Overview of hardware development tools (logic synthesis, simulation, verification); VHDL/Verilog programming language; FPGA design flow: I/O pin assignment, synchronous/asynchronous logic design, logic simulation and optimization, verification of design constraints; custom hardware development project: implementation and verification of IP cores on FPGA; software/hardware implementation and verification on FPGA prototype board; practical issues on microcontroller and FPGA.

ICT800  Master’s Thesis  15 credits
Student-faculty interaction on research and development in embedded system-related fields or information and communication technology-related fields.

Compulsory Elective Courses

ET 600  Numerical Methods for Engineers  3(3-0-9)
Programming concepts and techniques; Modern programming languages and computational tools for engineering problems; Numerical methods as applied to practical engineering problems; Introduction to finite element methods.

ICT600  Computational Mathematics  3(3-0-9)
Set theory; Relations; Formal proof methods; Finite automata; Regular expressions; Context-free grammar; Pushdown automata; First order logic; Theories related to counting, graphs and networks; Interplay between continuous models and their solution via discrete processes; Vector spaces, basis, dimension, eigenvalue problems, diagonalization, inner products, unitary matrices; Introduction to applied statistics and its application to intelligent systems; introduction to supervised statistical learning including discrimination methods.

SE600  Decision Making and Optimization  3(3-0-9)
Fundamental optimization tools for quantitative analysis to develop modeling and decision-making skill in management sciences; Linear programming; Integer programming; Nonlinear programming; Goal programming; Game theory; Markov chains; Queuing theory and decision analysis techniques; Advanced topics in optimization.

Technical Elective Courses

ICT740  Communication  3(3-0-9)
Information theory; signal processing; communication systems; data and digital communication concepts; theory and techniques in data communications: transmission, encoding, decoding, error detection, error correction, link control, networking, and standards; communication hardware and software; synchronization subsystems; time-division multiple-access systems; code-division multiple-access systems.
ICT750  Signal Processing  3(3-0-9)
Digital signal processing theory; audio processing; video processing; discrete-time signals and systems; linear
time-invariant systems and their properties; sampling of continuous-time signals and convolution; IIR and FIR filter
designs; discrete Fourier transforms; fast Fourier transform algorithms; relations between Fourier transform (FT),
discrete-frequency FT (DFFT) or Fourier series discrete-time FT (DFT), and discrete FT (DFT: discrete both time &
frequency); Speech coding and decoding; image coding and decoding; transmultiplexers; filter banks; channel
estimation; channel equalization; synchronization; array processing; power spectral estimation; adaptive filtering;
ADC and DAC algorithms.

ICT760  Intelligence Processing  3(3-0-9)
Human interface; computer graphics; artificial intelligence (AI); concept and design of human-machine interface;
trends of human interface design; graphic user interface, interactive software design; hardware technology for
human interface; basic descriptive geometry: points, lines, planes and their relationships; Methods of creating,
storing, manipulating, presenting and animating two and three dimensional objects; overview of current research
and application of artificial intelligence; introduction to AI languages such as Prolog or LISP; search techniques;
knowledge representation, reasoning and inference; machine learning; expert systems.

ICT770  Environment and Control Systems  3(3-0-9)
Control systems theory; environment control systems; power management systems; Laplace transforms; control
system description and block diagrams; dynamics of typical controlled systems; development and simplification of
transfer functions; analytic tools for predicting system response and performance; root locus design techniques.

ICT780  Current Topics in Embedded Systems  3(3-0-9)
Topics of current interest in the field of embedded systems.

ICT781  Advanced Topics in Embedded Systems  3(3-0-9)
Advanced topics which may be continuation of embedded system-related topics offered in other lower-level
courses.

ICT782  Selected Topics in Embedded Systems  3(3-0-9)
Topics selected by the instructor to prepare students to continue their research in embedded systems.

ICT790  Current Topics in Information and Communication Technology  3(3-0-9)
Topics of current interest in the field of information and communication technology.

ICT791  Advanced Topics in Information and Communication Technology  3(3-0-9)
Advanced topics which may be continuation of a topic offered in other lower-level courses of information and
communication technology.

ICT792  Selected Topics in Information and Communication Technology  3(3-0-9)
Topics selected by the instructor to prepare students to continue their research in information and communication
technology.
Master of Engineering in Logistics and Supply Chain Systems Engineering (LSCSE) (International Program)

Curriculum Title

Master of Engineering in Logistics and Supply Chain Systems Engineering (LSCSE) (International Program)

Degree Title

Master of Engineering (Logistics and Supply Chain Systems Engineering)

Applicants’ Qualifications

1. The applicant must hold a bachelor’s degree in engineering, science or a related field that is accepted by the SIIT Executive Committee.
2. The applicant must have a cumulative GPA of at least 2.75 or sufficient relevant research or work experience as specified by the SIIT Executive Committee.
3. The applicant must submit an official score of one of the following English language tests:
   - TU-GET,
   - TOEFL (official or institutional),
   - IELTS, or
   - an English test conducted by SIIT.

   The score must not be older than two years from the date on which it was issued to the date of the application for admission to the program.

Admission Requirements

1. The applicant must pass a selection interview conducted by an SIIT Committee consisting of at least 3 faculty members.
2. Admission to the program requires approval by the SIIT Executive Committee.

   Remark: Students who have inadequate knowledge in some areas, may be required to take additional courses in those areas.

Academic System

1. All courses are conducted in English. An academic year is divided into 2 semesters. Each semester consists of 16 weeks. Courses may be offered for a summer semester of at least 6 weeks duration. The total number of lecture hours required for the summer semester is the same as that for the regular semester. Enrollment for summer courses is optional.
2. Curriculum

   2.1 Study Plan

   The syllabus consists of prescribed coursework (24 credits) and thesis (15 credits). A total of 39 credits is required for completion of the program.

   2.2 Thesis

   2.2.1 A student can register for a thesis after he or she has studied for at least 2 regular semesters or has gained 12 credits with a minimum cumulative GPA of 3.00.

   2.2.2 Thesis Committee

   The Thesis Committee consists of the thesis advisor, who is a faculty member of SIIT, as the chairperson, the thesis co-advisor (if appointed), and one or more members. There must be at least one member who is not affiliated with SIIT. The total number of the committee members who are not the thesis advisor or co-advisor must not be less than the total number of the thesis advisor and co-advisor. In addition, the number of committee members from SIIT must not be less
than the number of external committee members. The Thesis Committee is appointed by the SIIT Executive Committee.

2.2.3 Thesis Final Defense Committee
The Thesis Final Defense Committee consists of the same members as the Thesis Committee. However, the defense must be chaired by a thesis committee member who is not the advisor or co-advisor.

2.2.4 External Examiner
The external examiner must be appointed by the SIIT Executive Committee.

Period of Study
The maximum period of study to complete the program is 4 academic years.

Registration
The student must enroll in courses and/or register for a thesis totaling at least 6 credits but not more than 12 credits per semester.

Academic Performance Evaluation and Graduation

1. Evaluation of Academic Performance
   1.1 A credit will be earned only if the grade is “S” or not lower than grade “C”. Grade “D” or “F” will be included in the calculation of the grade point average of each semester and for the cumulative grade point average.
   1.2 Any student, who gets grade “U”, “D” or “F” in a compulsory taught course, can re-enroll in that course only one more time. His or her student status will be terminated if he or she still fails to obtain grade “S” or at least “C” for the course in the second enrollment.
   1.3 Thesis assessment is classified into 2 grades:
      • S (Satisfactory)
      • U (Unsatisfactory).
      Students must get grade “S” for their theses.

2. Graduation Requirements
To graduate, students must meet the following minimum requirements:

2.1 Twenty-four credits of taught courses required by the curriculum with an accumulative GPA of at least 3.00. In addition, the grade of each of these courses must be at least “C”.
2.2 Fifteen credits of thesis work and passing a thesis defense.
2.3 Approval of the thesis by the external examiner and the thesis committee.
2.4 At least one paper on thesis findings has been accepted for publication in a national journal approved by the Academic Review Committee of SIIT, or at least two papers have been accepted for publication in international conference proceedings.
2.5 Have satisfied one of the following English proficiency requirements:
   • A TOEFL (official or institutional) score of at least 550 (paper-based), or 213 (computer-based), or 79 (internet-based), or
   • An IELTS score of at least 6.0, or
   • A TU-GET score of at least 550.

Curriculum

1. Total credits requirement
   A total of 39 credits is required for completion of the program.
2. Structure and Components
2.1 Core Courses 24 Credits
2.1.1 Compulsory Courses 12 Credits
2.1.2 Technical Elective Courses 12 Credits
2.2 Master's Thesis 15 Credits
Total 39 Credits

3. Course Coding System

Sirindhorn International Institute of Technology sets up the course as follows:

3.1 Subject code consists of letters and numbers.
3.2 ICT indicates subjects in Information and Communication Technology for Embedded Systems.
SE indicates subjects in Supply Chain System Engineering and Logistics Program.
ET indicates subjects in Engineering Technology Program.
ES indicates basic subjects.
3.3 Numbers are composed of 3 digits.
   - The first unit-place-digit indicates the order of subject.
   - The tenth-place-digit indicates the subject group.
   - The hundredth-place-digit indicates the graduate program.

4. List of courses in the curriculum

4.1 Core Courses, 24 credits

<table>
<thead>
<tr>
<th>Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SE600</td>
<td>Decision Making and Optimization</td>
<td>3(3-0-9)</td>
</tr>
<tr>
<td>or</td>
<td>Numerical Methods for Engineers</td>
<td>3(3-0-9)</td>
</tr>
<tr>
<td>ET600</td>
<td>Computational Mathematics</td>
<td>3(3-0-9)</td>
</tr>
<tr>
<td>SE601</td>
<td>Logistics and Supply Chain Systems</td>
<td>3(3-0-9)</td>
</tr>
<tr>
<td>SE602</td>
<td>Production Logistics</td>
<td>3(3-0-9)</td>
</tr>
<tr>
<td>ES805</td>
<td>Research Methodology</td>
<td>2(2-0-6)</td>
</tr>
<tr>
<td>ES806</td>
<td>Research Seminar</td>
<td>1(0-3-1)</td>
</tr>
</tbody>
</table>

4.1.2 Technical Elective Courses, 12 credits

<table>
<thead>
<tr>
<th>Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SE61x</td>
<td>Technical Elective*</td>
<td>3(3-0-9)</td>
</tr>
<tr>
<td>SE61x</td>
<td>Technical Elective*</td>
<td>3(3-0-9)</td>
</tr>
<tr>
<td>SE61x</td>
<td>Technical Elective*</td>
<td>3(3-0-9)</td>
</tr>
<tr>
<td>SE61x</td>
<td>Technical Elective*</td>
<td>3(3-0-9)</td>
</tr>
</tbody>
</table>

* List of Technical Electives: select 4 courses (12 credits) from the following courses:

<table>
<thead>
<tr>
<th>Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SE610</td>
<td>Simulation Modeling and Analysis in Supply Chain</td>
<td>3(3-0-9)</td>
</tr>
<tr>
<td>SE611</td>
<td>Procurement Logistics</td>
<td>3(3-0-9)</td>
</tr>
<tr>
<td>SE612</td>
<td>Laws and Regulations in Logistics</td>
<td>3(3-0-9)</td>
</tr>
<tr>
<td>SE613</td>
<td>Transportation Systems Design and Analysis</td>
<td>3(3-0-9)</td>
</tr>
<tr>
<td>SE614</td>
<td>Warehouse Design and Operations</td>
<td>3(3-0-9)</td>
</tr>
<tr>
<td>SE615</td>
<td>Operations Scheduling</td>
<td>3(3-0-9)</td>
</tr>
<tr>
<td>SE616</td>
<td>Design of Experiments in Supply Chain Systems</td>
<td>3(3-0-9)</td>
</tr>
<tr>
<td>SE617</td>
<td>Accounting and Financial Management for Logistics</td>
<td>3(3-0-9)</td>
</tr>
<tr>
<td>and Supply Chain Systems</td>
<td></td>
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</tr>
<tr>
<td>SE618</td>
<td>Special Topic in Logistics and Supply Chain Systems</td>
<td>3(3-0-9)</td>
</tr>
<tr>
<td>SE619</td>
<td>Current Topics in Logistics and Supply Chain Systems</td>
<td>3(3-0-9)</td>
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</table>

4.2 Master's Thesis

<table>
<thead>
<tr>
<th>Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>SE800</td>
<td>Master's Thesis</td>
<td>15</td>
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</tbody>
</table>
Course Descriptions

Compulsory Courses

ES805  Research Methodology  2(3-0-6)
Concepts of scientific and technological research; Statistics for research planning and research study; Data
collection and data analysis; Interpretations, conclusions and recommendations of research results.

ES806  Research Seminar  1(0-3-1)
Student-faculty interaction on advanced research topics.

ET600  Numerical Methods for Engineers  3(3-0-9)
Programming concepts and techniques; Modern programming languages and computational tools for engineering
problems; Numerical methods as applied to practical engineering problems; Introduction to finite element methods.

ICT600  Computational Mathematics  3(3-0-9)
Set theory; Relations; Formal proof methods; Finite automata; Regular expressions; Context-free grammar;
Pushdown automata; First order logic; Theories related to counting, graphs and networks; Interplay between
continuous models and their solution via discrete processes; Vector spaces, basis, dimension, eigenvalue
problems, diagonalization, inner products, unitary matrices; Introduction to applied statistics and its application to
intelligent systems; Introduction to supervised statistical learning including discrimination methods.

SE600  Decision Making and Optimization  3(3-0-9)
Fundamental optimization tools for quantitative analysis to develop modeling and decision-making skill in
management sciences; Linear programming; Integer programming; Nonlinear programming; Goal programming;
Game theory; Markov chains; Queuing theory and decision analysis techniques; Advanced topics in optimization.

SE601  Logistics and Supply Chain Systems  3(3-0-9)
Principle of domestic and international logistics and supply chain systems, logistics, transportation, production
planning, inventory control, purchasing and procurement, packaging, supply chain integration; Information
technologies and management information system/development and analysis, model-based, data-based, and
knowledge-based systems and knowledge engineering; Newly emerging technologies in supply chain systems
such as radio frequency identification (RFID); Global supply chain models, government intervention and
regulations, international transportation and risk analysis.

SE602  Production Logistics  3(3-0-9)
Design, analysis and implementation of enterprise-wide resource and production planning and control systems;
Demand forecasting, aggregate planning; Decision support models for production planning; Master scheduling;
Shop floor control; Inventory control and policy; Maintenance and reliability in engineering systems; Application of
information technologies such as ERP and MRPII to production and operations planning and control.

SE800  Master’s Thesis  15 credits
Students will conduct research studies in the area of logistics and supply chain systems engineering under the
supervision of their thesis advisor. Research areas include production logistics analysis (production planning,
inventory control, maintenance, reliability, scheduling specifically for and limited to logistics and supply chain
systems), procurement logistics analysis (e-procurement, outsourcing, multiple sourcing), distribution center and
warehouse system analysis, transportation systems design and analysis specifically for logistics and supply chain
systems. Research output must lead to publication in international conference proceedings, or
national/international refereed journal.

Technical Elective Courses

SE610  Simulation Modeling and Analysis in Supply Chain  3(3-0-9)
Understanding the role of modeling and simulation in the development and improvement of logistics and supply
chain operations; Methodology and modeling; Conducting a simulation study; Hands-on exercise of a particular
software package and its application in a practical context.

SE611  Procurement Logistics  3(3-0-9)
Overview of the procurement and purchasing activities in a supply chain; Supplier evaluation and selection; Pricing,
negotiation, contracts; Outsourcing; Multiple sourcing; Just-in-time procurement; Inventory management; Buying
decisions and plans; Cost analysis; Purchase agreements; E-procurement; Real-time internet-based e-supply
chains; Reverse logistics and customer services; Supply chains for financing; Purchasing analysis of capital
equipment; Institutional and government purchases.
SE612  Laws and Regulations in Logistics  3(3-0-9)
Logistics systems and legal framework for the domestic and international movement of goods; Operational characteristics of providers for exporting and importing services; Effects of government trade policies on global logistics.

SE613  Transportation Systems Design and Analysis  3(3-0-9)
Characteristics of various modes of domestic and international transportations; Vehicle types; Urban, air, ocean, highway, pick-up and delivery systems; Scheduling; Factors that influence transport demand; Costs; Market structures; Carrier pricing; Carrier operating and service characteristics and their influence on other supply chain costs and supply chain performance such as routes; labor; competition.

SE614  Warehouse Design and Operations  3(3-0-9)
Fundamental operations in warehousing including roles of warehousing, layout and facility design, warehouse technology such as bar codes, radio frequency identification (RFID) for inventory control systems, modern warehouse operations, classifying products, materials handling, racking and shelving, automated storage and retrieval systems (AS/RS), aisle width decision; Information technology for warehouse operations; Health and safety issues.

SE615  Operations Scheduling  3(3-0-9)
Sequencing and scheduling activities including: static and dynamic problems; deterministic and stochastic models, single machine processing; Parallel machine processing; Flow-shop and job-shop scheduling; Project scheduling; Workforce scheduling; Exact and heuristic solution methods and applications in logistics and supply chain systems.

SE616  Design of Experiments in Supply Chain Systems  3(3-0-9)
Fundamental of Design of Experiment; Simple experiment design, factorial, fractional factorial experiments; ANOVA analysis, model adequacy analysis, mixed level designs, response surface methodology and Taguchi design; Review of successful experimentation in Supply Chain Management practices.

SE617  Accounting and Financial Management for Logistics and Supply Chain Systems  3(3-0-9)
Profitability, liquidity; Analysis and interpretation of published financial statements; Cost behavior analysis; Profit, volume analyses; Budget preparation and control; Standard costing; Divisional, segmental performance measurement; Capital investment; Risk and uncertainty analysis; Effects of inflation and taxation; Introduction to computer based financial modeling; Good corporate governance.

SE618  Special Topic in Logistics and Supply Chain Systems  3(3-0-9)
Advanced topics in integrated logistics and supply chain operations; Procurement strategies and strategic sourcing; Dynamic pricing and revenue management tactics; Mitigation of supply chain risk through supply contracts; Risk analysis in global environment; Strategic outsourcing of supply chain functions and operations; Management and operation of third party logistics providers; Management of supply chain security.

SE619  Current Topics in Logistics and Supply Chain Systems  3(3-0-9)
A study on current interests in the field of logistics and supply chain systems and operations.
Master of Science in Engineering or Technology
(International Program)

Curriculum Title
Master of Science in Engineering or Technology

Degree Title
Master of Science in Engineering or Master of Science in Technology

Admission Requirements
- Bachelor degree in engineering or science from institutions approved by SIIT Executive Committee.
- Overall cumulative GPA of at least 2.75 with research experience, or overall cumulative GPA of at least 3.00, or top 20% of the class.
- Two letters of recommendations.
- Approval of the admission by SIIT Executive Committee.

Graduation Requirements
A candidate for a master of science in engineering or technology program must successfully complete 39 credits and meet other requirements as follows:

1. Twelve credits of taught courses (see the course descriptions) with a GPA of at least 3.00 or equivalent.
2. Twenty seven credits of thesis.
3. At least one paper on thesis results must have been accepted for publication in a reputable international journal approved by the Academic Review Committee. The following alternate requirements may be used: one paper in a national journal approved by the Academic Review Committee and one paper in a refereed international conference. To graduate, one paper must have been accepted and the other must have been submitted. The advisor should make sure that the submitted paper will eventually get published.
4. Approval of the thesis by an external examiner appointed by the Executive Committee.
5. Satisfying one of the following English proficiency requirements: TOEFL (official or institutional) not less than 550 marks (or 213 marks for computer-based test or 79 marks for Internet-based test), or IELTS not less than 6.0, or pass the TU-GET with a score of at least 550. Each student is expected to satisfy this English requirement within one year of enrolment.

Students with insufficient background may be required to take some basic courses and obtain satisfactory grades, as determined by the thesis committee.

Thesis Committee
The Thesis Committee consists of a) a faculty member of SIIT, who is the student’s advisor, as the chairperson, b) two or more members, at least one of whom is a faculty member of SIIT, and c) a co-advisor if necessary. There must be at least one member who is not affiliated with SIIT.

Thesis Final Defense Committee
The Thesis Final Defense Committee consists of the same members as the Thesis Committee. However, the defense must be chaired by a thesis committee member who is not the advisor or co-advisor.

External Examiner
The external examiner must be appointed by the SIIT Executive Committee.

Period of Study
The maximum period of study to complete the program is 4 academic years.
Taught Courses

ES801  Advanced Engineering Mathematics  3(3-0-9)
Mathematics for solving engineering problems; ordinary differential equations of higher order; partial differential equations; integral equations; numerical analysis; optimization techniques.

ES802  Research Methodology  3(3-0-9)
Concept of scientific and technological research; statistics for research planning and research study; data collection and data analysis; interpretations, conclusions and recommendations of research results.

ES803  Special Study  3(3-0-9)
Each student is required to undertake an in-depth study of an approved topic which will lead to formulation of thesis proposal. The study will be supervised by a faculty member. A written report and oral presentation have to be given at the end of the semester to the student thesis committee.

ES804  Selected Topic  3(3-0-9)
Each student is required to select an advanced engineering or technological course relevant to the student's thesis. The course may be offered by SIIT or any other reputable graduate school but has to be approved by the student thesis committee.

ES805  Research Methodology  2(2-0-6)
Concept of scientific and technological research; statistics for research planning and research study; data collection and data analysis; interpretations, conclusions and recommendations of research results.

ES806  Research Seminar  1(0-3-1)
Student-faculty interaction on advanced research topics.

ES811  Theory of Computation  3(3-0-9)
Set theory; relations; formal proof methods; finite automata; regular expressions; context-free grammar; pushdown automata; Turing machines; uncomputability; computational complexity; first-order logic.

ES898  Master's Thesis  27 Credits

Course Descriptions

ES801  Advanced Engineering Mathematics
Mathematics for solving engineering problems; ordinary differential equations of higher order; partial differential equations; integral equations; numerical analysis; optimization techniques.

ES802  Research Methodology
Concept of scientific and technological research; statistics for research planning and research study; data collection and data analysis; interpretations, conclusions and recommendations of research results.

ES803  Special Study
Each student is required to undertake an in-depth study of an approved topic which will lead to formulation of thesis proposal. The study will be supervised by a faculty member. A written report and oral presentation have to be given at the end of the semester to the student thesis committee.

ES804  Selected Topic
Each student is required to select an advanced engineering or technological course relevant to the student's thesis. The course may be offered by SIIT or any other reputable graduate school but has to be approved by the student thesis committee.

ES805  Research Methodology
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ES806  Research Seminar
Student-faculty interaction on advanced research topics.

ES811  Theory of Computation
Set theory; relations; formal proof methods; finite automata; regular expressions; context-free grammar; pushdown automata; Turing machines; uncomputability; computational complexity; first-order logic.

ES898  Master's Thesis

ET600  Numerical Methods for Engineers
Programming concepts and techniques; Modern programming languages and computational tools for engineering problems; Numerical methods as applied to practical engineering problems; Introduction to finite element methods.

ICT600  Computational Mathematics
Set theory; relations; Formal proof methods; Finite automata; Regular expressions; Context-free grammar; Pushdown automata; First order logic; Theories related to counting, graphs and networks; Interplay between continuous models and their solution via discrete processes; Vector spaces, basis, dimension, eigenvalue problems, diagonalization, inner products, unitary matrices; Introduction to applied statistics and its application to intelligent systems; introduction to supervised statistical learning including discrimination methods.

SE600  Decision Making and Optimization
Fundamental optimization tools for quantitative analysis to develop modeling and decision-making skill in management sciences; Linear programming; Integer programming; Nonlinear programming; Goal programming; Game theory; Markov chains; Queuing theory and decision analysis techniques; Advanced topics in optimization.
Doctoral Degree Program
(International Program)

Admission Requirements

- Graduate of Master Degree in Engineering or Science or related fields with very good academic record and/or thesis experience; or Master Degree student of SIIT with at least one international journal publication.
- Two letters of recommendations.
- Approval of the admission by SIIT Executive Committee.

Graduation Requirements

1. 1.1 A candidate for doctor of philosophy who has a master's degree must successfully complete 60 credits comprising at least 12 credits of coursework and at least 48 credits of thesis.
1.2 A candidate for doctor of philosophy who has only a bachelor's degree must successfully complete 90 credits, comprising at least 12 credits of coursework and at least 75 credits of thesis.
2. Each required course must have a "Satisfactory" grade, or at least a B grade.
3. At least two research publications accepted by reputable international journals, at least one of which must be listed in an international database with impact factor. It is recommended that there is at least one paper presented at a refereed international conference.
4. Approval of thesis by the thesis committee and the external examiner.
5. Satisfying one of the following English proficiency requirements: TOEFL (official or institutional) not less than 550 marks or 213 for computer-based test or 79 for Internet-based test, or IELTS not less than 6.0, or TU-GET not less than 550. Each student is expected to satisfy this English requirement within one year of enrolment. This requirement is waived for students who have already satisfied the same requirement in the Master's degree program at SIIT.

Students with insufficient background may be required to take some basic courses and obtain satisfactory grades, as determined by the thesis committee.

Transferred Credits

A student in the doctoral program may request to have credits transferred from the courses taken during the master's degree program. A maximum of 9 credits from the master's degree courses can be accredited for Advanced Engineering Mathematics or Theory of Computation or Numerical Methods for Engineers or Computational Mathematics or Decision Making and Optimization, Research Methodology, Research Seminar, and Selected Topic. The credits for Selected Topic must be from a course related to the student's research and must not have been used previously to satisfy the requirements of a degree. Courses which may be transferred are: courses instructed in English with a grade of B or better, courses instructed in a non-English language with a grade of B+ or better, courses instructed in a non-English language with a grade of B or better if the student has already passed the English proficiency requirement.

A student who enrolls in the doctoral program by upgrading from the SIIT master's degree program without receiving the master's degree may request to transfer up to 39 credits of coursework and thesis.

Taught Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ES801</td>
<td>Advanced Engineering Mathematics</td>
<td>3</td>
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<tr>
<td>or ES811</td>
<td>Theory of Computation</td>
<td>3</td>
</tr>
<tr>
<td>or ET600</td>
<td>Numerical Methods for Engineers</td>
<td>3</td>
</tr>
<tr>
<td>or ICT600</td>
<td>Computational Mathematics</td>
<td>3</td>
</tr>
<tr>
<td>or SE600</td>
<td>Decision Making and Optimization</td>
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<td>ES802</td>
<td>Research Methodology</td>
<td>3</td>
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<tr>
<td>or ES805</td>
<td>Research Methodology</td>
<td>2</td>
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<tr>
<td>and ES806</td>
<td>Research Seminar</td>
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<tr>
<td>ES803</td>
<td>Special Study</td>
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<tr>
<td>ES804</td>
<td>Selected Topic</td>
<td>3</td>
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</tbody>
</table>
Thesis Committee

The Thesis Committee consists of

- Two advisors comprising one principal advisor, who is an SIIT faculty member, and one co-advisor.
- Two or more committee members with at least one being a faculty member of SIIT and at least one member who is not affiliated with SIIT.

Thesis Final Defense Committee

The Thesis Final Defense Committee consists of the same members as the Thesis Committee. However, the defense must be chaired by a thesis committee member who is not the advisor or co-advisor.

External Examiner

The external examiner must be appointed by the SIIT Academic Review Committee (ARC).

Maximum Period of Study

Full-time students: 5 years (with MS), 6 years (without MS)

Course Descriptions

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
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<td>Advanced Engineering Mathematics</td>
<td>3(3-0-9)</td>
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<td>Mathematics for solving engineering problems; ordinary differential equations of higher order; partial differential equations; integral equations; numerical analysis; optimization techniques.</td>
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<td>Research Methodology</td>
<td>3(3-0-9)</td>
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<td>Special Study</td>
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<tr>
<td>ES805</td>
<td>Research Methodology</td>
<td>2(2-0-6)</td>
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<td>Concept of scientific and technological research; statistics for research planning and research study; data collection and data analysis; interpretations, conclusions and recommendations of research results.</td>
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<tr>
<td>ES806</td>
<td>Research Seminar</td>
<td>1(0-3-1)</td>
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<tr>
<td></td>
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</tr>
<tr>
<td>ES811</td>
<td>Theory of Computation</td>
<td>3(3-0-9)</td>
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<tr>
<td>ES899</td>
<td>Doctoral Dissertation</td>
<td>48 or 75 Credits</td>
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<tr>
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<td>(A candidate for doctor of philosophy who has a master's degree must successfully complete at least 48 credits of thesis. A candidate for doctor of philosophy who has only a bachelor's degree must successfully complete at least 75 credits of thesis.)</td>
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<tr>
<td>ET600</td>
<td>Numerical Methods for Engineers</td>
<td>3(3-0-9)</td>
</tr>
<tr>
<td></td>
<td>Programming concepts and techniques; Modern programming languages and computational tools for engineering problems; Numerical methods as applied to practical engineering problems; Introduction to finite element methods.</td>
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</tbody>
</table>
ICT600  Computational Mathematics  3(3-0-9)
Set theory; relations; Formal proof methods; Finite automata; Regular expressions; Context-free grammar; Pushdown automata; First order logic; Theories related to counting, graphs and networks; Interplay between continuous models and their solution via discrete processes; Vector spaces, basis, dimension, eigenvalue problems, diagonalization, inner products, unitary matrices; Introduction to applied statistics and its application to intelligent systems; introduction to supervised statistical learning including discrimination methods.

SE600  Decision Making and Optimization  3(3-0-9)
Fundamental optimization tools for quantitative analysis to develop modeling and decision-making skill in management sciences; Linear programming; Integer programming; Nonlinear programming; Goal programming; Game theory; Markov chains; Queuing theory and decision analysis techniques; Advanced topics in optimization.
## 2008 Faculty Members and Research Interests

### School of Bio-Chemical Engineering and Technology

<table>
<thead>
<tr>
<th>Faculty Member</th>
<th>Research Interests</th>
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<tbody>
<tr>
<td>Dr. Luckhana Lawtrakul</td>
<td>33</td>
</tr>
<tr>
<td>Dr. Pisanu Toochinda</td>
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</tr>
<tr>
<td>Dr. Rapeepong Suwanwarangkul</td>
<td>34</td>
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<tr>
<td>Dr. Sandhya Babel</td>
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<tr>
<td>Dr. Siwarut Boonyarattanakalin</td>
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<tr>
<td>Dr. Suwanchai Nitisoravut</td>
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<tr>
<td>Dr. Warwipa Srisawatechakul</td>
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### School of Civil Engineering and Technology

<table>
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<tr>
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<tbody>
<tr>
<td>Dr. Amorn Pimmarmas</td>
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<tr>
<td>Dr. Mongkol Piantanakulchai</td>
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</tr>
<tr>
<td>Dr. Prueitha Nanakorn</td>
<td>38</td>
</tr>
<tr>
<td>Dr. Somnuk Tangtermsirkul</td>
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<tr>
<td>Dr. Taweep Chaisombh</td>
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<td>Dr. Winpyu Rattanapitikom</td>
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### School of Communications, Instrumentations & Control

<table>
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<tbody>
<tr>
<td>Dr. Banlue Srisuchinwong</td>
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<tr>
<td>Dr. Chalie Charoenlarpopparut</td>
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<tr>
<td>Dr. Duangrat Eungdamrong</td>
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<tr>
<td>Dr. Ithisek Nikhamhang</td>
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<tr>
<td>Dr. Sawasd Tantaratan</td>
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<tr>
<td>Dr. Toshiaki Kondo</td>
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<tr>
<td>Dr. Waree Kongprawechnon</td>
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### School of Information and Computer Technology

<table>
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<tbody>
<tr>
<td>Dr. Bunyarit Uyyanonvara</td>
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<tr>
<td>Dr. Cholwich Nattee</td>
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</tr>
<tr>
<td>Dr. Ekawit Nantajeeewarawat</td>
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<tr>
<td>Dr. Gun Srijuntongsiri</td>
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<tr>
<td>Dr. Komwut Wipusitwarakun</td>
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<tr>
<td>Dr. Pakinee Airmamee</td>
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</tr>
<tr>
<td>Dr. Philippe Meunier</td>
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<tr>
<td>Dr. Stanislav S. Makhanov</td>
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<tr>
<td>Dr. Steven Gordon</td>
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<tr>
<td>Dr. Surapa Thiemjarus</td>
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<tr>
<td>Dr. Thanaruk Theeramunkong</td>
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### School of Management Technology

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<tr>
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<tbody>
<tr>
<td>Dr. Aussadavut Dumrongsi</td>
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<tr>
<td>Dr. Chawalit Jeenanunta</td>
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<tr>
<td>Dr. Natharika Ritippant</td>
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<tr>
<td>Dr. Pisit Chanvarasuth</td>
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<tr>
<td>Dr. Pomprimol Chongphaisal</td>
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<tr>
<td>Dr. Somrote Komolavanij</td>
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<tr>
<td>Dr. Suebsak Nanthavanij</td>
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<tr>
<td>Dr. Suthathip Suanmali</td>
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<tr>
<td>Dr. Thanwadee Chinda</td>
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<tr>
<td>Dr. Veeris Ammarapala</td>
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### School of Manufacturing Systems and Mechanical Engineering

<table>
<thead>
<tr>
<th>Faculty Member</th>
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<tbody>
<tr>
<td>Dr. Bundit Limmeechokchai</td>
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<tr>
<td>Dr. Jirachai Buddhakulsomsiri</td>
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<tr>
<td>Dr. Navee Chiadamrong</td>
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<tr>
<td>Dr. Pisan Yenradee</td>
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<tr>
<td>Dr. Pisut Pongchaierks</td>
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<tr>
<td>Dr. Ruengsak Kawtummachai</td>
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<tr>
<td>Dr. Satha Aphomratana</td>
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<tr>
<td>Dr. Supachart Chungsapibulpatana</td>
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<tr>
<td>Dr. Thananchai Leephakpreeda</td>
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### Department of Common and Graduate Studies

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School of Bio-Chemical Engineering and Technology

Faculty Members and Research Interests, 2008

Dr. Luckhana Lawtrakul

**Assistant Professor**
B.Sc. in Chemistry, Kasetsart University, Thailand
M.Sc. in Physical Chemistry, Kasetsart University, Thailand
Dr.rer.nat. in Theoretical Biochemistry, University of Vienna, Austria

Areas of Specialization: **Computational Chemistry, Computer-Aided Molecular Modeling and Molecular Design, Structure-Activity Relationships.**

Research Interest:

**Molecular modeling** is a collective term that refers to theoretical methods and computational techniques to model or mimic the behavior of molecules. The techniques are used in the fields of computational chemistry and computational biology for studying molecular systems ranging from small chemical systems to large biological molecules. Currently applications in the following areas are of special concern: Molecular dynamics (MD) simulations and quantum chemical calculations on the stability of guest-cyclodextrins inclusion complexes, and Quantitative structure-activity relationship (QSAR) studies of inclusion complexes of various guests with cyclodextrins.

Dr. Pisanu Toochinda

**Lecturer**
B.Sc. in Chemistry, Mahidol University, Bangkok, Thailand
M.Sc. in Chemical Engineering, The University of Akron, Akron, Ohio, USA
Ph.D. in Chemical Engineering, The University of Akron, Akron, Ohio, USA

Areas of Specialization: **Photo-catalytic synthesis of hydrocarbons from CO$_2$/H$_2$O, Photochemical solar cells, Gas-solid reactor design, Heterogeneous catalysis, Nano-material / zeolite syntheses, Bio-molecular imprinted materials.**

Research Interests:

**The Development of a Novel Catalyst for Hydrogen Production from Methanol Steam Reforming**

The shortage of energy is becoming an important problem for mankind and the research of renewable energy has emerged rapidly to solve this problem. One interesting renewable energy is the energy from hydrogen fuel cells, which generate electrical energy, from the electrochemical reaction of hydrogen with atmospheric oxygen and yields water, which is environmentally benign. Therefore, one of the most important issues to be considered for the hydrogen fuel cell is effective hydrogen production. Hydrogen could be produced from reforming reactions of hydrocarbons such as methane, methanol, ethanol, dimethyl ether, etc. This research focuses on methanol reforming to produce hydrogen for fuel cells from the steam reforming reaction. Unfortunately, the process still requires a huge amount of energy in order to produce a high yield of hydrogen. This is a major drawback of hydrogen production from the reforming reaction. The commercial catalysts for the methanol reforming reaction are Cu-Zn based catalysts which require an operation temperature as high as 553 K to produce an effective hydrogen yield. Therefore, active catalysts which could reduce the activation energy and reaction temperature must be developed to solve the problem and also increase the reaction activity of hydrogen production from the steam reforming of methanol. The objective of this research is to study the performance of various catalysts from different preparation methods to identify the proper catalyst for methanol reforming. The performances of catalysts are compared with the performance of a commercial catalyst. The optimization of the catalytic reactor design and reaction conditions are also investigated to enhance the reaction system for effective hydrogen production from methanol reforming.

**Carbon Dioxide Capture by Immobilized Amine over Solid Sorbents**

The high performance of amine solid sorbents could provide the alternative for CO$_2$ capture from power plant flue gases. The concept is to capture carbon dioxide (CO$_2$) from a simulated flue gas system by a tubular reactor using immobilized amine species on different solid sorbent support (activated carbon, zeolites, agriculture product waste) at ambient conditions. The concepts of the material preparation are high performance of CO$_2$ capture, cost effectiveness, and easy handling for various applications. The preliminary design of a scaled up plant for the CO$_2$ capture from solid sorbents is also considered in the study.
Photocatalysis

CO₂ emission has become a worldwide problem due to its potential impact on global warming. Photocatalytic reactions, which involve the combined use of photo energy and catalysts to convert reactants to products, provide a promising alternative to reduce CO₂ and convert it into useful hydrocarbon products (e.g., methane and methanol).

Dr. Rapeepong Suwanwarangkul

Lecturer

B.Eng. (Honors) in Chemical Engineering, Kasetsart University, Thailand
M.Eng. in Chemical Engineering, Chemical Engineering Practice School (ChEPS), King Mongkuts University of Technology Thonburi, Thailand
Ph.D. in Chemical Engineering, University of Waterloo, Waterloo, Canada


Research Interests:

Fuel Cell Science and Engineering

Since the crisis of energy price (oil, natural gas) and environmental concerns have emerged, fuel cell technology is now considered to be one of the most emerging technologies to reduce air pollution and improve energy efficiency. My research work mainly focuses on Solid Oxide Fuel Cell (SOFC) operating at high temperature of 800-1000ºC. My interesting researches are to develop the mechanistic cell-level and stack-level models based on planar and tubular design to study the influence of cell design and operating conditions (temperature, pressure, cell voltage and syngas compositions) on cell performance. In addition, the SOFC system model including SOFC, gas/steam turbines, fuel processing and CO₂ capture process is developed to analyze the overall cycle efficiency and appropriate operating condition of SOFC system. Finally, we will study the possibility to operate SOFC using different gas feedstocks (biogas, diesel reforming gas, propane, natural gas, ammonia, hydrogen sulfide and ethanol reforming gas) rather than hydrogen. We will also develop the mechanistic model to understand transport phenomena of these gases inside SOFC. This will help to design particular SOFC that match with the type of feed stock. This project is currently supported by National Metal and Materials Technology Center (MTEC).

Process System Engineering

Process system engineering focuses on simulation and modeling of chemical and related processes. The aims are to gain insight into the processes' behaviors leading to improvement of their operation and design. Furthermore, process optimization strategy can be obtained once the process model is established. Currently, the emphasis is placed on petroleum and petrochemical processes such as thermal cracking furnaces to produce olefin gas from liquid petroleum feed.

Reactor Analysis and Design

The design and operation of the catalytic reactor is sophisticated because of non-ideal behavior of the reactor which depends on reactor type, such as, fixed bed reactor and fluidized bed reactor. Therefore, in order to understand the fundamental operation of the reactor, it is important to develop the mathematical model to investigate the actual transport phenomena inside the reactor including mass, momentum and heat. The validated mathematical model will help scientists and engineers to optimize reactor configuration within a limited number of experimental investigations. My research work currently focuses on designing ethanol and methane reformers to produce hydrogen for fuel cells.

Dr. Sandhya Babel

Associate Professor

B.Sc. in Biology/Chemistry, University of Indore, India
M.Sc. in Biochemistry, University of Indore, India
M.Sc. in Environmental Technology and Management, Asian Institute of Technology, Thailand
D.Tech.Sc. in Environmental Technology and Management, Asian Institute of Technology, Thailand

Areas of Specialization: Membrane technology; Solid waste management; Water and wastewater treatment; Environmental Impact Assessment.

Research Interests:

Removal of Heavy Metals from Aqueous Solution/Sludges Using Agriculture Waste Materials

Agricultural wastes are unused resources, which in many cases present a serious problem of disposal. However, these waste materials can be used to remove toxic heavy metal from wastewater as they are capable of binding heavy metals by adsorption, chelation and ion exchange. The exchange properties of these wastes can be attributed to the presence of carboxylic, phenolic, hydroxylic groups. In order to
enhance cation exchange capacities, these groups may be modified by oxidation, carboxymethylation, acetylation, phosphorylation. The utilization of agricultural by-products in treating the wastewater/sludges contaminated by heavy metals is an attractive area of research.

Environment and Development Perspectives: Life Cycle Assessment a Tool

Developing countries in Asia have considered economic growth as the sole indicator of development. Monetary gain has dominated over environmental quality and the sustainability of natural resources. If a polluting factory yields a profit now, the effect on generations is forgotten. All this is carried out in the name of development and for the betterment of the quality of life without foreseeing the effect on the environment, which is the key component for sustainable development. Thus, it is necessary to analyze the existing situation and suggest measures to minimize the impacts on the environment and to conserve the finite natural resources. Life cycle assessment can be used as one of the tools to identify and assess the environmental burdens of different products or system over the entire period of its life.

Membrane Technology for Water Treatment

Membrane technology is an alternative to the long established conventional treatment techniques for the production of drinking water from various natural resources and its application to water treatment processes is now expanding rapidly due to stringent regulations. Membrane processes are capable of removing many materials from water that are typically treated using unit processes ranging from sand filtration to carbon adsorption to ion exchange. There is plenty of scope to focus research work on treatment of water by membranes and understanding the fouling phenomenon leading to the development of low-cost solutions to the drinking-water treatment problems.

Dr. Siwarutt Boonyarattanakalin

Lecturer (Joined SIIT in June 2008)
B.S. in Chemistry (Summa Cum Laude), Colorado State University, USA
Ph.D. in Organic Chemistry, The Pennsylvania State University, USA
Areas of Specialization: Chemical Biology, Organic Chemistry, Glycochemistry, and Glycobiology.

Research Interest:

Chemical Biology

Chemical Biology has recently emerged as an exciting new field that focuses on problems and processes at the interface of chemistry and biology. Chemistry uniquely provides essential tools and techniques to study biological systems at the molecular level. Appropriate small synthetic molecules are very useful in studying and manipulating biological processes. Dr. Siwarutt's research areas include design, synthesis and evaluation of biologically active molecules; and design and validation of assays to evaluate biologically active molecules and to study cellular processes.

Dr. Suwanchai Nitisoravut

Associate Professor
Diploma (Honors) in Analytical Chemistry, Institute of Analytical Chemistry Training, Ministry of Science, Technology, and Environment, Bangkok, Thailand
B.S. in Chemical Technology/Chemical Engineering, Chulalongkorn University, Thailand
M.S. in Biosystem Engineering, University of Hawaii at Manoa, Hawaii, USA
Ph.D. in Civil/Environmental Engineering, North Carolina State University, North Carolina, USA
Areas of Specialization: Environmental Biotechnology/Microbiology, Biological treatment of water and wastewater.

Research Interests:

Biohydrogen Production

Hydrogen is a promising alternative to fossil fuels. It is clean, renewable, carbon-free energy carrier of the future. It has a heating value of approximately 2.5 times greater than that of methane and can be used in fuel cells with high efficiency. When combusted, it produces water rather than greenhouse gases. Hydrogen can be derived from various means, chemically or biologically, each with its own set of advantages and disadvantages. Biohydrogen production is an environmentally friendly method employing either natural or genetically-modified microbial communities to produce hydrogen. Prior to the establishment of full-scale biohydrogen production, substantial, fundamental research is needed to address the key capabilities of the system so that high hydrogen production rates and efficiency can be achieved.

AAnaerobic AMMonium OXidation (ANAMMOX)

The AAnaerobic AMMonium OXidation (ANAMMOX) process involves the use of nitrite as an electron donor.
acceptor in the bacterially mediated oxidation of ammonia to yield di-nitrogen gas. The process allows nitrogen transformation similar to the classical processes of nitrification followed by denitrification. However, it reduces oxygen demand and requires no additional organic carbon source as compared to typical nitrification and denitrification, respectively. It is a promising microbial process to remove ammonia from wastewater characterized by a low content of organic materials.

**Assimilable Organic Carbon (AOC) and Regrowth Potential in Drinking Water**

During the past decade, research interest in drinking water treatment has focused on the biodegradable fraction of organic carbon in natural and treated water. This interest stems from the recognition that biodegradable organic matter in water can provide growth support to microorganisms which can be intensified during storage, and travel within the distribution systems. Such phenomenon is known as biological regrowth, and the fraction of biodegradable organic carbon is commonly termed biodegradable dissolved organic carbon (BDOC) or assimilable organic carbon (AOC). Biological regrowth in distribution systems has been known for years, as a potential cause of corrosion in distribution lines and deterioration of finished water quality, as well as an indirect link to waterborne diseases. It has, however, just come under attention, particularly for developed countries, due to the unclear impact on human health.

**Dr. Wanwipa Sriwatwechakul**

**Lecturer**
B.S. in Chemical Engineering, Massachusetts Institute of Technology, USA  
M.S. & Ph.D. in Chemical Engineering, Princeton University, USA  
Area of Specialization: Biomaterials and drug delivery.

**Research Interests:**

**Polymer and Surfactant Self-assembly Drug Delivery**

Traditionally, disease treatment is delivered mainly through oral or intravenous means. In the case of cancer treatment, however, drugs are so toxic that delivering them through traditional methods would mean killing healthy living cells. Thus, delivery vehicles are used to encapsulate the drugs and deliver them to the cancer site while protecting normal cells.

We are interested in developing drug delivery vehicles from polymers and surfactants self-assembly. They are ideal candidates for this application because they are compatible with hydrophobic and hydrophilic drugs. The problem of delivering hydrophobic drugs is one of the foremost issues in pharmaceutical industry. In addition, polymers and surfactants allow flexibility in attaching targeting molecules to improve the treatment efficacy. We are also interested in drug delivery application in tissue engineering since it can provide vehicles to deliver proteins to promote the wound-healing process.

**Computational Fluid Dynamics Applied to Human Physiology**

The principles of chemical engineering fluid mechanics can be applied to the study of basic human physiology, such as fluid flow in the blood stream, workload requirements on the human heart and the implications of having cholesterol buildups. This understanding is essential in engineering better cardiovascular devices, and it will assist healthcare professionals in providing better treatment and prevention options for chronic heart patients.
School of Civil Engineering and Technology

Faculty Members and Research Interests, 2008

Dr. Amorn Pimanmas

**Associate Professor**
B.Eng. in Civil Engineering, Chulalongkorn University, Thailand
M.Eng. & Ph.D. in Civil Engineering, University of Tokyo, Japan

**Areas of Specialization:** Behavior, analysis and evaluation of damaged reinforced concrete members and structures; Nonlinear finite element analysis of reinforced concrete (RC) mechanics; Maintenance, repair and inspection of RC buildings.

**Research Interests:**

**Earthquake Resistant Structural Design**

The goal of the research is to study the seismic performance of sub-standard non-ductile reinforced concrete members and develop a suitable structural design approach for buildings and bridges. The research begins with the evaluation of seismic performance of existing sub-standard reinforced concrete members in buildings and bridges. Several critical components such as sub-assemblages, beam-column joint, column, etc., will be tested. The failure mechanism of these critical components will be investigated. Then, appropriate design methods and reinforcement detailing shall be proposed. The research will emphasize reinforcement detailing in plastic hinge zones, shear failure in joints and columns, confinement, bond distress and lap splice failure and column hinging mechanisms.

**Seismic Retrofit of Reinforced Concrete Buildings**

The objective of the research is to retrofit existing buildings and bridges against seismic effect. The cost-effective strengthening methods will be proposed for critical sub-assemblages or components of the structure. An example of a successful retrofit method is Joint Planar Expansion which strengthens the beam-column joint. The strengthening scheme will enhance not only the capacity and displacement but also will change the failure mode from brittle to ductile failure. The research will propose both component strengthening and structural system strengthening, such as steel bracing and shear wall addition. Advanced composite materials such as fiber reinforced polymers will also be used for retrofit.

**Nonlinear Behavior and Modeling of Reinforced Concrete**

The research includes the advanced study of the nonlinear behavior and modeling of reinforced concrete. A behavioral model of beam column joints will be developed that includes bond deterioration, joint shear failure, and splitting cracks in beams and columns. A strut and tie model is also applied to explain the flow of forces within the beam-column joint. Moreover, various numerical and finite element analysis tools are utilized to analyze the behavior of components and structures. The finite element models will be both member based and element based with the advanced state-of-the-art constitutive models of reinforced concrete.

Dr. Mongkut Piantanakulchai

**Assistant Professor**
B.Eng. in Civil Engineering, Chulalongkorn University, Thailand
M.Eng. in Transportation, Asian Institute of Technology (AIT), Thailand
Ph.D. in Transportation, Tohoku University, Japan

**Areas of Specialization:** Life Cycle Assessment (LCA) of transportation and infrastructure; Transport and environment; Input-Output modeling, and applied economic modeling for transport; and Multicriteria decision making.

**Research Interests:**

**Multicriteria Decision Making in Civil Engineering**

The current research interest focuses on applications of multi criteria decision making techniques to solve civil engineering problems. Possible topics include engineering design, prioritization and evaluation of public measures, classification problems, etc. Some research topics require knowledge and cooperation from multi-disciplinary fields. Examples of research being conducted include highway corridor planning, prioritization of highway accident reduction measures, landslide/seismic hazard zoning, seismic resistance and maintenance prioritization of existing buildings. Techniques such as the Analytic Network Process (ANP) and Fuzzy Decision Making Methods are used to solve the multicriteria decision making problems.

**Highway Design Optimization**

Highway design is a complex process that involves many constraints and objectives to be achieved. The conventional design method is manual. Therefore the
number of alternatives is limited by the choices of the
designer. It is also time and cost consuming to
generate many alternatives by manual design. The
research aims to apply some heuristic techniques
such as Genetic Algorithm (GA) and Ant Colony
Optimization (ACO) to solve the highway design
optimization problem within the Geographic
Information System (GIS) environment.

Dr. Pruettha Nanakorn

**Associate Professor**

B.Eng. (1st Class Honors) in Civil Engineering, Chulalongkorn University, Thailand
M.Eng. in Structural Engineering, Asian Institute of Technology (AIT), Thailand
D.Eng. in Civil Engineering, The University of Tokyo, Japan

Areas of Specialization: Computational mechanics; Finite element analysis; Design automation; Structural optimization.

Research Interests:

**Automation in Structural Design**

Structural design can be classified into several design
tasks. These tasks need different degrees of human
intuition. Those design tasks that require little human
intuition and can be systematically written as
algorithms may be easily delegated to computers. In
contrast, other design tasks that require a lot of
human intuition and do not have clear algorithms
cannot be done without designers’ experiences.
Although it may seem that some of the heuristic
design tasks are not difficult and can be handled quite
easily by engineers, in practice, these easy tasks
unfortunately prevent the whole design process from
being completely automated. In this research area,
artificial intelligence (AI) and other advanced
computing technologies will be used to remove these
design task hindrances in order that complete
structural design automation can be developed.

**Advanced Finite Element Analysis**

It can be safely said that the finite element method
(FEM) is currently the best method for solving
mechanical problems. The method has been
continuously developed and its progress is quite
noticeable. Nevertheless, the development of FEM
has been mainly concentrated on the theoretical part
of the method. It is now time to integrate new
computing technologies with FEM in order that
advanced finite element analysis can be performed
with ease. In this research area, advanced computing
technologies, such as new programming
technologies, artificial intelligence, information
technologies, and database technologies, will be used
to improve the performance and usability of FEM.

Dr. Somnuk Tangtermsirikul

**Professor**

B.Eng. (Honors) in Civil Engineering, Chulalongkorn University, Thailand
M.Eng. & D.Eng. in Civil Engineering, University of Tokyo, Japan

Areas of Specialization: Modeling of concrete behavior; Durability of concrete; Special concrete; Use of
wastes and recycled materials in cement and concrete; Durability and service life design of concrete
structures; and Maintenance of concrete structures.

Research Interests:

**Performance Based Analysis and Design of
Concrete Mix Proportions**

Simulation models for predicting materials, mix
proportion, time and environment dependent
properties of concrete are studied. At present, the
studied properties are workability, bleeding, strength,
thermal cracking, autogeneous and drying shrinkage,
cracking resistance, carbonation, chloride induced
corrosion, and sulfate resistance. Computer software
is being developed for analysis and design purposes
to obtain mix proportions of concrete with the required
initial and long-term performances. Results of the
research works are utilized in the establishment of
“Design Considering Durability and Service Life” for
concrete structures in Thailand.

**Proper Use of Cementitious and Non-
cementitious Powders in Concrete**

Studies on the properties of concrete with various
kinds of powder materials are conducted. The
materials are: fly ash, bottom ash, CaCO₃ powder,
lime ash, blast furnace slag, etc. Optimizing the use
of these materials and development of new cement
are the aims of this project.

**Special Concrete**

Various types of special concrete are studied with the
aim to make proper use of local materials. Mix design
processes in the forms of software and design charts
are being developed. In addition to the mix design,
some standard guidelines are being established. The
studied types of special concrete are; self-compacting
concrete, zero-slump concrete, low-heat concrete,
sulfate-resisting concrete and expansive concrete, etc. carried out. The works are parts of the program to
develop appropriate maintenance codes and
standards for concrete structures in Thailand.

**Maintenance of Concrete Structures**

Research works and their applications on inspection
and life cycle evaluation of concrete structures are

**Dr. Taweep Chaisomphob**

**Associate Professor**

B.Eng. (1st Class Honors) in Civil Engineering, Chulalongkorn University, Thailand
M.Eng. & D.Eng. in Civil Engineering, University of Tokyo, Japan

Areas of Specialization: Application of Three-Dimensional Finite Element Methods to the Design of Steel Structures; Development of Run-off-River Small Hydropower Projects; Development of Efficient Organic Waste Composting System for Small or Medium Communities.

**Research Interests:**

**Application of Three-Dimensional Finite Element Methods to the Design of Bridge Structures**

In order to propose the improvement in the design methods of bridge structures, a three-dimensional
finite element method using solid and shell elements is employed. For the local stress analysis of a
complicated bridge structure, such as a composite steel-concrete bridge, a model accounting for
interaction between steel and concrete is developed. By carefully investigating the behavior of steel box-
girders, the assessment of shear lag effects on stress and deflection is proposed.

**Development of Run-off-River Small Hydropower Projects**

Run-off-river small hydropower is considered as one
of the promising renewable energy sources in
Thailand, since it gives less environmental and social
impacts. Feasibility studies of the hydropower
projects of this type are performed by considering
equipment, economic and environmental criteria. A
geographical information system (GIS) is adopted as
a tool for the present study.

**Development of Efficient Organic Waste Composting System for Small and Medium Communities**

Composting as the treatment of the municipal solid
waste has been getting more promising as it has
lesser effect to the environment. However, in the
developing countries, it has usually been over looked
due to its complex processes, and lack of technology.
To eliminate such problems, this research project
aims to develop a better composting system. A pilot
plant was set up, and a series of experiments was
conducted to study the optimal composting
conditions, which would maximize its efficiency in
actuality. This will be followed by a feasibility study
and Life Cycle Assessment (LCA) of the proposal as
a sustainable development for solid waste treatment
methods in the future.

**Dr. Winyu Rattanapitikon**

**Associate Professor**

B.Eng. in Agricultural Engineering, Khon Kaen University, Khon Kaen, Thailand
M.Eng. in Water Resources Development, Asian Institute of Technology (AIT), Thailand
D.Eng. in Civil Engineering, Yokohama National University, Yokohama, Japan

Areas of Specialization: Mathematical modeling, Coastal engineering.

**Research Interest:**

**Mathematical Modeling for Cross Shore Sediment Transport and Beach Deformation under Regular and Irregular Waves**

Many numerical models had been developed to
compute sediment transport rate. However, most of
the models were developed under limited
experimental conditions. Therefore their validity is
limited according to the range of experimental
conditions which were employed in the calibration.
The evidence is that many models exist. The main
objective of this research is to develop a reliable
sediment transport model based on a wide range of
experimental conditions.
School of Communications, Instrumentations & Control
Faculty Members and Research Interests, 2008

Dr. Banlue Srisuchinwong

*Associate Professor*

B.Eng. (Honors) in Electrical Engineering, King Mongkut's Institute of Technology Ladkrabang, Thailand
Diploma of the Philips International Inst. of Technological Studies (Electronics), Eindhoven, The Netherlands
M.Sc. & Ph.D. in Electrical Engineering, University of Manchester Institute of Science and Technology, UK

Areas of Specialization: *Microelectronics, Analogue Integrated Circuits.*

### Research Interests:

**Chaotic Oscillators**

Implementation of Chua's chaotic oscillators based on simple CMOS nonlinear resistors. High-frequency Sprott's sinusoidal and chaotic oscillators using current feedback operational amplifiers (CFOAs).

**Sinusoidal Oscillators and Filters**

High-frequency low-power sinusoidal quadrature oscillators. High-Q wide-dynamic-range bandpass filters.

Dr. Chalie Charoenlarpnopparut

*Assistant Professor*

B.Eng. (1st Class Honors with Gold Medal) in Electrical Engineering, Chulalongkorn University, Thailand
M.S. in Electrical Engineering, The Pennsylvania State University, University Park, PA, USA
Ph.D. in Electrical Engineering, The Pennsylvania State University, University Park, PA, USA

Areas of Specialization: *Multidimensional systems and signal processing, Robust control, Image processing, Minimax controller design, Wavelet and filter bank.*

### Research Interests:

**Digital Signal Processing**

Multidimensional signal processing has become more popular lately due to its efficiency and greater degree of freedom in the design. However, the design and analysis of multidimensional systems are generally more complicated and requires thorough understanding of abstract algebra. Applications of multidimensional DSP include image compression, video coding, multi-sensor system design, filter bank design and wavelet.

**Multidimensional System/Robust Control**

Over several decades, great effort has been invested in the finding of a multivariate (n-D) polynomial matrix factorization algorithm. The problem has been completely solved only for the bivariate case. Recently with the usage of Groebner basis and conventional algebra, some n-D matrix factorization algorithms have been developed for some special cases. The general problem however, remains open. The solution to this problem will simultaneously solve many other important problems and can be directly applied to the multidimensional system realization and synthesis.

**Signal Processing for Communication and Coding Theory**

Many signal processing techniques such as adaptive filtering and spectral analysis are used to improve the fidelity of the transmission and reception of digital signals. Unlike source coding, channel coding is used for the purpose of protecting the transmitted bit stream from erroneous receiving. Correction and detection of error bits by means of algebraic coding techniques such as 1-D and 2-D convolutional code are usually employed. Topics of interest include: adaptive filtering, power spectrum estimation, array processing, 2-D convolutional code design, and application-specific coding design.

Dr. Duangrat Eungdamrong

*Assistant Professor*

B.S. & M.S. in Electrical Engineering, University of Wisconsin-Madison, WI, USA
Ph.D. in Electrical Engineering, University of Wisconsin-Milwaukee, WI, USA

Areas of Specialization: *Wireless communication, Communication systems, Microwave and RF circuits, Antenna, Electrical Sensors.*
Research Interests:

**Phase Noise Models**

Because of an exponential growth in wireless communication, demand for the frequency channels in mobile communication application is increasing, which in turn, imposes more stringent requirements on phase noise of circuits. Oscillator phase noise is an essential parameter that limits the performances of many modern telecommunication systems because introducing even small noise into the circuit leads to dramatic changes in its frequency spectrum and timing properties. Phase and frequency fluctuations have been the subject of numerous studies both experimentally and theoretically.

**Open-Ended Coaxial Line Microwave Sensor**

Open-ended coaxial lines have been used as electromagnetic sensors or probes in various industrial and scientific applications. This includes in-vivo characterization of biological media, nondestructive measurements of materials, and non-contact testing of disbands in composites. In these applications, a radio frequency or microwave signal excites the probe that is placed against the sample medium. An echo signal received by the coaxial sensor carries the characteristics of the sample material. Therefore, the reflection coefficient (or aperture admittance) at the sensor can be monitored to extract the sample characteristics. Hence, the characterization process requires a suitable electrical model of the coaxial sensor in contact with the sample.

**Transformation of Transistor’s S-parameters**

Manufacturers generally supply the data sheets of transistors containing S-parameters with respect to the emitter (or the source). In other words, the transistor is considered as a two-port device with common emitter (or common source) configuration. However, the design engineers may want to use other configurations of the transistor for certain circuits. Hence, the transformation of S-parameters of the transistor is needed. Feedback networks can be conveniently designed to obtain the desired device behavior.

**Antenna**

In recent years, the need of wireless communications, operating at 1.9 GHz, GSM-USA standard, 2.4-2.5 GHz, 802.11b WLAN, Bluetooth, 3G and 4G, has grown at an exponential rate. Thus, it has been an endless improvement in increasing the capability and quality of transmission. Because of the struggle to achieve high data rates without compromising the quality of the received information, a new multi-antenna system that yields substantially increased channel capacity had been proposed. In addition, a new Multiple-input Multiple-output (MIMO) system was also introduced to support this multi-antenna system. Information are transmitted and received through these multiple antennas. The system uses the special routes to transmit more information with little interference.

Dr. Itthisek Nilkhamhang

**Lecturer** (Joined SIIT in May 2008)

B.Eng. (1st Class Honors) in Electrical Engineering, Sirindhorn International Institute of Technology, Thammasat University, Thailand

M.S. in Integrated Design Engineering, Keio University, Tokyo, Japan

Ph.D. in Integrated Design Engineering, Keio University, Tokyo, Japan

**Areas of Specialization:** Robust and adaptive control theories, System identification, Nonlinear systems, Mechatronics, Electrical power systems, Fuzzy and neural network control theories.

**Research Interests:**

**Robust and Adaptive Control Theories and Applications**

Control engineering is a rapidly evolving discipline with a wide range of applications, including but not limited to chemical, electrical, mechanical, and civil systems. However, the mathematical models upon which control theories are based can never precisely describe all the characteristics of any given system. This uncertainty is a direct result of various factors, such as incomplete system knowledge, variable dynamics and parameters, complex physical mechanisms, and external disturbances. The discrepancy between a physical system and its mathematical description is therefore an issue of grave concern for control engineers. Robust and adaptive control theories have emerged as highly efficient tools for dealing with uncertainties, capable of guaranteeing robust and stable system performance under varying operational conditions. This research aims at developing robust and adaptive control strategies, with particular emphasis on mechanical and electrical systems. Possible applications include vibration suppression of automotive systems, automation of industrial processes, force feedback and haptic interfacing.

**System Identification**

The accuracy and performance of any control system is greatly dependent upon the mathematical model on which it is based. Thus, there is a strong correlation between the practice of control engineering and system identification. System identification refers to the use of measured data in combination with stochastic or deterministic methods to discern the structure and relevant parameters of a given system. As such, it is an invaluable tool when dealing with
systems with uncertain or unknown mathematical models and parameters. This research is concerned primarily with applying system identification theories to complex systems involving nonlinearities and hybrid models.

Dr. Sawasd Tantaratana

Professor
B.E.E. with high distinction, University of Minnesota, USA
M.S.E.E. Stanford University, USA
Ph.D. in Electrical Engineering, Princeton University, USA
Areas of Specialization: Communication systems, Spread-spectrum systems, Wireless communications, Signal processing, Digital filter design and realization.

Research Interests:

Communication Systems

Wireless Communications and Spread-Spectrum Systems
Spread-spectrum system design and analysis.

Dr. Toshiaki Kondo

Assistant Professor
B.Eng. in Mechanical Engineering, Tokyo Institute of Technology, Japan
M.Eng. in Information Processing, Tokyo Institute of Technology, Japan
M.Eng. in Image Processing, The University of Sydney, Australia
Ph.D. in Image Processing, National University of Singapore, Singapore
Areas of Specialization: Digital image processing, such as feature detection and segmentation in 2-D and 3-D. Computer vision, such as depth estimation and motion estimation. Pattern recognition, such as human face recognition.

Research Interests:

Digital Image Processing (especially Medical Image Processing)
Feature detection and image segmentation are the primary areas of my research interests. “Analysis of 3-D maxillofacial image data” is the title of my doctoral dissertation, which focused on the analysis of the human dentition and jawbone for orthodontic treatment and surgery. The extraction of anatomical features in retinal images is one of my recent research topics.

Computer Vision and Remote Sensing
Depth estimation and motion analysis are the areas of my long-term research interests. Depth estimation is the central issue in dealing with stereo (or more) images, while motion analysis is concerned about the process of time-sequential images. I am particularly interested in the “correspondence problem” that has to be solved for estimating both depth and motion.

Object Classification and Recognition
Image understanding is another area of my interests. This category has various applications for bioinformatics and industry, such as security control, parts inspection, grading and sorting, etc. A popular research topic in bioinformatics is human face recognition which I have worked on.

Dr. Waree Kongprawechnon

Associate Professor
B.Eng. (1st Class Honors) in Electrical Engineering, Chulalongkorn University, Thailand
M.Eng. in Control Engineering, Osaka University, Japan
Ph.D. in Mathematical Engineering and Information Physics, University of Tokyo, Japan
Areas of Specialization: The theory in $H^\infty$ control, the theory in Robust control.
Research Interests:

**H∞ Control**

The advent of $H^\infty$ control was a truly remarkable innovation in multivariable theory. It eliminated the classical/modern dichotomy by formulating the design issues of classical control property and has solved it based on the state-space tool of modern theory. The theory-practice gap was no longer a significant issue at the beginning of the 1990s due to a number of successful applications of $H^\infty$ control to real design problems, especially applications of $H^\infty$ control based robust control theory.

**Robust Control**

No mathematical system can exactly model a physical system. Nowadays it is gradually being recognized that the real issue of control engineering we were faced with was the difficulty of modeling the plant to be controlled. For this reason we must be aware of how modeling errors might adversely affect the performance of a control system. Robust control theory became the most popular area that was expected to deal with model uncertainty.

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**School of Information and Computer Technology**

**Faculty Members and Research Interests, 2008**

**Dr. Bunyarit Uyyanonvara**

**Assistant Professor**

B.Sc. (1st Class Honors) in Science (Physics), Prince of Songkhla University, Thailand
Ph.D. in Image Processing, King's College, University of London, UK

**Areas of Specialization:** Image processing, Texture segmentation, Relaxation labeling, Medical imaging

**Research Interests:**

**Image Segmentation Using Texture and Relaxation Labeling Algorithms**

When normal density or intensity segmentation is not effective enough, a new representation of texture which is derived from the spatial energy of the texture is introduced in order to segment the given image. From the energy values, a 2D histogram of texture is generated. The texture histogram is used to discriminate textures and to retrieve image segmentation. In an attempt to assess the similarities in the regional areas, the property of adjacency could be useful. This characteristic of pixels is defined as a co-occurrence matrix, which is an important tool in Image Segmentation using Texture and Relaxation Labeling Algorithms.

**Medical Image Processing**

Taking advantage of the high capability of computers, offering advantages over film based systems, several image processing techniques are of interest, especially for medical purposes in order to get most of the information out of the given medical images. Essentially, medical imaging can make use of texture information, texture feature classification or texture segmentation because of the nature of the medical image itself. Medical assessment can then be made fully automated later on and this will lead to a reduction of human errors, increasing of consistency and repeatability. This can be distributed to the remote areas or hospitals that lack sophisticated treatment facilities or trained experts.

**Dr. Cholwich Nattee**

**Lecturer**

B.Eng. in Computer Engineering, Chulalongkorn University, Thailand
M.Eng. in Computer Science, Tokyo Institute of Technology, Japan
D.Eng. in Computer Science, Tokyo Institute of Technology, Japan

**Areas of Specialization:** Artificial intelligence, Machine learning, Knowledge discovery and Data mining, Artificial Intelligence applications in distance learning and pattern recognition.

**Research Interest:**

**Inductive Logic Programming for Structure-Activity Relationship Studies**

Nowadays, a vast amount of chemical compound structure information can be produced due to advances in High Throughput Screening technology that automates compound screening using the combination of robotics, image processing and pattern recognition. From these data, knowledge describing compound activities and characteristics
from their structures is essential, since it can be used for predicting characteristics of unknown compounds for developing new drugs. Machine learning and data mining techniques have been applied in order to automatically obtain models describing the relations between structure and activity. However, traditional data mining algorithms have limitations on knowledge representations. Thus, complicated structures of chemical compounds cannot be handled efficiently.

Extended from traditional machine learning techniques, Inductive Logic Programming (ILP) applies first-order logic for representing data. This allows complicated structures or relations among training examples to be denoted without losing any information. Moreover, learning results in the form of first-order rules, are comprehensible. The knowledge obtained can be easily explained to domain experts.

Dr. Ekawit Nantajeewarawat

Associate Professor
B.Eng. in Computer Engineering, Chulalongkorn University, Thailand
M.Eng. & D.Eng. in Computer Science, Asian Institute of Technology (AIT), Thailand
Areas of Specialization: Knowledge representation, Computational logics, Formal ontologies, Semantic Web, Computation theory, Object-oriented system analysis and design.

Research Interests:

Semantic Web
The basic idea of the Semantic Web is to describe the meaning of Web data in a way suitable for automatic reasoning. Expectedly, the Semantic Web technology will bring about large-scale heterogeneous Web knowledge bases with a qualitatively new level of service. The concept of ontology (domain theory) will play a key role as a formal, explicit specification of shared conceptualizations that describe the semantics of data on the Web. Formal ontology languages as well as meta-level representation of Web resources are investigated. The possibility of developing automated reasoning systems for Semantic Web is explored from both theoretical and practical viewpoints, e.g., a hybrid approach with a strict separation between ontology predicates and rule predicates and a homogeneous approach embedding rules and ontologies in a logical language. Realization of the Semantic Web vision demands further research works on several other knowledge-representation-related issues.

Reasoning with UML Diagrams
The Unified Modeling Language (UML) is a graphical language, adopted as a standard by the Object Management Group (OMG) for visualizing, specifying, constructing, and documenting the artifacts of a software-intensive system. As reported by recent works on the formal semantics of UML, there exist inherent interrelationships between components of a UML model. Such interrelationships constitute part of general knowledge about the domain of UML, which may be used for, e.g., deriving implicit properties and verifying the consistency of the model. A framework for knowledge representation and reasoning in the domain of UML is proposed, in which a UML model is represented as textual. XML data, and the general knowledge about the UML domain as an XML declarative description. Development of an inference engine for automatic refinement of the encoded UML diagrams and derivation of implicit model properties is underway.

Equivalent-Transformation Computation Model
In declarative paradigms, a declarative description plays the role of a precise specification, and, at the same time, operates as a program. A number of works on amalgamation and generalization of declarative languages have been proposed. Most of them have been driven mainly by computation-oriented requirements, e.g., enhancement of operational semantics and integration of computation models; other important related concepts such as program synthesis and program transformation are investigated only afterwards and not inherent in their designs. By contrast, the equivalent transformation (ET) paradigm takes a program-synthesis-oriented approach, i.e., effective generation of efficient and correct programs from specifications is its underlying design motivation. Theoretical investigation of the ET computation model is in progress.

A Theoretical Framework for Comparing Computation Models
Systematic generation of programs relies on some specific practically-determined correctness relation, which associates with each specification a number of cost-effectively-derivable correct programs with respect to it. Between two such correctness relations, if one is more expressive than the other, the former is preferable, i.e., it determines a larger space of derivable correct programs. Program generation in different computation paradigms, e.g., logic programming (LP), constraint logic programming (CLP), functional programming (FP), functional logic programming (FLP), and equivalent transformation (ET), employs different correctness relations, and the expressiveness thereof cannot be compared directly due to the discrepancy in the forms of specifications, programs and computations. The need arises for a means of comparing the expressiveness of correctness relations across computation frameworks.
Dr. Gun Srijuntongsiri

Lecturer (Joined SIIT in May 2008)
B.S. in Computer Science, Cornell University, USA
M.S. in Computer Science, Cornell University, USA
Ph.D. in Computer Science, Cornell University, USA
Areas of Specialization: Computer-aided design, Computational geometry, Intersection problems, Optimizations, Sparse computation, Matrix computation, and Numerical methods for differential equations.

Research Interests:

Intersections of Geometric Entities

The problems of finding all intersections between two or more geometric entities, such as lines, curves, and surfaces, have many applications in computational geometry and computer-aided geometric design. Ideal algorithms for these problems should have the following properties: robustness, efficiency, and accuracy. There have been no algorithms, however, that have all of the three properties; most of them are excellent in one or two aspects but are poor in the others. We are interested in designing algorithms that satisfy all of the three properties at the same time as much as possible. Another property of interest is whether the running time of the algorithm depends solely on the condition number of the problem instances. This property is beneficial to have as preconditioning is an important aspect of any numerical computations and it is not appealing if the algorithms become much slower after the problems have been preconditioned. In addition, this would give us an estimate of the running time of the algorithm for a particular problem instance.

Exploiting Sparsity in Semidefinite Programming

Semidefinite programming (SDP) is an optimization problem over symmetric positive semidefinite matrix variables with nonlinear but convex constraints. It is more general than linear and quadratic programming. SDP has many applications in engineering and control theory. It is also used to find approximate solutions to combinatorial optimization problems.

The semidefinite programs found in practice are usually very large but very sparse. That is, the entries of the data matrices are mostly zeroes. To solve such programs effectively, sparsity must be exploited. The most efficient class of algorithms for SDP, primal-dual interior point methods, does not preserve sparsity and cannot exploit sparsity in the input data. We are interested in designing an algorithm that is either in this class or is as efficient that can also exploit sparsity in every step of its computation.

Dr. Komwut Wipusitwarakun

Assistant Professor
B.Eng. (Honors) in Electrical Engineering, Chulalongkorn University, Thailand
M.Eng. in Communication Engineering, Osaka University, Osaka, Japan
Ph.D. in Communication Engineering, Osaka University, Osaka, Japan
Areas of Specialization: Broadband communication networks, Network reliability analysis, Self-healing network design, ATM and TCP/IP technologies, Congestion control technologies.

Research Interests:

Highly Reliable Wide Area Network Design

In the coming “Information Age”, business and daily life will be highly reliant on telecommunication services. All organizations, companies and ordinary homes will be connected together by the Wide Area Communication Networks (WAN) so that various kinds of services, provided at anywhere, can be accessible from everywhere at anytime. Network reliability will become a vital concern since the failure of network functionality will result in a significant impact on a wide-range of users both in tangible and intangible forms. Thus, technologies for designing and assuring the high reliability of WAN are needed. These include, for example, theory and tools to analyze the reliability-level of networks, automatic re-routting algorithms (self-healing algorithm) design, reliability-level based traffic prioritizing scheme, working and spare capacity design and plans to upgrade reliability-level of existing networks, etc.

Virtual Private Network

The Virtual Private Network (VPN) is technology to enhance the utilization of an unreliable connection traversing through public networks (either circuit-switching-based or IP (Internet Protocol)-based network) and sharing bandwidths with other users to create a reliable/secured connection (virtual private connection) like a conventional leased circuit, but with much lower costs. The IP-based VPN is promising since IP-based applications are widely used in all communities. The IP-based VPN technology involves designing a security scheme to protect transferred data from other users, a bandwidth management scheme to retain the acceptable bandwidth-level of the connection and a parallel data-transferring scheme to create a virtual high-bandwidth connection from a group of low-bandwidth connections.
Dr. Pakinee Aimmanee

**Lecturer**

- B.S. in Mathematics (Cum laude with distinction), minor in Computer Science, University of Delaware, USA
- M.S. in Applied Mathematics, University of Colorado at Boulder, USA
- Ph.D. in Applied Mathematics, University of Colorado at Boulder, USA

**Areas of Specialization:** Information Retrieval, Applied linear algebra.

**Research Interest:**

**Information Retrieval**

The number of text documents nowadays has grown very rapidly through widely varied media such as books, journals, and Webs. Getting information from the large collection of data or documents is not an easy task. Data indexing and retrieval are in the field of Information Retrieval (IR) that have been of interest to computer information scientists in the past few years. There are many search algorithms that are used to solve the retrieval problems, but each still has some disadvantages, especially in terms of storage usage, speed, and accuracy. This causes the search algorithms become not as efficient as they should be. My research focuses on how to improve search algorithms to gain more accuracy and to require less time and storage.

Dr. Philippe Meunier

**Lecturer**

- B.Eng. in Computer Science, Ecole Nationale Superieure des Telecommunications de Paris, France
- M.Sc. in Computer Science, Rice University, USA
- Ph.D. in Computer Science, Northeastern University, USA

**Areas of Specialization:** Programming languages, Static analyses.

**Research Interest:**

**Modular Analysis of Higher-Order Languages**

Detecting bugs before releasing software is a major goal of software engineering. While a rigorous software development process and systematic testing help, only formal methods can guarantee the absence of bugs, or at least the absence of some classes of bugs. From sound type systems to theorem provers, such formal systems have been available for a long time, but the adoption of these advanced systems has been slow, due to both their inherent complexity and their sometimes poor running times.

My research focuses on static analyses for higher-order languages, in particular value-flow analyses for the Scheme programming language. The challenge is to create an analysis that is modular (so programmers can analyze individual modules even when the source code of the whole program is not available), fast, and precise (not too many false positives). Using a graphical static debugger based on such an analysis, programmers can view sound approximations of the values and errors that each expression in a program might produce at runtime, as well as view the flows of the values in the program. With this information, programmers can then easily trace the sources of bugs in an intuitive manner.

Dr. Stanislav S. Makhanov

**Associate Professor**

- M. Appl. Math., Moscow State University, Faculty of Computational Mathematics and Cybernetics, Moscow
- Diploma in English Language, Moscow Institute of Foreign Languages, Moscow
- Ph.D. in Applied Mathematics, Computer Center of the Russian Academy of Science, Moscow

**Areas of Specialization:** Image processing, Robotics, Grid generation, Computational fluid dynamics.

**Research Interests:**

**Software for Optimization of the Tool-Path of Industrial Milling Robots**

Innovations in the field of mechanical engineering have enhanced the involvement of milling robots in various manufacturing processes. Nowadays, computer guided milling machines are employed to produce free-shape surfaces in mass manufacturing industries such as automobile, airplane, ship-building, etc. However, several physical phenomena, such as machine kinematics, thermal effects, static and dynamic loading, and common-cause failures often affect the quality of the desired surface. Although recent research papers have displayed a number of advanced methods to improve the characteristics of machining, a robust algorithm to generate the optimal tool-path for geometrically complex workpieces is still an open problem.

**Image/Signal Reconstruction**

Image processing and restoration has revolutionized the fields of medicine, space exploration, geology, and oceanography. A fundamental issue of image...
restoration is identification of the distortion in the presence of observation noise. However, it is well known that small variations of the initial data could lead to solutions far from a correct one. Moreover, the performance of the identification procedures critically depends on the assumptions regarding the size and the shape of the distortion. Therefore, an efficient procedure should be smart enough to perform an appropriate regularization and to recognize the size and the pattern of the distortion. These features are particularly important in the case of multi band wavelet based schemes since the procedure can not be decomposed with regard to filtered components of the image. The up-to-date Literature on Image Processing clearly indicates the need for further research.

Grid Generation Technologies

Grid generation techniques emerged as a sub-discipline of Computational Fluid Dynamics in the early seventies. Nowadays grid generators are among the major components employed by versatile codes in Geometrical Modeling, Computer Graphics, CAD/CAM, Structural Analysis, Aerodynamics and Computational Fluid Dynamics. However, in spite of considerable efforts and a long time spent on curvilinear and moving grid generation, the theoretical principles have not been yet established. Grid generation today is still much more of an art than a science. Since many different approaches exist and are being used, creative craftsmen are needed to operate the various packages. Therefore, from an industrial point of view, issues surrounding efficient implementation, interactive, graphical user interface, visualization and software engineering in grid generation are of paramount importance.

Dr. Steven Gordon

Assistant Professor
B.Eng. in Computer Systems Engineering, University of South Australia, Australia
Ph.D. in Telecommunications, University of South Australia, Australia
Areas of Specialization: Telecommunications, Internet and Computer Networking including: Wireless Networks, Satellite Internet, Wireless security, Distributed computing and middleware, Formal methods and Petri Nets, System protocol design and analysis.

Research Interests:

Mobile Peer-to-Peer Networking

Low-cost wireless networking devices, such as Wi-Fi enabled laptops and mobile phones, has allowed mobile Internet access to flourish. Future advances in wireless networking, such as Mobile Ad Hoc Networks, Mesh Networks and Sensor Networks, will enable mobile Internet applications to be used in a more distributed manner, in particular Mobile Peer-to-Peer applications. To make Mobile P2P feasible, many networking challenges must be overcome, including: maintaining network performance in presence of voice and video applications; providing fair and/or prioritised allocation of resources to users (e.g. Quality of Service control); detecting, and preferably avoiding Denial-of-Service security attacks; and allowing users to seamlessly move between networks, while maintaining their application sessions.

Formal Design of Protocols

Communication protocols (such as TCP/IP, IEEE 802.11, GSM, P2P protocols) are a core part of technologies we use everyday: the Internet, mobile and landline phones, transport systems, home entertainment and so on. Hence, it is vital that these protocols operate in a correct, efficient and secure manner. The design and analysis of communication protocols has been a subject of research and engineering practice for years. However, with the ever-increasing release of new protocols, especially for the Internet and wireless networks, tools and techniques are needed to verify the design of common protocol mechanisms, rather than analysing every protocol individually. Two promising areas of research are: creating and verifying formal Petri net models of mechanisms that are applicable to a range of protocols; and integrating techniques for formal, performance and security analysis (e.g. combining Petri nets with simulation tools like NS2 and OPNET; using formal models for security proofs).

Dr. Surapa Thiemjarus

Lecturer (Joined SIIT in June 2008)
B.Sc. (1st Class Honors) in Information Technology, Sirindhorn International Institute of Technology, Thammasat University, Thailand
M.Sc. in Advanced Computing, Imperial College London, UK
Ph.D. in Computing, Visual Information Processing Research Group, Imperial College London, UK
Research Interest:

**Context Aware Sensing with Body Sensor Networks**

In mobile computing research, embedding of context knowledge into devices as a means for adding practical value to mobile devices is becoming popular. In fact, reliable detection of patient activity under which the physiological signals are sampled is important to the capture of clinically relevant episodes, since similarly detected sensory signals can be interpreted differently depending on the task the patients are engaged in.

A wireless Body Sensor Network (BSN) represents the latest evolution of diagnostic tools from the traditional episodic management to continuous monitoring of patients’ physical and biochemical parameters under their natural physiological conditions. This allows the detection of transient but life threatening abnormalities and the early prediction of adverse events. Beside its applications in healthcare, a BSN can also be used as an human-computer interface for games and provide a monitoring platform for detailed analysis of the athletes under a natural training environment.

**Dr. Thanaruk Theeramunkong**

**Associate Professor**

B.Eng. in Electrical and Electronics Engineering, Tokyo Institute of Technology, Japan.
M.Eng. in Computer Science, Tokyo Institute of Technology, Japan.
D.Eng. in Computer Science, Tokyo Institute of Technology, Japan.

**Areas of Specialization:** Artificial Intelligence (AI), Natural Language Processing (NLP), Information Retrieval (IR), Knowledge Data Discovery, Data Mining, Machine Learning (ML), and Intelligent Information Systems.

**Research Interests:**

**Natural Language Processing**

(1) Robust NLP and Linguistic Knowledge Acquisition

While NLP systems are gradually becoming accepted by a wider range of people both in academic and business area, many difficult problems are still unsolved. One of the important problems is how to improve robustness and adaptiveness in NLP system, especially how to analyze and interpret various phrases and sentences which are ungrammatical (also called ill-formed inputs). A user-friendly system should be robust and flexible in that it can analyze any well-formed and ill-formed input efficiently. The system should also be adaptive to deal with phrases/sentences including unseen construction and vocabulary, for instance learning some new grammar rules. Currently, we are focusing on both rule-based and corpus-based approaches to cope with ill-formed inputs and, when needed, to acquire novel linguistic knowledge. On the increase of very large electronic corpora, statistics obtained from such corpora are a useful clue for this problem.

(2) Text Interpretation: Information Retrieval, Categorization and Information Extraction

In the past, most online information stored in databases or spreadsheets. At the present time, the majority of online information is text-based, e.g., e-mail, news, journal articles, reports, books, encyclopedias. These information sources are worth but there is too much information available, and not enough time to sort through it. Text interpretation techniques are helpful for categorizing, filtering and extracting information from text. Three types of text interpretation are information retrieval, categorization, and information extraction. We are interested in developing of efficient methods to various tasks of text interpretation.

**Knowledge Science and Engineering**

(1) Knowledge Data Discovery in Database

Knowledge Data Discovery (KDD) is a rapidly growing interdisciplinary field that merges together databases, statistics, machine learning and other AI technologies in order to extract useful knowledge from a large-scaled collection of data. The problems in this field are of two general categories: (1) prediction and (2) knowledge discovery. Knowledge discovery is a stage prior to prediction, where information is insufficient for prediction, such as clustering, association rules, text mining and so on. Our study aims at finding and implementing efficient, robust and scalable methods in real-world situation where databases are complex, voluminous, noisy and non-stationary. Some interesting applications include computer-aided education (CAI), decision support systems, and management information systems.

(2) Intelligent Decision Support Systems

In business, government, and other organizations, decision making plays an important part in determining the landscape of tomorrow’s world. Computer systems that assist decision-making process are called decision support systems (DSSs). Intelligent decision support systems (IDSSs) are DSSs that make use of techniques emerging from the field of artificial intelligence (AI). Our research focuses on studying new techniques in both (1) model-driven support systems, which are based on strong theory or model, and (2) data-driven support systems, which are based on database technologies and statistical methods.
School of Management Technology
Faculty Members and Research Interests, 2008

Dr. Aussadavut Dumrongsiri

Lecturer (Joined SIIT in May 2008)
B.E. in Electrical Engineering, Chulalongkorn University, Thailand
M.Sc. in Electrical Engineering, Michigan State University, East Lansing, MI, USA
M.Sc. in Industrial and Operations Engineering, University of Michigan, Ann Arbor, MI, USA
MBA (Finance), Thammasat University, Bangkok, Thailand
Ph.D. in Business Administration (Operations Management), University of Washington, Seattle, WA, USA.

Areas of Specialization: Operations management, Supply chain management, Project management, Inventory management, Game theory, Business competition.

Research Interests:

**Dual-Channel Supply Chain**
With the introduction of the Internet, firms can introduce a web-based channel to sell products directly to the consumers and this channel competes directly with the traditional channel: retailer stores. The research aims to study the outcomes of the competition under demand uncertainty and how to maximize the total supply chain profit. The coordination mechanism between the channels is analyzed and proposed.

**Rental Service Operations**
By using the on-line historical customer information, the rental service can learn the behavior of each customer. The behavior of customers, such as rental duration, is used by the firm to better manage the rental service operation. The research aims to find dynamic optimal allocation policy to allocate limited rental items, such as DVDs, among customers classified by rental duration under the fixed-price scheme.

Dr. Chawalit Jeenanunta

Lecturer
B.S. in Computer Science, University of Maryland, USA
B.S. in Mathematics, University of Maryland, USA
M.S. in Management Science, University of Maryland, USA
Ph.D. in Industrial and Systems Engineering, Virginia Polytechnic Institute and State University, USA

Areas of Specialization: Linear programming, Integer programming, Network optimization, Simulation, Supply chain management.

Research Interests:

**Large-Scale Simulation and Optimization**
Many problems in the real world are large and complex. Researchers in this field are trying to improve the algorithm and utilize available computational technology such as parallelism or grid computing to solve such problems where their resulting models are also very large. This technology also enables researchers to have a detail model which is close to the real world problem. Some examples of these problems are transportation problem in the urban area (where there consists of millions of people driving on thousands of streets), financial simulation, bioinformatics, and large-scale planning.

**Supply Chain Management (SCM)**
The researches in SCM involve the study of the process of planning, implementing, and controlling the operations of the supply chain with the purpose of reducing cost and increasing efficiency. SCM includes all movement and storage of raw materials, work-in-process inventory, and finished goods from origin to consumption. There are many problems that can be modeled by simulation and optimization models.

Dr. Nattharika Rittippant

Lecturer (Joined SIIT in May 2008)
B.S. in Biology, University of Dallas, USA
B.A. in Economics, University of Dallas, USA
M.B.A. in International Business Management, University of Dallas, USA
M.M. in E-Commerce, University of Dallas, USA
Ph.D. in Strategic and International Management, University of Texas at Arlington, USA

Areas of Specialization: Strategic management, International management, Entrepreneurship.
Research Interests:

**Strategic Management**

Strategic management focuses on the management process involving strategic formulation, strategic implementation, and control. The goal is to continuously assess the organization’s external factors (e.g., economy, politics, competitors) and internal factors (e.g., human resources, financial resources, core competencies) in order to create and sustain competitive advantages. This field of study explains how and why some firms outperform others.

**MNE Strategies**

Multinational Enterprises (MNEs) deal with a relatively higher level of uncertainty and changes than pure domestic firms due to the additional global macroenvironmental factors that can have significant impacts on these firms’ strategies and performance. As such, MNEs’ strategic formulation, implementation, and control processes are much more complex. Global trends and events must also be taken into consideration by the MNE top-level management when developing strategies to compete globally.

**Entrepreneurial Intentions**

Entrepreneurial intentions refer to the entrepreneurs’ determination to start new business ventures. The study of entrepreneurial intentions enables entrepreneurship researchers to better understand and predict entrepreneurial activities. As a result, policy makers can improve policies to promote and support entrepreneurship for economic growth and development. The entrepreneurs can also benefit from a better understanding of their own motivations.

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**Dr. Pisit Chanvarasuth**

**Lecturer**

Doctor of Veterinary Medicine, Chulalongkom University, Bangkok, Thailand
M.B.A. in Finance, Loyola University, Chicago, USA
M.S. in Management Information Systems, Rensselaer Polytechnic Institute, New York, USA
Ph.D. in Management Information Systems, Rensselaer Polytechnic Institute, New York, USA

Areas of Specialization: Information technology management, Electronic business, Supply chain management, Outsourcing, and Management of organizational business process.

**Research Interests:**

**Electronic Business**

Globalization and information technologies (IT) are drastically changing the face of business and organizations. We are all experiencing one of the most noticeable changes to our daily lives - the move to an Internet-based society. At present, there is a growing interest in the use of Electronic business as a means to perform business transactions. IT are being adopted and incorporated into nearly all organizations, which have invested heavily in IT infrastructure for the overall success of their businesses. Through using Electronic business, companies are able to connect with their trading partners, which improves their competitiveness globally. Not only does Electronic business create the Web-based businesses, it is the building of a new industrial order. Such a revolution brings a myriad of opportunities as well as risks. Electronic business is an exciting area for research because of its relative novelty and exploding growth.

**Business Process Outsourcing**

Despite the widespread trends in business process outsourcing, there has been too little focus on what happens to the shareholder wealth and firm value when an organization outsources. Typically, organizations simply lack the means and experiential research to assign value to business processes they are transferring and receiving. That is, they have no real understanding of how new value can be created in business process outsourcing situations, let alone exploited. This is a continuation of my dissertation research which focused on the shareholder wealth effect of business process outsourcing to the firm.

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**Dr. Pornpimol Chongphaisal**

**Lecturer**

B.B.A. in Marketing, Assumption University, Thailand
M.A. in Comparative Management, Ritsumeikan University, Japan
Ph.D. in Management, Ritsumeikan University, Japan

Areas of Specialization: Intercorporate relations, Competencies and their applications in Human Resources Management, Organizational Behavior and Development.

**Research Interest:**

**The “Intermediate Form” of Intercorporate Relations**

The traditional ‘make’ refers to a company making its own products whereas ‘buy’ refers to the transaction in the market, has become a problem of the past. Both ‘market’ and ‘organization’ as we know has its own sets of attributes. In making a transaction, a company has to select which is better between the two, taking into consideration the attributes and costs.
underlying each of them. A large diversified organization has the internal market for the goods, internal capital market, and internal labor market. Transactions in the middle range has been labeled differently as ‘hybrid transactions’, and ‘mixed coordination systems’. Dr. Pornpimol’s focus is on the study of these ‘intermediate forms’ which is not quite a complete integration into a single firm, but not quite an exchange between two separate firms in markets either. Firms may form links or bonds of a long term, ‘relational’ nature, through which they become interdependent for business. The study covers not only the intercorporate shareholding and interlocking directorates but includes cases where the buyer may own tools used by the supplier or cases where there may be intensive technology transfer or sharing of technical and managerial knowledge between firms. The transaction efficiency, stemming from such a relationship, enables the parties involved to realize the reduction of production cost and transaction costs or its combination. Dr. Pornpimol observed the relationship between the cohesiveness of intercorporate relations and the reduction of transaction costs of a business group in Thailand and compared it with those of Japan. Social network analysis is employed to quantitatively measure and compare intercorporate shareholdings of the objects of study to understand the changes of these relationships over time. The results implied by quantitative measurement are examined and logically explained in terms of the effects to the reduction of transaction costs.

Dr. Somrote Komolavanij

Associate Professor
B.Eng. in Chemical Engineering, Chulalongkorn University, Thailand
M.S. & Ph.D. in Industrial Engineering, University of Texas at Arlington, USA
Areas of Specialization: Engineering economy, Quality control, and Operations research.

Research Interests:

Applications of Fuzzy Sets Theory to Industrial Problems

The theory of fuzzy set was proposed in the early 1960s. It is suitable for applying to a problem where uncertainty is presented. The uncertainty can be the uncertainty of the data or the uncertainty of controlling rules. For example, capital budgeting problems usually require a lot of data for doing analysis and most of the data has to be estimated as it is future data. Examples of such data are many kinds of costs, interest rates and expected profit of the particular project, etc. Therefore, there will be uncertainty presented during the estimation process. For the uncertainty of controlling rules, fuzzy set theory can be used as the fuzzy decision-criteria to control the machine or the process to operate more efficiently or more economically.

Engineering Economy

Engineering Economy is the process that involves guidelines used for evaluating alternatives of investments. The research in this area will focus on the topics of investment analysis, replacement analysis, and mutually exclusive alternatives selections. Both deterministic and probabilistic capital budgeting models will be investigated.

Operations Research

The main purpose of research in this area is to minimize the cost or maximize the profit of what we are investigating. Mathematical models are used to represent the situation of the problem. They can be linear programming, non-linear programming, integer programming, dynamic programming model or job assignment model. After the type of model is selected and the model is developed, the optimal solution can be obtained by solving the model.

Quality Control

The application of quality control tools to improve the process is the main interest in this area. The research will include the application of Statistical Process Control (SPC), Sampling Plan, ISO 9000 and ISO 14000.

Dr. Suebsak Nanthavanij

Associate Professor
B.S. in Chemical Engineering, Chulalongkorn University, Thailand
M.S. & Ph.D. in Industrial Engineering, University of Texas at Arlington, USA
Areas of Specialization: Industrial ergonomics, Workforce scheduling, Industrial noise.

Research Interests:

Performance Analysis of Ergonomics-based Manual Assembly Line with Parallel Workstations and Floaters

It has been long known that manual assembly tasks are repetitive and require the use of specific muscles in the upper extremities, creating excessive postural and physical loads on the excessively used body members. As a result, manual assembly line workers are at high risk of cumulative trauma disorders in the upper extremities. When ergonomics concerns are introduced to the manual assembly line balancing problems to assign assembly tasks to workers to achieve the maximum postural-physical loads

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smoothness, the resulting task-workstation assignment solution must be determined using an ergonomics-based approach. Unfortunately, the line throughput is likely to decrease since the balance delay of the line might be compromised. This research project is intended to investigate the effect of adding parallel workstations to some potential bottleneck workstations and providing floaters (or extra helpers) to those parallel workstations so as to increase the assembly line productivity. Additionally, several strategies for opening parallel workstations and rotating floaters among them will be investigated with respect to various desired throughput rates. The Rapid Upper Limb Assessment (RULA) technique will be used to assess the postural and physical loads imposed on the musculoskeletal system of the body when performing each manual assembly task. A heuristic procedure will be employed to assign assembly tasks to workstations using a mixed productively and ergonomics consideration. Based on predefined dispatching strategies to assign floaters and rotate them among parallel workstations, simulation models will be developed. The performance of the given manual assembly line under different throughput rate requirements and operational conditions will be analyzed. The variables of interest include: throughput rate, number of full-time workstations, number of parallel workstations, number of floaters, dispatching strategy, and switchover strategy. The performance indices are: achieved throughput rate, balance delay, utilization rates of full-time and parallel workstations, switchover rates, and average queue lengths at full-time workstations.

Ergonomics-based Workforce Scheduling for the Vehicle Routing Problem

The vehicle routing problem is intended to determine the optimal number of vehicles to delivery goods between finite sets of origins and destinations, and their delivery routes. There are numerous variants of the vehicle scheduling problem that have been studied by operations research and industrial engineering researchers. However, very few (if any) have paid attention to the vehicle drivers. In real-world situations, vehicle drivers might not only drive delivery vehicles but also perform loading and unloading of goods at both the origins and destinations. With limited time windows, loading/unloading operations may require more than one person to perform. Moreover, long-distance driving is stressful and increases the risk of highway accidents. Alternate drivers may be required for certain delivery routes. This research project is intended to take the loading/unloading workload and long-distance driving into consideration when finding the optimal workforce schedule for the vehicle routing problem. Based on the given delivery loads (in terms of required energy costs) and the driving distances for individual delivery trucks, a heuristic approach will be developed to determine the minimum numbers of vehicles and operators (drivers and movers) and their delivery routes so as to minimize the total traveling distance without exceeding the recommended daily energy expenditure and driving distance.

Workforce Scheduler: An Ergonomic Manpower Management Tool

This research project is intended to develop a computerized tool called Workforce Scheduler for ergonomically managing manpower for a hazardous work system. A group of industrial workers will receive daily work assignments to operate/attend a set of machines/workstations in the workplace where ergonomics, safety, and health hazards are present. Job rotation will be implemented to alleviate the workers’ hazard exposures. The types of hazard considered in Workforce Scheduler include industrial noise, heat, over-exhaustion, over-exertion, and toxic gases. Workers may be considered as identical or non-identical receivers, depending on the type of hazard and body tolerance. Workforce Scheduler allows the user to choose between the single-hazard exposure option and the two-hazard exposure option. The permissible daily exposure level must be specified prior to the workforce scheduling. Workforce Scheduler will determine the daily work assignment for each worker such that his/her hazard exposure does not exceed the permissible level. Additionally, the weekly work schedule for the worker can be set so that his/her daily hazard exposures for different workdays will not be the same.

Dr. Suthathip Suanmali

Lecturer (Joined SIIT in October 2007)
B.S. in Mathematics and Financial Economics (Summa Cum Laude), Methodist University, USA
M.S. in Applied Mathematics, North Carolina State University, USA
Ph.D. in Mathematics, North Carolina State University, USA

Areas of Specialization: Applied linear algebra, Matrix theory, Data mining, Modeling of energy input-output analysis.

Research Interest:

Applied Linear Algebra and Matrix Theory

My research interests lie in matrix theory, applied linear algebra and their applications in manufacturing. The primary focus is to employ computational techniques of linear algebra as tools in developing and analyzing mathematical models that describe the behavior of the investigated data. Applied linear algebra and other related fields such as Markov chains, multiplicative processes, and Perron-Frobenius theorem together can deliver advanced models and algorithms and provide a clear perception of the situation in many challenging industrial problems. In particular, I am interested in the applications of nonnegative matrices such as link analysis, information retrieval, and data mining. The
goal is to develop a proper model for an application and create an algorithm that is capable of approximating for a solution.

Dr. Thanwadee Chinda

Lecturer (Joined SIIT in May 2008)

B.Eng. in Mechanical Engineering, King Mongkut's University of Technology Thonburi (KMUTT), Thailand
M.Eng. in Engineering Management, Griffith University, Australia
Ph.D. in Engineering Management, Griffith University, Australia

Areas of Specialization: Construction safety management, System dynamics modeling.

Research Interests:

Construction Safety Culture
Throughout the world, the construction industry has had a poor safety record, and is disproportionately more dangerous when compared to other industries. The major cause of construction accidents is attributed to unsafe behaviors and work practices, which are viewed as the direct result of having a poor safety culture. The development of a mature safety culture has been recognized as a vital element in the achievement of high standards of safety, alongside an effective safety management system. A better understanding of how to improve safety culture greatly assists an organization to allocate appropriate safety resources, and thus improve its overall occupational health and safety performance.

System Dynamics Modeling
The system dynamics (SD) modeling was first introduced by Forrester (1961) as a method for modeling and analyzing the behavior of complex social systems, particularly in an industrial context. It has been used to examine various social, economic, and environmental systems, where a holistic view is important, and feedback loops are critical to the understanding of interrelationships. A SD simulation approach relies on an understanding of complex interrelationships existing among different elements within a system. This understanding is achieved by developing a model that can simulate and quantify the behavior of the system over time. Such simulations are considered essential in understanding the dynamics of the system.

Dr. Veeris Ammarapala

Lecturer

B.Eng. in Industrial Engineering, Sirindhorn International Institute of Technology, Thammasat University, Thailand
M.Sc. in Operations Research, Columbia University, USA
Ph.D. in Industrial and Systems Engineering, Rutgers University, The State University of New Jersey, USA

Areas of Specialization: Decision Support Systems; Risk Management, Economic Analysis.

Research Interests:

Decision Support Systems
Decision Support Systems (DSS) are a specific class of computerized information system that supports business and organizational decision-making activities. A properly designed DSS is an interactive software-based system intended to help decision makers compile useful information from raw data, documents, personal knowledge, and/or business models to identify and solve problems and make decisions.

Risk Management
Risk is the net negative impact of the exercise of vulnerability, considering both the probability and the impact of occurrence. Risk management is the process of identifying risk, assessing risk, and taking steps to reduce risk to an acceptable level.

It is critical for any organization to establish a foundation for the development of an effective risk management program, containing both the definitions and the practical guidance necessary for assessing and mitigating risks identified within the organization. The ultimate goal is to help organizations to better manage mission-related risks.

Economic Analysis
Economics is a social science that typically studies the production, distribution, and consumption of goods and services. Economic logic is increasingly applied to any problem determining economic value (such as politics, religion, psychology, history and engineering).

Economic analysis is a systematic approach to a given program, designed to assist the management in solving a problem of choice. The full problem is investigated. Objectives and alternatives are searched out and compared in light of their benefits and costs through the use of an appropriate analytical framework.
School of Manufacturing Systems and Mechanical Engineering

Faculty Members and Research Interests, 2008

Dr. Bundit Limmeechokchai  
**Associate Professor**  
B.Eng. (1st Class Honors) in Mechanical Engineering, King Mongkut's Institute of Technology North Bangkok  
M.Eng. in Energy Technology, Asian Institute of Technology (AIT), Thailand  
D.Eng. in Energy Economics and Planning, Asian Institute of Technology (AIT), Thailand  
Areas of Specialization: Energy conservation and energy management, Demand-side management, Integrated resource planning, Modeling of energy and environment systems.

Research Interests:

**Energy Conservation and Efficiency Improvement**

Energy management is the effective use of energy to maximize profits (minimize costs). A comprehensive energy management program is not purely technical. It takes into account planning and communication as well as marketing. Energy management includes energy productivity and energy awareness. In Thailand, energy management in buildings and industries is necessary to the country, as an energy importing country. The state has implemented energy-conservation policies and measures for close to 20 years with little evidence of success. On the other hand, the energy consumption and GDP per capita in constant 1980 US$ from 1973 to 2000 are highly correlated with an elasticity of 1.12, which shows energy-consumption growth. The Energy-Conservation Promotion (ECP) Act was passed in 1992 and has been implemented since 1996 with one objective being the promotion of energy efficiency in buildings and industries.

**Integrated Resource Planning and CO₂ Mitigation**

Traditionally, the method used in the power expansion process is to identify the sequence of generation additions which results in supplying the forecast load at the minimum overall costs, which has concentrated almost exclusively on supply-side options. However, the saving of electricity through a demand side management (DSM) program is equivalent to building a new power generating unit. This concept is known as integrated resource planning (IRP). Therefore, the DSM programs are evaluated in the IRP process. In addition to energy efficiency improvement from IRP, CO₂ emissions and other pollutants are mitigated.

Dr. Jirachai Buddhakulsomsiri  
**Assistant Professor**  
B.Eng. in Chemical Engineering, Chulalongkorn University, Thailand  
M.S. in Industrial Engineering, Oregon State University, USA  
M.S. in Statistics, Oregon State University, USA  
Ph.D. in Industrial Engineering, Oregon State University, USA  
Areas of Specialization: Applied operations research, Data mining, Production planning and control, Systems simulation, and Engineering economics analysis.

Research Interests:

**Applied Operations Research**

The main focus is to effectively and efficiently solve application problems using existing, modified or newly developed optimization tools. Various applications of interest include, but are not limited to, 1) resource-constrained project scheduling problems in project management; 2) parallel replacement problems in engineering economic decision analysis; 3) vehicle routing, facility location, and supply chain optimization in logistic and supply chains, and 4) production planning and controls in manufacturing and agro-industrial plants.

**Data Analysis for Process/Product Optimization and Improvement**

Process and product can be optimized or improved by using the information contained in the process data. Data analysis tools of interest include statistical data analysis, design and analysis of experiments, statistical process control, statistical sampling, and data mining.

**Systems Simulation Modeling and Analysis**

The research involves modeling of actual and large complex systems using computer simulations and conducting analyses on the simulation models. The objectives are to study and predict the behavior of actual systems, to improve/optimize the performance of existing systems, or to design new systems.
Dr. Navee Chiadamrong

**Associate Professor**

- B.Eng. in Industrial Engineering, Chulalongkorn University, Thailand
- M.Sc. in Engineering Business Management, University of Warwick, UK
- Ph.D. in Manufacturing Engineering and Operations Management, University of Nottingham, UK

**Areas of Specialization:** Cellular manufacturing systems (CMS), Advanced manufacturing systems, Systems simulation, Production planning and control, Supply chain management.

**Research Interests:**

**Simulation Modelling and Analysis**

Simulation is one of the most powerful analysis tools responsible for the design and operation of complex systems. Simulation involves the modelling of a process or system in such a way that the model mimics the response of the actual system to events that take place over time. The model can be used to predict future behaviour and the effects produced by changes in the systems or in its method of operation.

**Cellular Manufacturing Systems (CMS)**

CMS is another form of manufacturing system which applies the concept of group technology to provide some of the operational advantages of a flow shop while maintaining some of the strategic advantages of the job shop. Many research areas are involved in the concept including different types of cell formation and production planning for controlling the operation within and among the cells (inter-cell workload transfer).

Dr. Pisal Yenradee

**Associate Professor**

- B.Eng. (1st Class Honors) in Production Engineering, King Mongkut's Institute of Technology North Bangkok
- M.Eng. & D.Eng. in Industrial Engineering and Management, Asian Institute of Technology (AIT), Thailand

**Areas of Specialization:** Production and Inventory Control (P&IC) systems, JIT, MRP, and TOC; P&IC systems for Thai industries; Applied Operations Research; Supply Chain Management.

**Research Interests:**

Small- to medium-sized industries (SMIs) in Thailand face considerable production and inventory control (P&IC) problems. These problems greatly deteriorate the manufacturing competitiveness of SMIs. In order to alleviate the problems, their characteristics and causes should be analyzed. Some causes of the problems are manageable while others are non-manageable. The non-manageable problems must be considered as constraints for developing the P&IC systems. The P&IC systems suitable for the SMIs in Thailand should be developed based on these constraints. Particular research topics in this research area are listed as follows:

**Analyses of Production and Inventory Control Problems in Thai Industries**

There are various possible problems related to the production and inventory control (P&IC) systems in Thai industries. The nature, characteristics, and causes of such problems should be known in order to design an appropriate P&IC system or to improve the performance of the system. This research aims to identify the characteristics and also real causes of the encountered P&IC problems in Thai industries using an interview survey and case studies.

**Guideline or Methodology for Developing the Appropriate P&IC System for Thai Industries**

It is reasonable to assume that the situation of industries in developed and developing countries are different. Therefore, the P&IC systems widely used in developed countries, for example, Just-in-Time, MRP, and TOC (Theory of Constraints) may not be suitable for Thai industries. An entirely new system or a modification of certain existing systems may be required by Thai industries. This research aims to recommend P&IC techniques or systems suitable for Thai industries by focusing on aggregate planning, master production scheduling, detailed production and purchasing scheduling, and shop floor control.
Dr. Pisut Pongchairerks

Lecturer (Joined SIIT in May 2008)
B.Eng. in Industrial Engineering, Kasetsart University, Thailand
M.Eng. in Industrial Engineering (International Program), Kasetsart University, Thailand
D.Eng. in Industrial Engineering and Management, Asian Institute of Technology (AIT), Thailand

Areas of Specialization: Scheduling and sequencing, Production planning and control, Large-scale optimization, Applied operations research, Meta-heuristics for solving industrial engineering problems, Method design and work measurement.

Research Interests:

Scheduling and Sequencing

Scheduling is an important tool for manufacturing and engineering, where it has a major impact on the productivity of a process. It is a decision making process to allocate limited resources over time to perform tasks. It usually uses manufacturing terminology, where jobs represent tasks and machines represent resources, while the domain of scheduling problems is not limited to manufacturing but includes logistics and transportation, procurement and production, information processing and communications, service business, etc. A proper schedule enables the organization to achieve its goal and gain the optimum benefit.

Applications of Meta-heuristics to Industrial Engineering Problems

A meta-heuristic is a high-level algorithmic framework or approach that can be specialized to solve optimization problems. Meta-heuristics are generally applied to problems for which there is no satisfactory problem-specific algorithm or heuristic.

Dr. Ruengsak Kawtummachai

Associate Professor
B.Eng. (1st Class Honors) in Industrial Engineering, Chiang Mai University, Thailand
M.Eng. in Mechanical Engineering, Okayama University, Japan
Ph.D. in Production System, Okayama University, Japan

Areas of Specialization: Scheduling, Production planning and control, Just-in-time production, Inventory control, Production system, Supply Chain, Logistics.

Research Interests:

Inventory Control

This field of study is concerned with the management of inventory level. There are so many strategies that have been applied in this field, such as, MRP, MRP II, JIT, etc. MRP may be the most appropriate method for a particular firm but may be a poor one for other companies. The aim of this field of study is to select the most appropriate method of inventory control under the constraints of a system. The most recent study is concerned with a hybrid system JIT/MRP. This idea combines the philosophy of JIT into the system of MRP to construct a better method when compared to the inventory system controlled by only JIT or MRP.

Heuristic Scheduling Algorithms

Scheduling (or Sequencing) is a topic that is well known for its complexity. It requires a huge amount of effort to solve this major problem and sometimes there is no method for solving such a problem to obtain the optimal solution. Heuristic scheduling algorithms such as Simulated Annealing and Genetic Algorithm can be used to seek the near optimal solution when calculated by a high-speed computer. The study will construct an algorithm that is suitable and satisfies the constraints of the concerned problems.

Supply Chain Management

A Supply Chain is a cluster of companies cooperatively interacting with each other to fulfill a production goal in response to customers’ orders. A well-organized supply chain will gain a competitive advantage and benefit all partners in the supply chain. Issues of supply chain management include: statistical forecasting, collaborative demand planning, product life cycle planning, multi-plant MRP/ MPS, constrained production planning, supply and distribution network modeling, supply network optimization and vendor managed inventory. One of the key issues in supply chain management is to identify the most profitable supply chain in which all partners in the chain can gain a win-win situation.
Dr. Satha Aphornratana

**Associate Professor**

B.Sc. in Mechanical Engineering, Prince of Songkhla University, Songkhla, Thailand  
M.Eng. in Mechanical Engineering, University of Technology, Sydney, Australia  
Ph.D. in Mechanical Engineering, University of Sheffield, England  

Area of Specialization: **Refrigeration system.**

**Research Interest:**

**Heat Powered Refrigeration Cycles**

A refrigeration system is a thermodynamics cycle that removes heat from an enclosed space, or from a substance, and rejects it out to the surrounding at a higher temperature. In most refrigeration systems, the liquid refrigerant is evaporated at a low pressure and is condensed back to liquid at a higher temperature. The refrigerant can absorb heat at a low temperature during the evaporation process and condense back to liquid by rejecting heat out to the surrounding during the condensation process. Many types of refrigeration systems have been invented. The most common system used is known as “a vapor-compression refrigeration system”. In this system, the elevation of the refrigerant pressure is achieved by means of a mechanical compressor. This system is operated using electrical energy input to the mechanical compressor. Therefore it is known as a worked-operated refrigeration system.

Since energy consumption and environmental problems have become serious issues for the world, there have been many attempts to reduce the use of electricity in the refrigeration process. Heat powered refrigeration systems seem to be one of the most appropriate systems for the current energy and environment situations. Unlike the work-operated refrigeration systems, industrial waste heat can be recovered and converted to produce the useful refrigeration. As a result, the electricity purchased from utility companies for producing refrigeration from a conventional vapor compression refrigerator can be reduced. Therefore, the use of a heat powered refrigeration system helps reduce problems related to the global environment, such as emissions from burning fossil fuels in utility power plants. There are two well-known types of heat operated refrigeration systems: a jet refrigeration system and an absorption refrigeration system.

Dr. Supachart Chungpaibulpatana

**Associate Professor**

B.Sc. (Honors) in Mechanical Engineering, Prince of Songkhla University, Songkhla, Thailand  
M.Eng. & D.Eng. in Energy Technology, Asian Institute of Technology (AIT), Thailand  

Areas of Specialization: **Thermal engineering, Solar energy, Energy conservation and management.**

**Research Interests:**

With a background in mechanical engineering and energy technology, research activities and interests include both energy equipment design, development and applications, as well as energy system planning and management.

Energy conservation and management in industries and in large commercial buildings in Thailand is an area which still needs a lot of research. The main topics include energy analysis of potential savings, thermal energy storage (cool/ice storage) for air-conditioning system, cogeneration system for industries which require both heat and electricity simultaneously, industrial waste heat recovery and evaporative cooling.

The transportation sector accounts for about 45% of total energy demand in Thailand and, in addition, fuels used are mainly from imported petroleum. This not only affects the country economy but burning fossil fuels also produces air pollution as well as CO$_2$ which is a main greenhouse gas emission. Research topics under investigation include the development of Bangkok driving modes for various types of vehicles, assessment of the use of catalytic converters in gasoline cars, and the effects of using vegetable oils in diesel engines.

Another field of research to be mentioned is concerned with **solar energy**; both thermal and electrical applications. Interesting topics under consideration are the design and development of low cost solar water heaters using local materials, solar-photovoltaic refrigerators for use in remote areas where electricity from the utility grid is not available, modeling of solar PV/thermal systems under various types of applications, development of standard methods for testing solar energy equipment, software packages for optimum sizing of solar energy systems.
Dr. Thananchai Leephakpreeda

**Associate Professor**
B.Eng. in Mechanical Engineering, Chulalongkorn University, Thailand
M.S. & Ph.D. in Mechanical Engineering, The University of Akron, Ohio, USA

**Research Interest:**

**Mechatronics in Application-oriented Control**
The primary research interests cover mechatronics in application-oriented control for practical implementation in process modeling and control as well as design and optimization. The current topics include optimal control for air condition, and novel techniques for computational intelligence in system and control engineering, etc.

Dr. Vladimir I. Kuprianov

**Associate Professor**
Honors Diploma of Engineer (Equiv. to B.Eng. & M.Eng.) in Mechanical Engineering, Moscow Power Engineering Institute (MPEI), Russia
D.Eng. in Steam Boilers & Steam Generators, MPEI, Russia
Areas of Specialization: Thermal power plants; Boiler and furnace technology; Combustion and emission control in boilers fired with fossil fuels; Fluidized bed combustion (FBC) of biomass residues and wastes; Assessment of environmental impacts by thermal power plants and FBC systems.

**Research Interests:**

**Analysis and Improvement of Thermal Efficiency and Environmental Performance of Boiler Units**
In many countries with developing economies, fossil fuels of relatively low quality (e.g. lignite) and/or high-calorific fuels with elevated contents of fuel-S and fuel-N are used for power generation. Such a situation results in significant environmental impacts by pollutants discharged from boilers of thermal power plants. Implementation of least-cost methods for the improvement of thermal efficiency and environmental performance of operating utilities seems to be the most attractive way for energy conservation as well as mitigating environmental impacts by the power producers. Research works relevant to this objective include various aspects, such as: (1) exploring technological options for the improvement of the thermal efficiency and environmental performance of existing boiler units; (2) optimization of key operating variables affecting the combustion process in a boiler furnace when firing distinct fuels and/or fuel blends; (3) optimal load dispatching over the boiler units of a power plant. Additionally, through modeling the emission rates of different pollutants (NO\textsubscript{x}, CO\textsubscript{2}, CO, SO\textsubscript{x}, PM, trace elements) discharged from distinct boiler units, reliable data for the assessment of environmental impacts by a power plant can be obtained for various fuel options taking into account actual unit operating conditions and power outputs.

**Development and Study of Fluidized Bed Combustion Systems for Firing Biomass Fuels**
Biomass is one of the major primary energy sources in Thailand. Residues and wastes collected on a large scale from agricultural and forest-related activities such as rice, sugar, wood and palm oil industries can be used (alternatively to fossil fuels) as energy sources for heat and power production in this country. Thus, the development of highly efficient, reliable and environmentally friendly technologies for biomass utilization with the aim of energy production, is a problem of paramount importance for the Thai energy sector. Due to some advantages, fluidized bed combustion technology seems to be the most suitable for energy conversion of biomass. Conical fluidized-bed combustors of various modifications have been proposed and are being studied. The research objectives include: (1) investigation of fluidization characteristics of the bed material in conical prototypes; (2) study of the effects of fuel and bed material types as well as operating conditions (including air staging) on the combustion efficiency and emission characteristics of the combustor; (3) study of the physical and chemical factors affecting formation and reduction of major pollutants in the combustor; (4) optimization of the combustor design and its operating conditions; (5) assessment of environmental impacts for various biomass fuels; (6) study on co-firing of different biomass fuels and/or co-firing of biomass with coal in a conical fluidized bed.
Department of Common and Graduate Studies  
Faculty Members and Research Interests, 2008

Dr. Alice Sharp

Assistant Professor
B.Sc. in Biology, Chiang Mai University, Thailand  
M.Sc. in Environmental Risk Assessment, Chiang Mai University, Thailand  
M.Sc. in Natural Resource Management, Hiroshima University, Japan  
Ph.D. in Natural Resource Management, Hiroshima University, Japan  
Areas of Specialization: Community based natural resource management, Environmental Impact Assessment, Pollution monitoring.

Research Interests:

**Community Based Environmental Protection (CBEP)**

CBEP is a new approach to environmental protection. Traditionally, environmental protection programs have focused on the command and control approach, which have been very effective at reducing point source pollution and improving environmental quality. However, some environmental problems, such as non-point source pollution are less amenable to these programs. CBEP will supplement and complement the traditional environmental protection approach by focusing on the health of an ecosystem and the behavior of humans that live in the ecosystem’s boundaries. This study is aiming to 1) comprehensively identify local environmental concerns, 2) set priorities and goals that reflect overall community concerns, and 3) develop comprehensive, long-term solution to environmental problems.

**Products Life-Cycle Assessment (LCA)**

Life-cycle assessment (LCA) is used to quantify the environmental inputs and outputs of a product or process, from the mining of raw materials, through production, distribution, use and reuse or recycling, to final disposal. There are two main stages of LCA: inventory analysis and impact assessment. Inventory analysis involves the quantification of environmental inputs and outputs throughout a product or process’s lifetime. The inventory analysis is aiming to identify a list of pollutants that may have an impact on the environment. The purpose of the impact assessment is to aggregate and evaluate the potential environmental impacts identified in the inventory. This study will be focusing on particular kinds of waste which have high potential to be a major environmental problem in the future, mobile phone and its batteries, as an example in order to develop waste management plan and minimize the amount of waste before hand.

Waste Management

Waste management is one of the major long-term problems in our society. Cost-effective, environmentally sound management of wastes continues to be an unstable issue, the solution of which must integrate science, technology, individual awareness, and policy. Waste management begins with understanding the complete and detailed physical, chemical, and biological characteristics of the waste in question. This understanding is crucial to successful utilization or environmentally sound disposal measures. Additionally, waste management enables us to predict what is in a material, how much is there, how it may leach out, and how it will ultimately impact the environment.

Dr. Pakorn Opaprakasit

Assistant Professor
B.Sc. (1st Class Honors) in Chemistry, Chiang Mai University, Thailand.  
M.S. in Materials Science and Engineering (Polymer Option), the Pennsylvania State University, Pennsylvania, USA.  
Ph.D. in Materials Science and Engineering, the Pennsylvania State University, Pennsylvania, USA.  
Areas of Specialization: Infrared spectroscopy, Rapid prototyping, Natural rubber, Biocompatible/biodegradable polymers, Lactide-based polyesters, Coal/fossil fuels, Biodiesel.

Research Interests:

**Properties Enhancement of Polylactide and Natural Rubber for Multicolor Articles Rapid Prototyping**

The work is aiming to enhance properties of polylactide and natural rubber, and to set up a processing methodology to manufacture multicolor articles from the two economically significant raw materials of Thailand. Rapid prototyping (RP) is employed to reduce design and development time by fabricating parts layer-by-layer. Natural rubber is used in latex form, while polylactide is applied in powder form. Various properties of these materials are modified to be used in the RP process. Mixing
behavior of colorants and base materials (polylactide and natural rubber) is also investigated to develop an in-process technique of producing colored parts.

**Thermal Properties and Degradation of Polylactide**

Polylactic acid or polylactides (PLA) are well known as a biodegradable and biocompatible thermoplastic and are of interest in various medical applications. Their enzymatic degradability and mechanical properties, which are comparable to those of PE and PS, have also attracted interest in using these degradable polymers as packaging materials. Most importantly, the monomer constituents of these polymers can be derived from agricultural resources such as carbohydrates. A racemic crystal structure or stereocomplex can be achieved by mixing two polylactides with opposite configurations: poly L-lactide (L-PLA) and poly D-lactide (D-PLA). This stereocomplex, in turn, shows a higher melting temperature than that of its homopolymer counterpart. Accordingly, this stereocomplex has been used as a potential high performance biodegradable material. Current research is focused on the mechanism and dynamics of crystallization and degradation processes of these polylactides and their stereocomplex.

**Conventional and Two-Dimensional FTIR Spectroscopy**

Infrared spectroscopy is a fundamental analytical technique that is widely used in material characterization. Recently, an advanced methodology, two-dimensional infrared spectroscopy (2D-FTIR) has been developed as a novel data analysis and presentation technique. This technique has provided notable advantages over conventional FTIR. For example, an improvement in band resolution, simplicity in band assignment, and determination of relative order of responses of specific functional groups to external perturbation, have been achieved. The 2D-FTIR has been applied to study effects of mechanical and electrical perturbations on the structural transition of PVDF/TrFE/CTFE piezoelectric polymer, and investigate crystallization of biodegradable polymer or polylactide.

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Dr. Sujin Suwanna

**Lecturer (Joined SIIT in October 2007)**

- B.S. in Mathematics, Lehigh University, Bethlehem, Pennsylvania, USA
- B.A. in Physics, Lehigh University, Bethlehem, Pennsylvania, USA
- M.S. in Mathematics, The University of Virginia, Charlottesville, Virginia, USA
- Ph.D. in Mathematics (Mathematical Physics), The University of Virginia, Charlottesville, Virginia, USA

Areas of Specialization: Mathematics, Mathematical Physics, Applied Mathematics and Physics.

**Research Interests:**

**Mathematical Physics**

Mathematical research concerns problems arising in physics, especially in Quantum Mechanics. The main research activity has been focused on propagation of particles and waves in disordered systems, centered on topics such as localization and delocalization of wave functions in random media. Techniques in this research are mathematical tools from probability, functional analysis (theory of random Schrödinger operators), stochastic process (random walk and Brownian motion), harmonic analysis (estimates of oscillatory integrals), and differential equations.

**Theoretical and Computational Plasma Physics**

This research concerns the properties of plasma for nuclear fusion reaction. The main research activity is centered on the study of thermal and particle transport in a nuclear reaction prototype, called a tokamak. The purpose of this study is predicting the time evolution of temperature and density profiles as well as effects of impurity transport in plasma. This research is carried out in two approaches. One approach involves simulations using predictive integrated codes to model and explain experimental results from various tokamaks. The other approach emphasizes on theoretical work to model effects such as impurity transport and instabilities in plasma.
Dr. Thawatchai Onjun

Assistant Professor
B.S. in Physics, University of Rochester, Rochester, New York, USA
M.S. in Physics, Lehigh University, Bethlehem, Pennsylvania, USA
Ph.D. in Physics, Lehigh University, Bethlehem, Pennsylvania, USA
Areas of Specialization: Plasma physics and nuclear fusion.

Research Interest:

Plasma Physics and Nuclear Fusion

This work aims to study plasma behaviors and nuclear fusion reactions that occur inside a device called a “Tokamak”. The research focuses on various topics including thermal and particle transports, plasma instability, plasma-wall interactions, and plasma heating. The results can contribute in simulating the time evolution of temperature and density profiles in tokamaks. This research contributes in an essential way to the interpretation and planning of experiments, validation of theory against experimental results, development of plasma control techniques, and the design of next step devices such as ITER.
# SIIT Directory

## Executive Committee

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   Assistant Director for Admission and Public Relations.
8. **Asst. Prof. Dr. Alice Sharp**  
   Head, Department of Common and Graduate Studies (CGS).
9. **Assoc. Prof. Dr. Suebsak Nanthavanij**  
   Acting Head, School of Bio-Chemical Engineering and Technology (BCET).
10. **Assoc. Prof. Dr. Pruetha Nanakorn**  
    Head, School of Civil Engineering and Technology (CET).
11. **Asst. Prof. Dr. Chalie Charoenlarpnopparat**  
    Head, School of Communications, Instrumentations and Control (CIC).
12. **Assoc. Prof. Dr. Thanaruk Theeramunkong**  
    Head, School of Information and Computer Technology (ICT).
13. **Assoc. Prof. Dr. Somrote Komolavanij**  
    Head, School of Management Technology (MT).
14. **Assoc. Prof. Dr. Navee Chiadamrong**  
    Head, School of Manufacturing Systems and Mechanical Engineering (MSME).
15. **Ms. On-Anong Suraniranat**  
    Head of Library and Information Services Center; Member and Secretary of the Committee.

## Adjunct Faculty Members - Graduate Programs

**Dr. R.H.B. Exell**  
*Professor,*  
King Mongkut’s University of Technology Thonburi, Thailand;  
Professor Emeritus,  
Asian Institute of Technology (AIT), Thailand.  
BA Oxford University, UK  
MA Oxford University, UK  
DPhil Oxford University, UK

**Dr. Yongwimon Lenbury**  
*Professor,*  
Mahidol University, Thailand.  
BSc Australian National University, Australia  
MSc Australian National University, Australia  
PhD Vanderbilt Tennesse University, USA

## Instructors

### Academic Year 2008

#### School of Information and Computer Technology

**Nyan Bo Bo (Full-time)**  
BEng Telecommunication Engineering, Assumption University, Bangkok, Thailand.  
MSc Information Technology, Sirindhorn International Institute of Technology, Thammasat University, Thailand.

#### School of Management Technology

**Seitaro Seko (Full-time)**  
BA Information and Management Science, University of Marketing and Distribution Sciences, Japan.  
MA Marketing, University of Marketing and Distribution Sciences, Japan.  
MBA Management Accounting, Kobe University of Commerce, Japan.  
Doctoral Research Student, Global Business, Osaka City University, Japan.  
PhD Candidate, Accounting, University of Kent, UK.
Department of Common and Graduate Studies
English Training Unit

Clement A Trahan, Full-time English Instructor
BSc Secondary Education, Old Dominion University, Norfolk, Virginia, USA.
BC Business, University of Guelph, Guelph, Ontario, Canada.
TEFL Teaching English as a Foreign Language, Frankfurt, Germany.

Dr. Egill H. Bragason, Full-time English Instructor
BA Psychology, University of Iceland, Iceland.
MS Work and Organizational Psychology, Institute of Psychology, University of Aarhus, Denmark.
PhD Work and Organizational Psychology (Specializing in Industrial Psychology), Institute of Psychology, University of Aarhus, Denmark.

Paul V Neilson, Full-time English Instructor
BS Chemistry, California Polytechnic State University (SLO), USA.
MS Chemistry, California Institute of Technology (CALTECH), USA.
Certificate TEFL, by Internet.

Ratanawalee Wimolmas, Full-time English Instructor
BA Mass Communications, Thammasat University, Thailand.
MA Mass Communications, Thammasat University, Thailand.
TESOL Diploma, Teaching English to Speakers of Other Languages, ISS College, Vancouver, B.C, Canada.
Instructor Training Certificate, Vancouver School Board, Vancouver, BC, Canada.

Terrance J Downey, Full-time English Instructor
BA Humanities, Harvard University, Cambridge, MA, USA.
MA Humanities, San Francisco State University, San Francisco, CA, USA.

Chiefs of Divisions and Sections
SIIT at Rangsit
SIIT-Tel: +66 (0) 2986 9009, 2564 3221-9; SIIT-Fax: +66 (0) 2986 9112-3

Director Office
Ms. Ajarathorn Indasorn ☏ ext. 1104 Secretary for Executive Affairs
Ms. Narumol Weerayangkul ☏ ext. 1108 Secretary
Mr. Wasinee Meekul ☏ ext. 1301 SIIT Internal Auditor

Academic Services Division
Ms. Naree Moolsawas ☏ ext. 1400 Chief of Academic Services Division
Mr. Sumrit Sriboonthieng ☏ ext. 1610 Chief of Academic Services Section (Rangsit)

Accounting Division
Ms. Areerat Boonboot ☏ ext. 1316 Chief of Accounting Division
Ms. Doungdow Asawalertasak ☏ ext. 1316 Chief of Accounting Section (Bangkadi)
Ms. Woraluck Petchtaeh ☏ ext. 1318 Chief of Financial Accounting Section (Rangsit)

Admissions Division
Ms. Wanna Boonkokuae ☏ ext. 1201 Chief of Admissions Division

Central Coordinating Division
Ms. Boonitiwa Kittiya ☏ ext. 1208 Chief of Central Coordinating Division
Ms. Aroonkamol Imsanguan ☏ ext. 1206 Chief of Personnel Section (Rangsit)
Mr. Manite Narkthong ☏ ext. 1209 Chief of Materials and Supplies Section (Rangsit)
Ms. Orapin Kawtham ☏ ext. 1302 General Documentation Coordinator
Ms. Rapeepan Narkruksa ☏ ext. 1305 Chief of Administrative Section (Rangsit)

Computer Center
Asst. Prof. Dr. Komwut Wipusitvarakun ☏ ext. 2006 System Manager of Computer Center
Ms. Saowaphan Sriphophon ☏ ext. 1609 Secretary

Finance Division
Ms. Yowwapa Yodngean ☏ ext. 1317 Chief of Finance Division
Ms. Yaowaluk Laothoh ☏ ext. 1319 Chief of Finance & Budget Section (Rangsit)
Ground and Properties Division
Mr. Kitipol Sutasararikanom  ext. 1309  Chief of Ground and Properties Division (Rangsit)
Mr. Teerasak Ngogsakda  ext. 1308  Chief of Ground and Properties Section (Rangsit)

International Office
Ms. Peechalika Khattiya  ext. 1560  Secretary

Library and Information Services Center
Ms. On-Anong Suraniranat  ext. 1503  Head of Library and Information Services Center
Ms. Chotika Praphrutthikul  ext. 1508  Chief Librarian
Ms. Mo Mo Tin  ext. 1510  Chief Information Scientist

Registration Division
Asst. Prof. Dr. Thawatchai Onjun  ext. 1430  Chief of Registration Division

Student Affairs Division
Ms. Waraporn Thongthua  ext. 1403  Chief of Student Affairs Division
Ms. Pavinee Jongjaitate  ext. 1402  Chief of Student Affairs Section

Training and Industrial Relation Office
Ms. Janjira Boonruangsaj  ext. 1444  Coordinator of Training and Industrial Relation Office

SIIT at Bangkadi
SIIT-Tel: +66 (0) 2501 3505-20; SIIT-Fax: +66 (0) 2501 3524

Director Office
Ms. Prapasiri Kajorncheepunngam  ext. 1105  Executive Secretary
Ms. Pattaraporn Boonyingyong  ext. 1104  Secretary to Executive Assistant Director at Bangkadi

Academic Services Division
Ms. Naree Moolsawas  ext. 1400  Chief of Academic Services Division
Mr. Peerasak Raksanont  ext. 1404  Chief of Academic Services Section (Bangkadi)

Computer Center
Asst. Prof. Dr. Komwut Wipusitwarakun  ext. 2006  System Manager of Computer Center

Finance Division
Ms. Yowvapa Yodngean  ext. 1204  Chief of Finance Division
Ms. Tippharat Pangsang  ext. 1203  Chief of Finance and Budget Section (Bangkadi)

Central Coordinating Division
Ms. Boontiwa Kittiya  ext. 1208  Chief of Central Coordinating Division
Ms. Chotip Nuamdee  ext. 1202  Chief of Materials and Supplies Section (Bangkadi)
Ms. Sukannika Maitreepan  ext. 1201  Chief of Administrative Section (Bangkadi)

Ground and Properties Division
Mr. Seangjan Kwang-Khwang  ext. 1300  Chief of Ground and Properties Division (Bangkadi) and Acting Manager of SIIT Residential Hall at Bangkadi
Mr. Jedsada Sangnak  ext. 1302  Chief of Ground and Properties Section (Bangkadi)
Mr. Kanokchat Choungcham  ext. 1305  Chief of Transportations and Gardening Section

Library and Information Services Center
Ms. On-Anong Suraniranat  ext. 1503  Head of Library and Information Services Center

Student Affairs Division
Ms. Waraporn Thongthua  ext. 1403  Chief of Student Affairs Division
School Secretaries

SIIT at Rangsit
SIIT-Tel: +66 (0) 2986 9009, 2564 3221-9; SIIT-Fax: +66 (0) 2986 9112-3

School of Bio-Chemical Engineering and Technology (BCET)
Ms. Suwanna Punyadee 📞 ext. 2303 Secretary
Mr. Witchapon Jomprapan 📞 ext. 2308 Secretary

School of Civil Engineering and Technology (CET)
Ms. Pitchayapa Yuenyaw 📞 ext. 1902 Secretary
Ms. Thanathorn Srisawat 📞 ext. 1901 Secretary

School of Manufacturing Systems and Mechanical Engineering (MSME)
Ms. Mayuree Phan-on 📞 ext. 2203 Secretary
Ms. Pareena Thaibumrungwiwat 📞 ext. 2102 Secretary
Ms. Wanna Teerapokin 📞 ext. 2202 Secretary

Department of Common and Graduate Studies (CGS)
Ms. Chanpen Huabnarin 📞 ext. 1563 Secretary
Ms. Sirinart Sirijorn 📞 ext. 1561 Secretary
Ms. Monthicha Nimsook 📞 ext. 1518 Secretary

SIIT at Bangkadi
SIIT-Tel: +66 (0) 2501 3505-20; SIIT-Fax: +66 (0) 2501 3524

School of Communications, Instrumentations and Control (CIC)
Ms. Chiranat Puakanokhiran 📞 ext. 1802 Secretary
Ms. Cholthicha Praditkwan 📞 ext. 1817 Secretary

School of Information and Computer Technology (ICT)
Ms. Khotchakorn Puapunturna 📞 ext. 2002 Secretary
Ms. Nachcha Rodphotong 📞 ext. 2012 Acting Secretary

School of Management Technology (IMT)
Ms. Benchasri Sriyothin 📞 ext. 2104 Secretary
Ms. Prapaiporn Tunyuvardhana 📞 ext. 2102 Secretary
Ms. Usanee Koedlapmeesuk 📞 ext. 2110 Secretary
International Journals


International Conferences


National Conferences


School of Bio-Chemical Engineering and Technology

Faculty Members, 2007

1. Dr. Luckhana Lawtrakul Assistant Professor
2. Dr. Pisanu Toochinda Lecturer
3. Dr. Rapeepong Suwanwarangkul Lecturer
4. Dr. Sandhya Babel Associate Professor
5. Dr. Suwanchai Nitisoravut Associate Professor
6. Dr. Wanwipa Siriwatwechakul Lecturer (Joined SIIT in June 2007)
International Journals


National Journals


International Conferences


**National Conferences**


School of Civil Engineering and Technology
Faculty Members, 2007

1. Dr. Amorn Pimanmas Associate Professor
2. Dr. Krishna Murari Neaupane Associate Professor (Until June 2008)
3. Dr. Mongkut Piantanakulchai Assistant Professor
4. Dr. Pruetha Nanakorn Associate Professor
5. Dr. Somnuk Tangtermsirikul Professor
6. Dr. Taweep Chaisomphob Associate Professor
7. Dr. Winyu Rattanapitikon Associate Professor

School of Communications, Instrumentations and Control
2007 Publications

International Journals


National Journals


International Conferences


School of Communications, Instrumentations and Control
Faculty Members, 2007

1. Dr. Banlue Srisuchinwong Associate Professor
2. Dr. Chalie Charoenlarpnopparut Assistant Professor
3. Dr. Duangrat Eungdamrong Assistant Professor
4. Dr. Sawasd Tantaratana Professor
5. Dr. Toshiaki Kondo Assistant Professor
6. Dr. Waree Kongprawechnon Associate Professor
International Journals


**National Journals**


**International Conferences**


**Books**


**School of Information and Computer Technology**  
**Faculty Members, 2007**

1. Dr. Bunyarit Uyyanonvara  
   Assistant Professor
2. Dr. Chaiwat Ootamakorn  
   Assistant Professor (From October 2007 to May 2008)
3. Dr. Cholwich Nattee  
   Lecturer
4. Dr. Ekawit Nantajeewarawat  
   Associate Professor
5. Dr. Komwut Wipusitwarakun  
   Assistant Professor
6. Dr. Pakinee Suwannajan  
   Lecturer
7. Dr. Philippe Meunier  
   Lecturer
8. Dr. Stanislav S. Makhanov  
   Associate Professor
9. Dr. Steven Gordon  
   Assistant Professor
10. Dr. Thanaruk Theeramunkong  
    Associate Professor
School of Management Technology

2007 Publications

International Journals


International Conferences


**School of Management Technology**

**Faculty Members, 2007**

1. Dr. Chawalit Jeenanunta Lecturer
2. Dr. Jittima Tongurai Lecturer (Until April 2008)
3. Dr. Junalux Chalidabhongse Assistant Professor (Until December 2007)
4. Dr. Pisit Chanvarasuth Lecturer
5. Dr. Pornpimol Chongphaisal Lecturer
6. Dr. Somrote Komolavanij Associate Professor
7. Dr. Suebsak Nanthavanij Associate Professor
8. Dr. Suthathip Suanmali Lecturer (Joined SIIT in October 2007)
9. Dr. Veeris Ammarapala Lecturer
School of Manufacturing Systems and Mechanical Engineering

2007 Publications

International Journals


**National Journal**


**International Conferences**


8. Kuprianov, Vladimir I.; Watcharee Kaewboonsong; and Nutsupak Chovichien (2007). Predicting fuel and emission costs for a utility boiler co-firing fuel oil and natural gas. In *Proceedings of the Sixth Asia Pacific


National Conferences


Book


School of Manufacturing Systems and Mechanical Engineering
Faculty Members, 2007

1. Dr. Bundit Limmeechokchhai Associate Professor
2. Dr. Jirachai Buddhakulsomsiri Assistant Professor
3. Dr. Lalita Tantimuratha Assistant Professor (Until October 2007)
4. Dr. Pinal Yenradee Associate Professor
5. Dr. Navee Chiaiamrong Associate Professor
6. Dr. Ruengsak Kawtummachai Associate Professor
7. Dr. Satha Aphornratana Associate Professor
8. Dr. Supachart Chungpaibulpatna Associate Professor
9. Dr. Thananchai Leephakpreeda Associate Professor
10. Dr. Vladimir I. Kuprianov Associate Professor

Department of Common and Graduate Studies
2007 Publications

International Journals


National Journal


International Conferences


National Conference


Department of Common and Graduate Studies
Faculty Members, 2007

1. Dr. Alice Sharp Assistant Professor
2. Dr. Jeffrey Frank Webb Assistant Professor (Until March 2008)
3. Dr. Pakorn Opaprakasit Assistant Professor
4. Dr. Ruben Nelson Mera Assistant Professor (Until March 2008)
5. Dr. Sujin Suwanna Lecturer (Joined SIIT in October 2007)
6. Dr. Thawatchai Onjun Assistant Professor
# Summary of Contracted Research Projects, Academic Year 2007

<table>
<thead>
<tr>
<th>Principal Investigator</th>
<th>Title</th>
<th>Sponsoring Organization</th>
<th>Total Project Budget (Baht)</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr. Amorn P.</td>
<td>Preparation of Reinforced Concrete Members Against Seismic Hazard</td>
<td>The Thailand Research Fund (TRF)</td>
<td>1,200,000</td>
<td>Jul. 2005-Present</td>
</tr>
<tr>
<td></td>
<td>The Improvements of Seismic Performance for Reinforced Concrete Bridge</td>
<td>Thammasat University Research Fund</td>
<td>240,000</td>
<td>May 2007-Present</td>
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<tr>
<td>Dr. S. Babel</td>
<td>Treatment of Landfill Leachate by White Rot Fungi</td>
<td>Joint Graduate School of Energy &amp; Environment (JGSEE)</td>
<td>538,400</td>
<td>Nov. 2006-May 2008</td>
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<tr>
<td></td>
<td>Hydrogen Production from Agro-industrial Wastewater Using Microorganisms</td>
<td></td>
<td>538,400</td>
<td>Nov. 2007-May 2010</td>
</tr>
<tr>
<td>Dr. Banlue S.</td>
<td>10.7-MHz Fully-Balanced, High-Q, Wide-Dynamic-Range Current-Tunable Bandpass Filters</td>
<td>The Thailand Research Fund (TRF)</td>
<td>1,591,000</td>
<td>Nov. 2006-Present</td>
</tr>
<tr>
<td>Dr. Bundit L.</td>
<td>Assessment of Long-term Energy Demand and Energy Efficiency Improvement in Thailand</td>
<td>Joint Graduate School of Energy &amp; Environment (JGSEE)</td>
<td>60,000</td>
<td>Jun. 2006-Present</td>
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<tr>
<td></td>
<td>Energy Consumption and CO₂ Emission in the Thai Industrial Sector</td>
<td></td>
<td>538,000</td>
<td>Nov. 2007-May 2010</td>
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<tr>
<td>Dr. Bundit L.</td>
<td>Dr. Supachart C.</td>
<td></td>
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<tr>
<td>Dr. Navee C.</td>
<td>Dr. Ruengsak K.</td>
<td></td>
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<tr>
<td>Dr. Thananchai L.</td>
<td>Dental Information Archiving and Monitoring System, 2nd Phase</td>
<td>Advanced Dental Technology Center (ADTEC) and National Electronics and Computer Technology Center (NECTEC)</td>
<td>3,664,000</td>
<td>Jun. 2006-Present</td>
</tr>
<tr>
<td>Dr. Bunyarit U.</td>
<td>Dental Implant Information System Management</td>
<td>National Science and Technology Development Agency (NSTDA)</td>
<td>1,615,400</td>
<td>Apr. 2008-Apr. 2009</td>
</tr>
<tr>
<td>Principal Investigator</td>
<td>Title</td>
<td>Sponsoring Organization</td>
<td>Total Project Budget (Baht)</td>
<td>Duration</td>
</tr>
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<tr>
<td>Dr. Chalie C.</td>
<td>Two-dimensional Convolutional Code Design: Algebraic Approach</td>
<td>Thammasat University Research Fund</td>
<td>80,000</td>
<td>May 2007-Present</td>
</tr>
<tr>
<td></td>
<td>Design of WCDMA Uplink Adaptive Channel Equalizer</td>
<td>National Electronics and Computer Technology Center (NECTEC)</td>
<td>50,000</td>
<td>Jun. 2006-Present</td>
</tr>
<tr>
<td>Dr. Jirachai B.</td>
<td>Application of Data Mining and Knowledge Discovery in Industrial Safety</td>
<td>The Thailand Research Fund (TRF)</td>
<td>360,000</td>
<td>Jul. 2007-Jun. 2009</td>
</tr>
<tr>
<td>Dr. T. Kondo</td>
<td>Robust Motion Estimation under Varying Lighting Conditions</td>
<td>Thammasat University Research Fund</td>
<td>80,000</td>
<td>Sep. 2007-Aug. 2008</td>
</tr>
<tr>
<td></td>
<td>Robust Motion Estimation in Image Sequence</td>
<td>The Thailand Research Fund (TRF)</td>
<td>360,000</td>
<td>May 2008-Apr. 2010</td>
</tr>
<tr>
<td>Dr. V. I. Kuprianov</td>
<td>Development and Study on Co-firing of Biomass Fuels in a Conical Fluidized-bed Combustor</td>
<td>The Thailand Research Fund (TRF)</td>
<td>2,000,000</td>
<td>May 2007-Apr. 2010</td>
</tr>
<tr>
<td>Dr. Luckhana L.</td>
<td>Molecular Dynamics Simulations and Quantum Chemical Calculation on Stability and Solubilization of Drug-Cyclodextrin Inclusion Complexes in Water/Cosolvent Mixtures</td>
<td>The Thailand Research Fund (TRF)</td>
<td>1,200,000</td>
<td>July 2007-July 2010</td>
</tr>
<tr>
<td>Dr. S. S. Makhanov</td>
<td>New Algorithms for Optimization of Five Axis Machining</td>
<td>The Thailand Research Fund (TRF)</td>
<td>792,000</td>
<td>Jul. 2007-May 2009</td>
</tr>
<tr>
<td>Dr. Pakorn O.</td>
<td>The Study of Intra-Molecular Hydrogen Bonds Formation for Improving of Adhesive Strength of Wood Protecting Materials, Phenolic Resins</td>
<td>Thammasat University Research Fund</td>
<td>80,000</td>
<td>May 2007-Present</td>
</tr>
<tr>
<td>Dr. Luckhana L.</td>
<td>The Study of Intra-Molecular Hydrogen Bonds Formation for Improving of Adhesive Strength of Wood Protecting Materials, Phenolic Resins</td>
<td>Thammasat University Research Fund</td>
<td>80,000</td>
<td>May 2007-Present</td>
</tr>
<tr>
<td>Dr. Prueutta N.</td>
<td>Finite Element Modeling of Tsunami Propagation on the Coast of Thailand</td>
<td>The Office of the Education Council, The Royal Thai Government</td>
<td>262,500 (SIIT Portion)</td>
<td>Nov. 2005-Present</td>
</tr>
<tr>
<td></td>
<td>(with AIT)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dr. Rapeepong S.</td>
<td>Development of Multi-physics Model for Designing the Solid Oxide Fuel Cell Stack Fueled by Natural Gas and Biomass-Derived Synthesis Gas</td>
<td>The Thailand Research Fund (TRF)</td>
<td>360,000</td>
<td>Dec. 2006-Present</td>
</tr>
<tr>
<td>Principal Investigator</td>
<td>Title</td>
<td>Sponsoring Organization</td>
<td>Total Project Budget (Baht)</td>
<td>Duration</td>
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<tr>
<td>------------------------</td>
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</tr>
<tr>
<td>Dr. Rapeepong S.</td>
<td>Design and Development of Methanol Reformer to Produce Hydrogen for Fuel Cell</td>
<td>Thammasat University Research Fund</td>
<td>80,000</td>
<td>May 2007-Present</td>
</tr>
<tr>
<td>Dr. Pisanu T.</td>
<td>Development of System Test Station for Portion Exchange Membrane Fuel Cell Performance</td>
<td>National Research Council of Thailand (NRCT)</td>
<td>710,000</td>
<td>Sep. 2007-Sep. 2008</td>
</tr>
<tr>
<td>Dr. Thawatchai O.</td>
<td>Development of a Pumpless Jet Refrigeration Cycle for Actual Application</td>
<td>The Thailand Research Fund (TRF)</td>
<td>1,200,000</td>
<td>May. 2008-Apr. 2011</td>
</tr>
<tr>
<td>Dr. A. Sharp &amp; Dr. S. Babel (with four Universities)</td>
<td>Asia Euro Link Project - Establishment of Master Program at the National University of Laos in Environmental Engineering and Management</td>
<td>European Commission</td>
<td>Euro 139,850 (approx. 6,712,800) (SIIT Portion)</td>
<td>Jan. 2006-Dec. 2008</td>
</tr>
<tr>
<td>Dr. A. Sharp &amp; Dr. S. Babel</td>
<td>Community and Stakeholder Participation in Water Quality Improvement and Pollution Abatement in Bang Pa Canal in a Peri-Urban Area of Ratchaburi Province, Thailand</td>
<td>Canadian International Development Agency (CIDA) through the Southeast Asia Urban Environmental Management Application Project (SEA-UEMA)</td>
<td>Euro 18,750</td>
<td>Oct. 2007-Sep. 2008</td>
</tr>
<tr>
<td>Dr. A. Sharp &amp; Dr. Thawatchai O.</td>
<td>Study on the Conditions of Using Microorganisms from Wastewater Treatment Facility to Produce Electricity</td>
<td>Thammasat University Research Fund</td>
<td>80,000</td>
<td>May 2007-Present</td>
</tr>
<tr>
<td>Dr. Somnuk T.</td>
<td>Durability Code of Reinforced Concrete Structures and Performance-based Design Method for Concrete Mix Proportions</td>
<td>Kasetsart University</td>
<td>200,000</td>
<td>Oct. 2006-Present</td>
</tr>
<tr>
<td></td>
<td>Development of Expansive Concrete with Expansive Additives for Application in Thailand</td>
<td>Taiheiyo Materials Corporation</td>
<td>635,100</td>
<td>Oct. 2006-Present</td>
</tr>
<tr>
<td>Dr. Somrote K.</td>
<td>Application of CaCO₃ Powder in Concrete Industry</td>
<td>Surint Omya Chemicals (Thailand) Co., Ltd.</td>
<td>759,400</td>
<td>Apr. 2007-Mar. 2008</td>
</tr>
<tr>
<td>Dr. Chawalit J.</td>
<td>Analysis and Testing on Drying Shrinkage of Concrete</td>
<td>The Concrete Products and Aggregate Co., Ltd.</td>
<td>300,000</td>
<td>Oct. 2007-Mar. 2008</td>
</tr>
<tr>
<td>Dr. Pornpimol C.</td>
<td>Properties of High Free Lime Fly Ash and Concrete Incorparations High Free Lime Fly Ash</td>
<td>Electricity Generating Authority of Thailand (EGAT)</td>
<td>2,400,000</td>
<td>Oct. 2007-Nov. 2008</td>
</tr>
<tr>
<td></td>
<td>Inspection of Cracking Problem of Main Control Building, Ratchaburi</td>
<td></td>
<td>400,000</td>
<td>Nov. 2007-Sep. 2008</td>
</tr>
<tr>
<td></td>
<td>Study on Deterioration of RC Building in Marine Environment</td>
<td>National Housing Authority</td>
<td>2,200,000</td>
<td>Jul. 2007-Apr. 2008</td>
</tr>
<tr>
<td></td>
<td>Durability of Concrete under Marine Environment of Thailand</td>
<td>SCG Cement Co., Ltd.</td>
<td>3,500,000</td>
<td>Apr. 2008-Mar. 2009</td>
</tr>
<tr>
<td></td>
<td>Study &amp; Promotion of Expansive Concrete I, Thailand - Second Stage</td>
<td>Taiheiyo Materials Corporation</td>
<td>772,000</td>
<td>May. 2008-Apr. 2009</td>
</tr>
<tr>
<td>Principal Investigator</td>
<td>Title</td>
<td>Sponsoring Organization</td>
<td>Total Project Budget (Baht)</td>
<td>Duration</td>
</tr>
<tr>
<td>------------------------</td>
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</tr>
<tr>
<td>Dr. Thawatchai O.</td>
<td>Development of Serial Self-turning Reactor System for Composting of Organic Waste</td>
<td>The University of Tokyo</td>
<td>375,442</td>
<td>Nov. 2006-Present</td>
</tr>
<tr>
<td>Dr. Sujin S.</td>
<td>Study and Making Report and Explanation of Changes in Details of No. 4 Wang-noi Thermal Power Plant</td>
<td>Southeast Asia Technology Co., Ltd.</td>
<td>2,205,600</td>
<td>Apr. 2008-Jul. 2008</td>
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<tr>
<td>Dr. Bundit L.</td>
<td>Control of Pneumatic Muscle Actuator via Hydrogen Driving Metal Hydride</td>
<td>The Thailand Research Fund (TRF)</td>
<td>1,200,000</td>
<td>May 2008-Apr. 2011</td>
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<td>Dr. Taweep C.</td>
<td>Development on Administration of a Standardized Test Bank for Supporting Information Technology Professional Examination</td>
<td>National Electronics and Computer Technology Center (NECTEC)</td>
<td>1,520,000</td>
<td>Aug. 2007-Mar. 2009</td>
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<td>Dr. Thananuch L.</td>
<td>SSME Fast Track Program</td>
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<td>1,000,000</td>
<td>Jan. 2008-Mar. 2009</td>
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<td>Dr. Thanaruk T.</td>
<td>Research and Development of a Prototype of Medical-related Knowledge Base in Thailand</td>
<td>National Electronics and Computer Technology Center (NECTEC)</td>
<td>2,360,400</td>
<td>Sep. 2006-Aug. 2007</td>
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<td>Research on Automatic Relationship Discovery in News Articles</td>
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<td>Dr. Thawatchai O.</td>
<td>Predictions of Nuclear Fusion Energy Efficiency in ITER Tokamak</td>
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<td>Dr. Wanwipa S.</td>
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<td>Dr. Waree K.</td>
<td>Fuzzy Controller and Image Enhancement for Slit Lamp Microscopy</td>
<td>National Electronics and Computer Technology Center (NECTEC)</td>
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<td>Dr. Winyu R.</td>
<td>Mathematical Modeling for Cross Shore Sediment Transport and Beach Deformation under Irregular Waves</td>
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SIIT Doctoral Faculty Members’ 2007 Publications

<table>
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<tr>
<th>Publications(1)</th>
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<tr>
<td>International Journal Papers</td>
<td>41.8(4)</td>
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<tr>
<td>Regional/National Journal Papers</td>
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<td>International Conference Papers</td>
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<td><strong>Total</strong></td>
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**Total Equivalent International Journal Papers (2)** | 71.38 |

| No. of International Journal Papers/Faculty Member | 0.79 |
| No. of Equivalent International Journal Papers /Faculty Member | 1.35 |

(1) Publications with non-SIIT co-authors are weighted according to the number of SIIT authors
(2) Equivalent Number: International Journal Paper in International Database x 1.0, International Journal Paper x 0.75, National Journal Paper x 0.5, International Conference Paper x 0.33
(3) 33.14 International Journal Papers in International Databases (x 1.0) and 8.66 International Journal Papers (x 0.75)

SIIT Graduate Students, 2nd/2007 Semester

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<th>Program</th>
<th>PhD</th>
<th>MS</th>
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<tbody>
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<td>Chemical Engineering</td>
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<td>Civil Engineering</td>
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Number of SIIT Graduates, Academic Years 1998 - 2007

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<th>Program</th>
<th>Bachelor’s Degree</th>
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<td>Building Facilities Engineering (BF)</td>
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<td>Industrial Engineering (IE)</td>
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<td>Telecommunications (TC)</td>
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* including Joint Program with TU Faculty of Engineering
### Royal Golden Jubilee & ADB Scholarships for Graduate Students

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### External Research Grants and Internal Research Support

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<th>School/Department</th>
<th>External Research Grants, Baht</th>
<th>Internal Research Support*, Baht</th>
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<tr>
<td></td>
<td>Academic Year (June - May)</td>
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<tr>
<td>School of Bio-Chemical Engineering and Technology</td>
<td>409,486</td>
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<td>School of Civil Engineering and Technology</td>
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<tr>
<td>School of Communications, Instrumentations and Control</td>
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<tr>
<td>School of Information and Computer Technology</td>
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<td>School of Management Technology</td>
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<td>School of Manufacturing Systems and Mechanical Engineering</td>
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<td><strong>Total</strong></td>
<td>21,845,110</td>
<td>17,483,808</td>
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* Internal research support includes financial support for graduate thesis, for paper presentation and publication.
Sirindhorn International Institute of Technology (SIIT) at Bangkadi
Thammasat University
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http://www.siit.tu.ac.th
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Thammasat University
P.O. Box 22, Thammasat-Rangsit Post Office, Pathum Thani 12121, Thailand
Tel. +66 (0) 2986 9009, (0) 2564 3226. Fax. +66 (0) 2986 9112-3
http://www.siit.tu.ac.th
Sirindhorn International Institute of Technology
Thammasat University
http://www.siit.tu.ac.th