Sirindhorn International Institute of Technology (SIIT)

SIIT at Rangsit

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Fax. +66-2-986-9112-3

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Mueang, Pathum Thani 12000, Thailand

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Pathum Thani 12121, Thailand

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website: http://www.siit.tu.ac.th
2012 Graduate Catalog
2011 Annual R&D Report

Sirindhorn International Institute of Technology
Thammasat University

A Leading Teaching/Learning and Research Institute
VISION

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

MISSIONS

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

2. To educate graduate students to be able to conduct high quality and innovative research corresponding to engineering and related technological development

3. To conduct research and development in engineering and related technologies relevant to teaching, modern industries, and societal needs
2012 Graduate Catalog
AND 2011 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 Center 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 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).

SIIT started offering 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 2011, there were 118 master's degree students and 92 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 m² with a 490-seat capacity. More than 28,600 volumes of publications are available. An SIIT branch library at Bangkadi has a total floor area of 1,319 m² with a 250-seat capacity. The branch library has more than 9,600 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-story buildings, the SIIT main building and the advanced laboratory building, one four-story building which accommodates classrooms and a student activities center, and a small building housing the Environmental Technology Laboratory. Construction of a new five-story wing of the SIIT main building (7,004 m²) was commenced in October 2009 and will be completed in academic year 2012. There are two new buildings at Bangkadi, in addition to an existing building which is named after Thanpuying Niramol Suriyasat. One is a five-story building housing the administration offices and classrooms. The other, the "Sirindralai" Building, is a six-story building. It accommodates the School of Information, Computer, and Communication Technology, School of Management Technology, the Library, the computer center, laboratories, and classrooms.

Since 1996, the Institute has graduated 17 batches of students and the total number of SIIT graduates (as of August 2012) is 5,092: 4,878 Bachelor's Degree, 148 Master's Degree and 66 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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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's 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 Center 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 Sirindhralai Building at Bangkadi on June 28, 2006. This new six-story building houses the School of Information, Computer, and Communication Technology (ICT), the School of Management Technology (MT), 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 Center, 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), Computer Science (CS), Electronics and Communication Engineering (EC), Engineering Management (EM), Industrial Engineering (IE), Information Technology (IT), Management Technology (MT), and Mechanical Engineering (ME).

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 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 and Rank Assessment Committee (ARRAC), comprising reputable scholars in various fields, provides recommendations on qualifications of new faculty members, rank promotions and contract renewal of faculty members and also reviews academic curricula. The Institute, headed by the Director, consists of administrative divisions, a library and information services center, five academic schools, and Department of Common and Graduate Studies (CGS).
Campuses of SIIT

Operations of SIIT are carried out at two locations: Rangsit Campus (at the Rangsit Center of Thammasat University) and Bangkadi Campus (at Bangkadi Industrial Park).

Rangsit Campus

Campus and Transportation

The Rangsit Center of Thammasat University (TU) is located 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 and a four-story building located at the Rangsit Campus. The first building is the main building with an area of almost 20,677 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 and administrative divisions, are located on the second, third, and a section of the fourth 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 m². 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.

The third SIIT building, Edutivity, is a four-story building which is adjacent to the second one, with a total area of about 1,500 m². This building houses a student activities center and the office of the Ground & Properties Division on the first floor, classrooms of various sizes on the second, third, and fourth floors, and the Construction and Maintenance Technology Research Center (CONTEC) on the third floor.

Computer Center

The SIIT Computer Center is located on the third floor of the main SIIT building. The center is equipped with personal computers in four separate rooms, two of which are used mainly for instruction on programming, mathematical problem solving, engineering graphics 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 and staff members. 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. Wireless Internet (WiFi) can be accessible from any area of the SIIT buildings. A VPN service by which students can access SIIT’s online system from their homes 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 university’s Rangsit Center, for their study and literature searches on social sciences and humanities.

Infirmary Room

The SIIT infirmary 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 a timely transfer to Thammasat University Hospital.

Hospitals

Thammasat University Hospital, located at the Rangsit Center, 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 Center.

Student Activities Center

A spacious student activities center is located on the first floor of the SIIT Edutivity 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 and Alumni Relations. All student activities must conform to SIIT and TU regulations.

University Bookstore

The TU Bookstore at the Rangsit Center 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 at the Duen Bunnag 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. Many convenience stores are located on campus, and nearby vicinities.

Cafeterias and Canteens

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

Additionally, there are three canteens in SIIT. The first two canteens are inside the SIIT main building (on the first and the third floor). The last one near the student activities center also sells snacks and beverages.
Banking Services

For banking services such as cash withdrawal and balance inquiries, students can conveniently use the automated teller machines (ATMs) 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 Center has on-campus dormitories for male and female students. Over 6,200 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 Center 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.

Students may also choose to exercise by biking, jogging, etc., especially in the morning since the air is very refreshing.

Bangkadi Campus

In 1999, FTI, with cooperation from Toshiba Thailand Co., Ltd., and Mitsui & Co. (Thailand), Ltd., provided 5.6 rai (0.9 hectare) 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 (0.64 hectare) and 5 rai (0.8 hectare). The existing building was renovated and enlarged. The new building, which is called the IT&MT building, has a combined area of approximately 3,300 m². 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 m² 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. Currently, it houses the School of Information, Computer, and Communication Technology (ICT), the School of Management Technology (MT), the library, the computer center, classrooms, and laboratories.

The third SIIT building is the SIIT Administration and Training Building, located in front of the Bangkadi Industrial Park (BIP) on Tiwanond Road. It is a four-story building which aims to be a research and training center. The first floor is for car parking. Bangkok Bank and Thanachart Bank are located on the second floor. On the third floor is a research and innovation center, namely “Service and Knowledge Innovation Center” (SAKI). The aim of this research center is to provide practical training, education, and seminars related to Information and Communication Technology (ICT) and Management Technology (MT) towards frontier knowledge innovation and service innovation. The computer laboratory with 30 Mac computers and an intelligent board system are provided in SAKI for practical training courses.

Facilities

Computer Center

A Computer Center office is located on the second floor of the Sirindhralai building. It supervises and maintains two laboratories for instruction and students’ use in mathematical and statistical problem solving, computer graphics, systems simulation, database applications and programming, computer networking, and general computing purposes. In addition, there are network access points in almost every room in the campus’ buildings which connect to the Rangsit Campus of SIIT by a high-speed connection. Students can easily access the Internet either from their notebook computers, using wireless hotspots in every building, or from the computers in both the library and the computer laboratories.
Library and Information Services Center

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.

Laboratories of the School of ICT

The School of ICT has eight laboratories. There are four laboratories for electronic engineering, two computer laboratories, and two research laboratories. All electronic laboratories are located on the fifth and sixth floors of the Sirindhralai building. They are used for instruction in digital signal processing and communications, electronics, and feedback control laboratories.

Two computer laboratories are located on the ground and third floors of the IT&MT building. These laboratories are used mainly for instruction purposes on mathematical problem solving, computer programming, computer graphics, and networking.

The last two laboratories entitled "NTC Telecommunications Research Laboratories," are on the third floor of the IT&MT buildings and the fourth floor of the Sirindhralai building. SIIT and the Telecommunications Research and Industrial Development Institute (TRIDI), the Office of the National Broadcasting and Telecommunications Commission (NBTC), cooperate to establish these laboratories, which are supported by The Office of Public Fund for Telecommunication Development. The aim of these laboratories is to be a research center with emphases in wireless communications, dynamic networking, ambient intelligence, and their applications that can be applied for the national broadcasting and telecommunications.

Infirmary Room

The infirmary room is on the ground floor of the IT&MT building. A fully qualified nurse is in charge during weekdays to assist with minor medical problems and provide first-aid treatment.

Dormitory

The SIIT Hall of Residence at Bangkadi has two five-story buildings, one for male residents and another for female residents. There are 72 rooms on the 2nd-5th floors, which can accommodate up to 144 residents. Common rooms, canteen, and a launderette are located on the first floor, with a convenience store nearby. In addition, free internet Wi-Fi is provided for the residents on the ground floor.

Cafeteria and Canteen

A variety of foods, snacks, and beverages are provided from vendors at reasonable prices at a canteen on the ground floor of the Sirindhralai building. Additionally, there is a cafeteria on the ground floor of the IT&MT building which serves snacks and beverages.

Sport Facilities

There is a soccer field behind the Sirindhralai building. In addition, an outdoor basketball court is located next to the SIIT Hall of Residence. A fitness center is on the first floor of the SIIT Hall of Residence.
SIIT GRADUATE PROGRAMS: GENERAL INFORMATION

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

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

APPLICATION FORM

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

Admission and Public Relations Division
Sirindhorn International Institute of Technology
Thammasat University - Rangsit Center
P.O.Box 22, Thammasat-Rangsit Post Office
Pathum Thani 12121, Thailand
Tel. +66-2-986-9009, +66-2-564-3226 (Ext. 1520)
Fax. +66-2-986-9106, +66-2-986-9112~3
E-mail: admissions@siit.tu.ac.th

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

Application Deadlines:
- 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 the number of registered credits is less than or equal to 6 credits)

Summer session: 22,000 Baht for summer session (or 15,750 Baht if the number of registered credits is less than or equal to 3 credits)

Student status maintaining: 4,800 Baht per semester

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

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

Financial Aid

Internal and external scholarships are available each year to a number of students. For additional information, contact the school heads or faculty members in the area of your interest, or visit the SIIT website: http://www.siit.tu.ac.th.
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 15 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>
</tbody>
</table>

For thesis/dissertation/independent study, the academic performance is measured by the following grades:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Point</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>S</td>
<td>-</td>
<td>Satisfactory</td>
</tr>
<tr>
<td>U</td>
<td>-</td>
<td>Unsatisfactory</td>
</tr>
</tbody>
</table>

The grade system of "P" (Pass) and "N" (Not Pass) is applied only for evaluation of a qualification examination and English proficiency requirements.
MASTER OF ENGINEERING PROGRAM IN ENGINEERING TECHNOLOGY (INTERNATIONAL PROGRAM)

CURRICULUM TITLE
Master of Engineering in Engineering Technology (International Program)

DEGREE TITLE
Master of Engineering (Engineering Technology)

APPLICANT’S QUALIFICATIONS
1. The applicant must hold a bachelor’s degree in engineering, science, or a related field that is accepted by the SIIT Academic 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 Academic Committee.
3. The applicant must submit an official score of one of the following English language tests:
   - TU-GET
   - TOEFL (official or institutional)
   - IELTS
   - 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 Academic 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 8 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 at least 3 members:

One principal advisor, faculty members of SIIT or Thammasat University, and at least one member who is not affiliated with Thammasat University and serves as an external committee member.

• The principal advisor must be an SIIT faculty member with a doctoral degree or equivalent or an academic rank of at least associate professor in the program or a related program.
• The external committee member must be an expert outside Thammasat University with a doctoral degree and holding an academic rank of at least assistant professor or equivalent, or without a doctoral degree but holding an academic rank of at least associate professor or equivalent. The specialization of the external committee member must be in a field related to the thesis.
• A co-advisor (if any) must be a faculty member of SIIT or Thammasat University, or an expert outside Thammasat University with a doctoral degree or equivalent, or with an academic rank of at least associate professor in the program or a related program.
• The number of the committee members who are not the thesis advisor or co-advisor must not be less than the number of committee members who are the thesis advisor and co-advisor. The number of Thesis Committee members who are faculty members of SIIT or Thammasat University should not be less than that of the Thesis Committee members from outside.

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.

## Period of Study

The maximum period of study to complete the program is 5 academic years.

## Registration

The student must enroll in courses and/or register for a thesis totalling at least 6 credits but not more than 15 credits per semester for a regular semester and not more than 6 credits for a summer semester.

## Academic Performance Evaluation and Graduation

1. Evaluation of Academic Performance

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

   1.2 Any student, who gets grade “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 at least grade “C” for the course in the second enrollment.

   1.3 Thesis assessment is graded 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 a cumulative 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 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 and Rank Assessment Committee of SIIT, or at least one paper has been accepted for publication in international conference proceedings.
2.5 Having 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)
   - An IELTS score of at least 6.0
   - A TU-GET score of at least 550

**TRANSFERRED CREDITS**

A maximum of 9 credits of courses with all grades B or better can be transferred.
1. Total Credits Requirement
   A total of 39 credits is required for completion of the program.

2. Structure and Components
   
   **2.1 Core Courses**
   
   **2.1.1 Compulsory Courses**
   
   **2.1.2 Specialized Courses**
   from one of the following six majors of study, i.e.,
   1. Chemical Engineering
   2. Civil Engineering
   3. Electrical Engineering
   4. Industrial Engineering and Manufacturing Systems
   5. Mechanical Engineering
   6. Sustainable Energy and Environment
   
   **2.1.3 Elective Courses**
   
   **2.2 Master’s Thesis**
   
   Total 39 Credits

3. Course Coding System
   Sirindhorn International Institute of Technology sets up the course coding system as follows:
   
   3.1 Subject code consists of letters and numbers.
   3.2 ES indicates basic subjects.
   ET indicates subjects in Engineering Technology Program.
   ICT indicates subjects in Information and Communication Technology for Embedded Systems.
   SE indicates subjects in Supply Chain System Engineering and Logistics Program.
   
   3.3 Numbers are composed of 3 digits.
   • The first unit-place-digit indicates the subject order.
   • The tenth-place-digit indicates the subject group.

0    General
1    Chemical Engineering
2    Civil Engineering
3    Electrical Engineering
4    Industrial Engineering and Manufacturing Systems
5    Mechanical Engineering
6-7  Sustainable Energy and Environment
• 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>ES801</td>
<td>Advanced Engineering Mathematics</td>
<td>3(3-0-9)</td>
</tr>
<tr>
<td>or</td>
<td>ES811 Theory of Computation</td>
<td>3(3-0-9)</td>
</tr>
<tr>
<td>or</td>
<td>ES812 Advanced Business Statistics</td>
<td>3(3-0-9)</td>
</tr>
<tr>
<td>or</td>
<td>ET600 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>
<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>
<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</th>
</tr>
</thead>
<tbody>
<tr>
<td>ET630</td>
<td>Special Topic in Electrical Engineering</td>
<td>3(3-0-9)</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>ET63x</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</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>ET64x</td>
<td>Technical Elective</td>
<td>3(3-0-9)</td>
</tr>
</tbody>
</table>

### 4.1.2.5 Major: Mechanical Engineering

<table>
<thead>
<tr>
<th>Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ET650</td>
<td>Special Topic in Mechanical Engineering</td>
<td>3(3-0-9)</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>ET65x</td>
<td>Technical Elective</td>
<td>3(3-0-9)</td>
</tr>
</tbody>
</table>

### 4.1.2.6 Major: Sustainable Energy and Environment

<table>
<thead>
<tr>
<th>Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ET660</td>
<td>Special Topic in Sustainable Energy and Environment</td>
<td>3(3-0-9)</td>
</tr>
<tr>
<td>ET661</td>
<td>Current Topics in Sustainable Energy and Environment</td>
<td>3(3-0-9)</td>
</tr>
<tr>
<td>ET66x</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</th>
</tr>
</thead>
<tbody>
<tr>
<td>ET6xx</td>
<td>Technical Elective</td>
<td>3(3-0-9)</td>
</tr>
<tr>
<td></td>
<td>or SE611-7</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>ES800</td>
<td>Master’s Thesis</td>
<td>15</td>
</tr>
</tbody>
</table>
## COURSE DESCRIPTIONS

### COMPULSORY COURSES

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ES801</td>
<td>Advanced Engineering Mathematics</td>
<td>3(3-0-9)</td>
<td>Mathematics for solving engineering problems; ordinary differential equations of higher order; partial differential equations; integral equations; numerical analysis; optimization techniques.</td>
</tr>
<tr>
<td>ES805</td>
<td>Research Methodology</td>
<td>2(2-0-6)</td>
<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>
</tr>
<tr>
<td>ES806</td>
<td>Research Seminar</td>
<td>1(0-3-1)</td>
<td>Student-faculty interaction on advanced research topics.</td>
</tr>
<tr>
<td>ES811</td>
<td>Theory of Computation</td>
<td>3(3-0-9)</td>
<td>Set theory; relations; formal proof methods; finite automata; regular expressions; context-free grammar; pushdown automata; Turing machines; uncomputability; computational complexity; first-order logic.</td>
</tr>
<tr>
<td>ES812</td>
<td>Advanced Business Statistics</td>
<td>3(3-0-9)</td>
<td>This course exposes students to the application of statistical techniques used to address business and economic problems. Topics include linear regression and correlation, multiple regression, model building, analysis of variance, multivariate statistics, time series analysis, and chi-square test of significance.</td>
</tr>
<tr>
<td>ET600</td>
<td>Numerical Methods for Engineers</td>
<td>3(3-0-9)</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>
</tr>
<tr>
<td>ET601</td>
<td>Computer-Aided Engineering</td>
<td>3(3-0-9)</td>
<td>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.</td>
</tr>
<tr>
<td>ICT600</td>
<td>Computational Mathematics</td>
<td>3(3-0-9)</td>
<td>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.</td>
</tr>
<tr>
<td>SE600</td>
<td>Decision Making and Optimization</td>
<td>3(3-0-9)</td>
<td>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; Queueing theory and decision analysis techniques; Advanced topics in optimization.</td>
</tr>
</tbody>
</table>

### SPECIALIZED COURSES/ ELECTIVE COURSES

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ET610</td>
<td>Special Topic in Chemical Engineering</td>
<td>3(3-0-9)</td>
<td>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.</td>
</tr>
<tr>
<td>ET611</td>
<td>Current Topics in Chemical Engineering</td>
<td>3(3-0-9)</td>
<td>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.</td>
</tr>
<tr>
<td>ET612</td>
<td>Advanced Thermodynamics for Chemical Engineering</td>
<td>3(3-0-9)</td>
<td>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.</td>
</tr>
<tr>
<td>ET613</td>
<td>Advanced Transport Phenomena</td>
<td>3(3-0-9)</td>
<td>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.</td>
</tr>
<tr>
<td>ET614</td>
<td>Advanced Chemical Kinetics and Reactor Design</td>
<td>3(3-0-9)</td>
<td>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.</td>
</tr>
<tr>
<td>ET615</td>
<td>Genetic Engineering</td>
<td>3(3-0-9)</td>
<td>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.</td>
</tr>
</tbody>
</table>
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  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  3(3-0-9)
Information Systems
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; Queuing 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.

ET636 Digital Communication System Design 3(3-0-9)
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.

ET640 Special Topic in Industrial Engineering and Manufacturing Systems 3(3-0-9)
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 & control systems and methodologies (MRP, MRPII, ERP, OPT, JIT).

ET641 Current Topics in Industrial Engineering and Manufacturing Systems 3(3-0-9)
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.

ET642 Quality Management 3(3-0-9)
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.

ET643 Manufacturing Strategy 3(3-0-9)
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.

ET644 Simulation Modeling and Analysis 3(3-0-9)
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.

ET645 Advanced Manufacturing Processes 3(3-0-9)
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.

ET646 Design of Operations Facilities and Systems 3(3-0-9)
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.

ET647 Advanced Materials and Processes 3(3-0-9)
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.

ET650 Special Topic in Mechanical Engineering 3(3-0-9)
An in-depth study on a topic of interest in the field 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 and neural control, mechatronics, and automatic control.

ET651 Current Topics in Mechanical Engineering 3(3-0-9)
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.

ET652 Power Plant Engineering and Emissions 3(3-0-9)
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, SOx, 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.

**ET653 Optimization Methods in Mechanical Engineering**

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**

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**

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**

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**

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.

**ET660 Special Topic in Sustainable Energy and Environment**

An in-depth study on a topic of interest in the field of Energy and Environment such as biomass energy, fossil fuels, geothermal energy, nuclear power, wind power, solar energy, hydrogen fuel, fusion energy, biodegradation and bioremediation, waste treatment technologies, and waste disposal technologies.

**ET661 Current Topics in Sustainable Energy and Environment**

A study on current interests in the field of Energy and Environment such as bio-energy conversions, clean energy resources, low carbon economy and technology, energy-environmental-sustainable-economic development, greenhouse gas mitigation technologies.

**ET662 Energy and Environmental Impact Assessment**

EIA objectives and principles; EIA process; Types of EIA; Impact assessment methods; Impacts on various sectors of environment; Energy system and its environmental impacts; Baseline data collection; Modeling of facility combined with existing baseline conditions; Analysis of potential effects and mitigation measures; Issues in social and health impact assessment.

**ET663 Climate Change**

Sources of greenhouse gases (GHG); Global carbon cycle; Greenhouse gases effects on climate; Energy system related to GHG emissions; Sectoral energy demand and GHG emissions; Primary energy consumption and GHG emissions; Energy technologies for climate change mitigation; GHG mitigation assessment in energy system; Impact of climate change on natural resources and ecosystem; Production system and public health; Mitigation measures including sequestration; Clean development mechanisms (CDM).

**ET664 Sustainable Energy**

Current and potential future energy systems, covers resources, extraction, conversion, and end-use, and emphasizes meeting regional and global energy needs in the 21st century in a sustainable manner; Different renewable and conventional energy technologies will be presented including biomass energy, fossil fuels, geothermal energy, nuclear power, wind power, solar energy, hydrogen fuel, and fusion energy and their attributes described within a framework that aids in evaluation and analysis of energy technology systems in the context of political, social, economic, and environmental goals.

**ET665 Energy Planning and Policy**

Energy flows in the economy; Energy accounting framework; Basic econometric Methods; Methodology for energy demand analysis; End-use method of energy; Demand analysis; Energy demand forecasting methodologies; Planning in electricity; Demand side management; Energy policy and institutions; Environmental regulations of energy.

**ET666 Nuclear Power Generation and Management**

Principle of nuclear reaction and power generation; Types of current nuclear reactors and future development; Nuclear fuel cycle and waste disposal management; Nuclear safety; Nuclear power plant siting and public participation; Nuclear reactor decommissioning procedures; Economics of nuclear power plants; Legal and regulatory issues associated with nuclear power generation and proliferation risks.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ET667</td>
<td>Cleaner Production</td>
<td>3(3-0-9)</td>
</tr>
<tr>
<td>ET668</td>
<td>Pollution Control and Management</td>
<td>3(3-0-9)</td>
</tr>
<tr>
<td>ET669</td>
<td>Nuclear Reactions and Radiation</td>
<td>3(3-0-9)</td>
</tr>
<tr>
<td>ET672</td>
<td>Resource Economics</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 and Supply Chain Systems</td>
<td>3(3-0-9)</td>
</tr>
<tr>
<td>ES800</td>
<td>Master’s Thesis</td>
<td>15 credits</td>
</tr>
</tbody>
</table>

**ET667 Cleaner Production**
Sustainable waste treatment; Industrial ecology; Green chemistry; Life cycle assessment; Waste and cleaner production audits; Cleaner production technologies, applications, implementation, and success case studies; Roles of international standards; ISO14000.

**ET668 Pollution Control and Management**
Physical, chemical and biological processes influencing the extent of air, water and soil pollution; Methods of treatment and control of air and water pollution; Treatment, reuse, recycle, and management of solid and hazardous wastes; Monitoring; Standards.

**ET669 Nuclear Reactions and Radiation**
Kinetics of nuclear reactions and radioactive decay, fission reactions, fusion reactions, and reactions of energetic neutrons, properties of the fission products and the actinides; nuclear models and transition probabilities; interaction of radiation with matter.

**ET672 Resource Economics**
Economic analysis of the natural and energy resources, relationship between environment and economy, the causes and impacts of environmental deterioration, the economics of environmental quality. The application of economic theories to various kinds of resources, economic theories and instruments in resource management, energy and environmental policy, social and legal issues.

**SE611 Procurement Logistics**
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**
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**
Characteristics of various modes of domestic and international transportation; 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**
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**
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**
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**
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.

**ES800 Master’s Thesis**
15 credits
**Master of Engineering Program 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)

**Applicant’s Qualifications**

1. The applicant must hold a bachelor’s degree in engineering, science, or a related field that is accepted by the SIIT Academic 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 Academic Committee.
3. The applicant must submit an official score of one of the following English language tests:
   - TU-GET
   - TOEFL (official or institutional)
   - IELTS
   - 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 Academic 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 8 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 at least 3 members:

One principal advisor, faculty members of SIIT or Thammasat University, and at least one member who is not affiliated with Thammasat University and serves as an external committee member.

- The principal advisor must be an SIIT faculty member with a doctoral degree or equivalent or an academic rank of at least associate professor in the program or a related program.
- The external committee member must be an expert outside Thammasat University with a doctoral degree and holding an academic rank of at least assistant professor or equivalent, or without a doctoral degree but holding an academic rank of at least associate professor or equivalent. The specialization of the external committee member must be in a field related to the thesis.
- A co-advisor (if any) must be a faculty member of SIIT or Thammasat University, or an expert outside Thammasat University with a doctoral degree or equivalent, or with an academic rank of at least associate professor in the program or a related program.
- The number of the committee members who are not the thesis advisor or co-advisor must not be less than the number of committee members who are the thesis advisor and co-advisor. The number of Thesis Committee members who are faculty members of SIIT or Thammasat University should not be less than that of the Thesis Committee members from outside.

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.

**PERIOD OF STUDY**

The maximum period of study to complete the program is 5 academic years.

**REGISTRATION**

The student must enroll in courses and/or register for a thesis totalling at least 6 credits but not more than 15 credits per semester for a regular semester and not more than 6 credits for a summer semester.

**ACADEMIC PERFORMANCE EVALUATION AND GRADUATION**

1. Evaluation of Academic Performance

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

   1.2 Any student, who gets grade "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 at least grade "C" for the course in the second enrollment.

   1.3 Thesis assessment is graded 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 a cumulative 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 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 and Rank Assessment Committee of SIIT, or at least one paper has 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)
   - An IELTS score of at least 6.0
   - A TU-GET score of at least 550

**TRANSFERRED CREDITS**

A maximum of 9 credits of courses with all grades B or better can be transferred.
1. **Total Credits Requirement**
   A total of 39 credits is required for completion of the program.

2. **Structure and Components**

   **2.1 Core Courses**
   
   - **2.1.1 Compulsory Courses**
     15 Credits
   - **2.1.2 Compulsory Elective Course**
     3 Credits
   - **2.1.3 Technical Elective Courses**
     6 Credits

   **2.2 Master’s Thesis**
   
   **Total**
   39 Credits

3. **Course Coding System**
   Sirindhorn International Institute of Technology sets up the course coding system as follows:

   3.1 Subject code consists of letters and numbers.
   3.2 ES indicates basic subjects.
   ET indicates subjects in Engineering Technology Program.
   ICT indicates subjects in Information and Communication Technology for Embedded Systems.
   SE indicates subjects in Supply Chain System Engineering and Logistics Program.
   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 hours)</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 Course, 3 credits**

<table>
<thead>
<tr>
<th>Code</th>
<th>Course Title</th>
<th>Credits (lecture-practice-self study hours)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ES801</td>
<td>Advanced Engineering Mathematics</td>
<td>3(3-0-9)</td>
</tr>
<tr>
<td>or ES811</td>
<td>Theory of Computation</td>
<td>3(3-0-9)</td>
</tr>
<tr>
<td>or ES812</td>
<td>Advanced Business Statistics</td>
<td>3(3-0-9)</td>
</tr>
<tr>
<td>or ET600</td>
<td>Numerical Methods for Engineers</td>
<td>3(3-0-9)</td>
</tr>
<tr>
<td>or ICT600</td>
<td>Computational Mathematics</td>
<td>3(3-0-9)</td>
</tr>
<tr>
<td>or 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 hours)</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

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

ES805 Research Methodology
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
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.

ES812 Advanced Business Statistics
This course exposes students to the application of statistical techniques used to address business and economic problems. Topics include linear regression and correlation, multiple regression, model building, analysis of variance, multivariate statistics, time series analysis, and chi-square test of significance.

ICT700 Software for Embedded Systems
Software programming; embedded operating systems and middle-ware 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.

ICT720 Hardware for Embedded Systems
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
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.

Compulsory Elective Courses

ET 600 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.

ICT710 Software Design Exercise for Embedded Systems
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 logics; VHDL/Verilog programming; project planning, system specification design, software coding; software implementation and verification on FPGA prototype board.

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.

Technical Elective Courses

ICT740 Communication
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 (DTFT), 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.

**ICT 781 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'S THESIS**

**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.
Master of Engineering Program in Logistics and Supply Chain Systems Engineering (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)

Applicant’s Qualifications
1. The applicant must hold a bachelor’s degree in engineering, science or a related field that is accepted by the SIIT Academic Committee.
2. The applicant must have a top 20% class rank for his/her bachelor’s degree, or a cumulative GPA of at least 2.75, or sufficient relevant research or work experience as specified by the SIIT Academic Committee.
3. The applicant must submit an official score of one of the following English language tests:
   - TU-GET
   - TOEFL (official or institutional)
   - IELTS
   - 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 Academic 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 8 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 A
      This 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 Study Plan B
      This syllabus focuses on coursework (not less than 33 credits). Independent study (not less than 6 credits) and comprehensive examination are required for completion of the program.
3. Thesis (Study Plan A)
   3.1 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.
   3.2 Thesis Committee
      The Thesis Committee consists of at least 3 members:
      One principal advisor, faculty members of SIIT or Thammasat University, and at least one member who is not affiliated with Thammasat University and serves as an external committee member.
• The principal advisor must be an SIIT faculty member with a doctoral degree or equivalent or an academic rank of at least associate professor in the program or a related program.
• The external committee member must be an expert outside Thammasat University with a doctoral degree and holding an academic rank of at least assistant professor or equivalent, or without a doctoral degree but holding an academic rank of at least associate professor or equivalent. The specialization of the external committee member must be in a field related to the thesis.
• A co-advisor (if any) must be a faculty member of SIIT or Thammasat University, or an expert outside Thammasat University with a doctoral degree or equivalent, or with an academic rank of at least associate professor in the program or a related program.
• The number of the committee members who are not the thesis advisor or co-advisor must not be less than the number of committee members who are the thesis advisor and co-advisor. The number of Thesis Committee members who are faculty members of SIIT or Thammasat University should not be less than that of the Thesis Committee members from outside.

3.3 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.

4. Independent Study (Study Plan B)
4.1 A student can register for independent study after he or she has gained at least 18 credits with a minimum cumulative GPA of 3.00.
4.2 A student can take the final examination of an independent study only after he or she obtained “P” (Pass) for his or her comprehensive examination and satisfied English proficiency requirements.

4.3 Independent Study Examination
4.3.1 SIIT shall appoint a project advisor and, if required, a project co-advisor to advise the student on the independent study
   4.3.1.1 The project advisor must be a faculty member of SIIT with a doctoral degree or equivalent, or have an academic rank of at least associate professor in the program or a related program.
   4.3.1.2 SIIT shall appoint a project committee of at least 3 persons consisting of the project advisor, project co-advisor (if needed), faculty member(s) of SIIT, and an external member if necessary.

4.4 Comprehensive Examination
4.4.1 A comprehensive examination can be taken if the student has gained 24 credits with a minimum cumulative GPA of 3.00.
4.4.2 A student can take the comprehensive examination up to a maximum of 3 times, but must pass by the last time. If the student cannot pass the comprehensive examination, the status of the student will be terminated. Results of all comprehensive examinations will be recorded in the student's academic record.

**PERIOD OF STUDY**
The maximum period of study to complete the program is 5 academic years.

**REGISTRATION**
The student must enroll in courses and/or register for a thesis totalling at least 6 credits but not more than 15 credits per semester for a regular semester and not more than 6 credits for a summer semester.

**ACADEMIC PERFORMANCE EVALUATION AND GRADUATION**

1. Evaluation of Academic Performance
   1.1 A credit will be earned only if the grade is not lower than grade "C." Grade "D" or "F" will be included in the calculation of the grade point average of each semester and the cumulative grade point average.
   1.2 Any student, who gets grade "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 at least grade "C" for the course in the second enrollment.
1.3 Thesis assessment and independent study assessment are graded as follows:
   • S (Satisfactory)
   • U (Unsatisfactory)
   Students must get grade "S" for their theses/independent studies.

2. Graduation Requirements

2.1 Graduation requirements (Study Plan A)
   To graduate, students must meet the following minimum requirements:
   2.1.1 Twenty-four credits of courses required by the curriculum a cumulative GPA of at least 3.00. In addition, the grade of each of these courses must be at least "C."
   2.1.2 Fifteen credits of thesis work with grade "S" and passing a thesis defense.
   2.1.3 Approval of the thesis by the thesis committee.
   2.1.4 At least one paper on thesis findings has been accepted for publication in a national journal approved by the Academic Review and Rank Assessment Committee of SIIT, or at least one paper has been accepted for publication in international conference proceedings.
   2.1.5 Having satisfied one of the following English proficiency requirements:
      • A TOEFL score of not less than 550 (paper-based) or 213 (computer-based), or 79 (internet-based)
      • An IELTS score of not less than 6.0
      • A TU-GET score of not less than 550

2.2 Graduation requirements (Study Plan B)
   To graduate, students must meet the following minimum requirements:
   2.2.1 Thirty-three credits of courses required by the curriculum with a cumulative GPA of at least 3.00. In addition, the grade of each of these courses must be at least "C."
   2.2.2 Having obtained "S" in his or her independent study for 6 credits and passing the comprehensive examination.
   2.2.3 Having satisfied one of the following English proficiency requirements:
      • A TOEFL score of not less than 550 (paper-based) or 213 (computer-based), or 79 (internet-based)
      • An IELTS score of not less than 6.0
      • A TU-GET score of not less than 550
   Students must satisfied one of the above English proficiency requirements before the final independent study examination.

**Transferred Credits**

A maximum of 9 credits of courses with all grades B or better can be transferred.
Curriculum

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

2. Structure and Components

   2.1 Study Plan A

   2.1.1 Courses 24 Credits
   - 2.1.1.1 Compulsory Courses 12 Credits
   - 2.1.1.2 Technical Elective Courses 12 Credits

   2.1.2 Master’s Thesis 15 Credits
   Total 39 Credits

2.2 Study Plan B

   2.2.1 Courses 33 Credits
   - 2.2.1.1 Compulsory Courses 12 Credits
   - 2.2.1.2 Technical Elective Courses 21 Credits

   2.2.2 Independent Study 6 Credits
   Total 39 Credits

3. Course Coding System

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

   3.1 Subject code consists of letters and numbers.
   - ES indicates basic subjects.
   - ET indicates subjects in Engineering Technology Program.
   - ICT indicates subjects in Information and Communication Technology for Embedded Systems.
   - SE indicates subjects in Supply Chain System Engineering and Logistics Program.

   3.2 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, 12 credits

<table>
<thead>
<tr>
<th>Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ES801</td>
<td>Advanced Engineering Mathematics</td>
<td>3(3-0-9)</td>
</tr>
<tr>
<td>or</td>
<td>ES811 Theory of Computation</td>
<td>3(3-0-9)</td>
</tr>
<tr>
<td>or</td>
<td>ES812 Advanced Business Statistics</td>
<td>3(3-0-9)</td>
</tr>
<tr>
<td>or</td>
<td>ET600 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>
<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

   4.1.2.1 Study Plan A

   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>
### 4.1.2.2 Study Plan B

#### Technical Elective Courses

<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>
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<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

* For Study Plan A, select 4 courses (12 credits) from the following courses.

** For Study Plan B, select 7 courses (21 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 and Supply Chain Systems</td>
<td>3(3-0-9)</td>
</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>
</tr>
</tbody>
</table>

#### 4.2 Master's Thesis/Independent Study

**Study Plan A**

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

**Study Plan B**

<table>
<thead>
<tr>
<th>Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SE801</td>
<td>Independent Study</td>
<td>6</td>
</tr>
</tbody>
</table>
### Compulsory Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ES801</td>
<td>Advanced Engineering Mathematics</td>
<td>3(3-0-9)</td>
</tr>
<tr>
<td></td>
<td>Mathematics</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mathematics for solving engineering problems; ordinary differential equations of higher order; partial differential equations; integral equations; numerical analysis; optimization techniques.</td>
<td></td>
</tr>
<tr>
<td>ES805</td>
<td>Research Methodology</td>
<td>2(3-0-6)</td>
</tr>
<tr>
<td></td>
<td>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.</td>
<td></td>
</tr>
<tr>
<td>ES806</td>
<td>Research Seminar</td>
<td>1(0-3-1)</td>
</tr>
<tr>
<td></td>
<td>Student-faculty interaction on advanced research topics.</td>
<td></td>
</tr>
<tr>
<td>ES811</td>
<td>Theory of Computation</td>
<td>3(3-0-9)</td>
</tr>
<tr>
<td></td>
<td>Set theory; relations; formal proof methods; finite automata; regular expressions; context-free grammar; pushdown automata; Turing machines; uncomputability; computational complexity; first-order logic.</td>
<td></td>
</tr>
<tr>
<td>ES812</td>
<td>Advanced Business Statistics</td>
<td>3(3-0-9)</td>
</tr>
<tr>
<td></td>
<td>This course exposes students to the application of statistical techniques used to address business and economic problems. Topics include linear regression and correlation, multiple regression, model building, analysis of variance, multivariate statistics, time series analysis, and chi-square test of significance.</td>
<td></td>
</tr>
<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>
<td></td>
</tr>
<tr>
<td>ICT600</td>
<td>Computational Mathematics</td>
<td>3(3-0-9)</td>
</tr>
<tr>
<td></td>
<td>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.</td>
<td></td>
</tr>
<tr>
<td>SE600</td>
<td>Decision Making and Optimization</td>
<td>3(3-0-9)</td>
</tr>
<tr>
<td></td>
<td>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.</td>
<td></td>
</tr>
<tr>
<td>SE601</td>
<td>Logistics and Supply Chain Systems</td>
<td>3(3-0-9)</td>
</tr>
<tr>
<td></td>
<td>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.</td>
<td></td>
</tr>
<tr>
<td>SE602</td>
<td>Production Logistics</td>
<td>3(3-0-9)</td>
</tr>
<tr>
<td></td>
<td>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.</td>
<td></td>
</tr>
<tr>
<td>SE610</td>
<td>Simulation Modeling and Analysis in Supply Chain</td>
<td>3(3-0-9)</td>
</tr>
<tr>
<td></td>
<td>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.</td>
<td></td>
</tr>
<tr>
<td>SE611</td>
<td>Procurement Logistics</td>
<td>3(3-0-9)</td>
</tr>
<tr>
<td></td>
<td>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.</td>
<td></td>
</tr>
<tr>
<td>SE612</td>
<td>Laws and Regulations in Logistics</td>
<td>3(3-0-9)</td>
</tr>
<tr>
<td></td>
<td>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.</td>
<td></td>
</tr>
<tr>
<td>ES805</td>
<td>Research Methodology</td>
<td>2(3-0-6)</td>
</tr>
<tr>
<td>ES806</td>
<td>Research Seminar</td>
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<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>
</tbody>
</table>
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’S THESIS

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.

INDEPENDENT STUDY

SE801 Independent Study 6 credits
Students will conduct research studies in the area of logistics and supply chain systems engineering under the supervision of their project advisors. Progress of the research studies must be reported at the end of semester. Research output must lead to publication in international conference proceedings, or national/international refereed journal.
**Master of Science Program in Engineering and Technology (International Program)**

**Curriculum Title**
Master of Science in Engineering and Technology (International Program)

**Degree Title**
Master of Science (Engineering and Technology)

**Applicant’s Qualifications**
1. The applicant must hold a bachelor’s degree in engineering, science or a related field that is accepted by SIIT Academic Committee and must have a top 20% class rank for a bachelor’s degree, or a cumulative GPA of at least 2.75, or 2.50 with sufficient relevant research or work experience as specified by SIIT Academic Committee.
2. Two letters of recommendation
3. The applicant must submit an English score of one of the following English language tests:
   - TOEFL score of not less than 400 (paper-based) or 97 (computer-based), or 32 (internet-based)
   - IELTS score of not less than 4.5
   - TU-GET score of not less than 400
   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.
4. Approval of the admission by the SIIT Academic Committee

**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 Academic 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 15 weeks. Courses may be offered for a summer semester of at least 8 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
   This syllabus consists of prescribed coursework (12 credits) and thesis (27 credits). A total of 39 credits are 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 1 regular semester or has gained 12 credits with a minimum cumulative GPA of 3.00.
   2.2.2 Thesis Committee
   The Thesis Committee consists of at least 3 members:
   One principal advisor, faculty members of SIIT or Thammasat University, and at least one member who is not affiliated with Thammasat University and serves as an external committee member.
   - The principal advisor must be an SIIT faculty member with a doctoral degree or equivalent or an academic rank of at least associate professor in the program or a related program.
   - The external committee member must be an expert outside Thammasat University with a doctoral degree and holding an academic rank of at least assistant professor or equivalent, or without a doctoral degree but holding an academic rank of at least associate professor or equivalent. The specialization of the external committee member must be in a field related to the thesis.
   - A co-advisor (if any) must be a faculty member of SIIT or Thammasat University, or an expert outside Thammasat University with a doctoral degree or equivalent, or with an academic rank of at least associate professor in the program or a related program.
• The number of the committee members who are not the thesis advisor or co-advisor must not be less than the number of committee members who are the thesis advisor and co-advisor. The number of Thesis Committee members who are faculty members of SIIT or Thammasat University should not be less than that of the Thesis Committee members from outside.

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.

## Period of Study
The maximum period of study to complete the program is 5 academic years.

## Registration
The student must enroll in courses and/or register for a thesis totalling at least 6 credits but not more than 15 credits per semester for a regular semester and not more than 6 credits for a summer semester.

## Academic Performance Evaluation and Graduation

1. Evaluation of Academic Performance
   1.1 A credit will be earned only if the grade is not lower than grade "C," Grade "D" or "F" will be included in the calculation of the grade point average of each semester and the cumulative grade point average.
   1.2 Any student, who gets grade "D" or "F" in a compulsory 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 at least grade "C" for the course in the second enrollment.
   1.3 Thesis assessment is graded as follows:
      • S (Satisfactory)
      • U (Unsatisfactory)
      Students must get grade “S” for their theses.
   1.4 Additional course assessment and English proficiency requirements are graded as follows:
      • P (Pass)
      • N (Not Pass)

2. Graduation Requirements
   To graduate, students must meet the following minimum requirements:
   2.1 Twelve credits of courses (see the course descriptions) with a cumulative GPA of at least 3.00 or equivalent.
   2.2 Twenty-seven credits of thesis with grade “S”
   2.3 At least one paper on thesis results must have been accepted for publication in a reputable international journal approved by the Academic Review and Rank Assessment Committee. The following alternative requirements may be used: one national journal paper (accepted) and one national conference proceedings paper (accepted), or one international conference proceedings paper (accepted and registered for presentation) and one international conference proceedings paper (submitted).
   2.4 Approval of the thesis by Thesis Committee, and passing a thesis defense.
   2.5 Satisfying one of the following English proficiency requirements: TOEFL (official or institutional) not less than 550 (or 213 for computer-based test or 79 for Internet-based test), IELTS not less than 6.0, or TU-GET with a score of at least 550.

## Transferred Credits
A maximum of 9 credits of courses with all grades B or better can be transferred.
1. Total Credits Requirement
   A total of 39 credits is required for completion of the program.

2. Structure and Components
   2.1 Compulsory Courses  6 Credits
   2.2 Compulsory Elective Course  3 Credits
   2.3 Elective Course  3 Credits
   2.4 Master’s Thesis  27 Credits
   **Total**  39 Credits

3. Course Coding System
   Sirindhorn International Institute of Technology sets up the course coding system as follows:
   3.1 Subject code consists of letters and numbers.
   3.2 **ES** indicates basic subjects.
   **ET** indicates subjects in Engineering Technology Program.
   **ICT** indicates subjects in Information and Communication Technology for Embedded Systems.
   **SE** indicates subjects in Supply Chain System Engineering and Logistics Program.
   3.3 Numbers are composed of 3 digits.
   • The first unit-place-digit indicates the subject order.
   • 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 Compulsory Courses, 6 credits
      | Code | Course Title                      | Credits | (lecture-practice-self study hours) |
      |------|-----------------------------------|---------|-------------------------------------|
      | ES803| Special Study                     | 3       | (3-0-9)                             |
      | ES805| Research Methodology              | 2       | (2-0-6)                             |
      | ES806| Research Seminar                 | 1       | (0-3-1)                             |

   4.2 Compulsory Elective Course, 3 credits
      | Code | Course Title                      | Credits | (lecture-practice-self study hours) |
      |------|-----------------------------------|---------|-------------------------------------|
      | ES801| Advanced Engineering Mathematics  | 3       | (3-0-9)                             |
      or ES811| Theory of Computation            | 3       | (3-0-9)                             |
      or ES812| Advanced Business Statistics     | 3       | (3-0-9)                             |
      or ET600| Numerical Methods for Engineers  | 3       | (3-0-9)                             |
      or ICT600| Computational Mathematics        | 3       | (3-0-9)                             |
      or SE600| Decision Making and Optimization | 3       | (3-0-9)                             |

   4.3 Elective Course, 3 credits
      | Code | Course Title                      | Credits | (lecture-practice-self study hours) |
      |------|-----------------------------------|---------|-------------------------------------|
      | ES804| Selected Topic                    | 3       | (3-0-9)                             |

   4.4 Master’s Thesis, 27 credits
      | Code | Course Title                      | Credits | (lecture-practice-self study hours) |
      |------|-----------------------------------|---------|-------------------------------------|
      | ES800| Master’s Thesis                   | 27      |                                    |
## Course Descriptions

### Compulsory Courses

<table>
<thead>
<tr>
<th>Course Code</th>
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<th>Credits</th>
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<tbody>
<tr>
<td>ES803</td>
<td>Special Study</td>
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<tr>
<td>ES805</td>
<td>Research Methodology</td>
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<td>ES806</td>
<td>Research Seminar</td>
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#### Compulsory Elective Courses

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<tbody>
<tr>
<td>ES801</td>
<td>Advanced Engineering</td>
<td>3(3-0-9)</td>
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<tr>
<td>ES811</td>
<td>Theory of Computation</td>
<td>3(3-0-9)</td>
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<tr>
<td>ES812</td>
<td>Advanced Business Statistics</td>
<td>3(3-0-9)</td>
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<tr>
<td>ET600</td>
<td>Numerical Methods for Engineers</td>
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### Elective Course

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<tr>
<td>ES804</td>
<td>Selected Topic</td>
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### Master’s Thesis

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<tr>
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<th>Course Title</th>
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<tbody>
<tr>
<td>ES800</td>
<td>Master’s Thesis</td>
<td>27 Credits</td>
</tr>
</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.

### ES800 Master’s Thesis 27 Credits
This course guides students how to develop and carry out master research in the field of engineering and technology: Thesis writing, thesis presentation, publication, and research ethics.
Doctor of Philosophy Program in Engineering and Technology (International Program)

Curriculum Title

Doctor of Philosophy in Engineering and Technology (International Program)

Degree Title

Doctor of Philosophy (Engineering and Technology)

Applicant’s Qualifications

1. A graduate of Master Degree in Engineering, Science, or related fields with very good academic record (normally with cumulative GPA of not less than 3.50) and/or thesis experience; or a master's degree student of SIIT with at least one international journal publication.
2. Two letters of recommendation
3. The applicant must submit an English score of one of the following English language tests:
   - TOEFL score of not less than 400 (paper-based) or 97 (computer-based), or 32 (internet-based).
   - IELTS score of not less than 4.5
   - TU-GET score of not less than 400
   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.
4. Approval of the admission by the SIIT Academic Committee

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 Academic 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 15 weeks. Courses may be offered for a summer semester of at least 8 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
      2.1.1 Plan 1.1
      60 credits of thesis, the Thesis-only PhD Program Plan 1 (60 credits)
      2.1.2 Plan 2.1
      - 12 credits of courses
      - 48 credits of thesis
   2.2 Thesis
      2.2.1 Plan 1.1
      A student can register for a thesis in the first semester.
      2.2.2 Plan 2.1
      A student can register for a thesis after he or she has studied for at least 1 regular semester or has gained 12 credits with a minimum cumulative GPA of 3.00 and has grade “P” (Pass) in a qualification examination.
2.3 Thesis Committee

The Thesis Committee consists of at least 5 members:

One principle advisor, faculty members of SIIT or Thammasat University, and at least one member who is not affiliated with Thammasat University and serves as an external committee member.

- The principal advisor must be an SIIT faculty member with a doctoral degree or equivalent or with an academic rank of at least associate professor in the program or a related program.
- The external committee member must be an expert outside Thammasat University with a doctoral degree or equivalent or an academic rank of at least associate professor in the program or a related program.
- A co-advisor (if any) must be a faculty member of SIIT or Thammasat University, or an expert outside Thammasat University with a doctoral degree or equivalent or an academic rank of at least associate professor in the program or a related program.
- The number of the committee members who are not the thesis advisor or co-advisor must not be less than the number of committee member who are the thesis advisor and co-advisor. The number of Thesis Committee members who are faculty members of SIIT or Thammasat University should not be less than that of the Thesis Committee members from outside.

2.4 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.

2.5 External Examiner

The external examiner must be appointed by the SIIT Academic Review and Rank Assessment Committee (ARRAC).

## Period of Study

The maximum period of study to complete the program is 6 academic years.

## Registration

The student must enroll in courses and/or register for a thesis totaling at least 6 credits but not more than 15 credits per semester for a regular semester and not more than 6 credits for a summer semester.

## Academic Performance Evaluation and Graduation

1. Evaluation of Academic Performance
   
   1.1 A credit will be earned only if the grade is not lower than grade "B."
   
   1.2 Any student who gets grade lower than grade "B" in a compulsory course can re-enroll in that course only once. His or her student status will be terminated if he or she still fails to obtain at least grade "B" for the course in the second enrollment.
   
   1.3 Thesis assessment is graded as follows:
   - S (Satisfactory)
   - U (Unsatisfactory)
   
   Students must get grade "S" for their theses.
   
   1.4 Additional course assessment and English proficiency requirements are graded as follows:
   - P (Pass)
   - N (Not Pass)

2. Graduation Requirements

   To graduate, students must meet the following minimum requirements:

   2.1 Plan 1.1
   
   2.1.1 Students must successfully complete 60 credits of thesis.
   
   2.1.2 Approval of the thesis by Thesis Committee and passing a thesis defense
2.1.3 Two international journal papers (accepted), and one international conference proceedings paper (accepted) or one national journal paper (accepted)

2.1.4 Satisfying one of the following English proficiency requirements: TOEFL (official or institutional) not less than 550 (or 213 for computer-based test or 79 for Internet-based test), IELTS not less than 6.0, or TU-GET with a score of at least 550.

2.2 Plan 2.1

2.2.1 Students must successfully complete 60 credits comprising at least 12 credits of coursework and at least 48 credits of thesis.

2.2.2 Cumulative GPA of at least 3.00 or equivalent

2.2.3 Each required course must have at least a "B" grade.

2.2.4 Two international journal papers (accepted), and one international conference proceedings paper (accepted) or one national journal paper (accepted).

2.2.5 Approval of thesis by the thesis committee and passing a thesis defense.

2.2.6 Satisfying one of the following English proficiency requirements: TOEFL (official or institutional) not less than 550 (or 213 for computer-based test or 79 for Internet-based test), IELTS not less than 6.0, or TU-GET with a score of at least 550

### TRANSFERRED CREDITS

A maximum of 12 credits of courses with all grades B or better can be transferred.
1. Total Credits Requirement

1.1 Plan 1.1, 60 credits of thesis
1.2 Plan 2.1, 48 credits of thesis and 12 credits of courses with a GPA of at least 3.00 or equivalent.

2. Structure and Components

2.1 Plan 1.1

Doctoral Thesis

60 Credits

2.2 Plan 2.1

2.2.1 Compulsory Courses

6 Credits

2.2.2 Compulsory Elective Course

3 Credits

2.2.3 Elective Course

3 Credits

2.2.4 Doctoral Thesis

48 Credits

Total

60 Credits

3. Course Coding System

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

3.1 Subject code consists of letters and numbers.

3.2 ES indicates basic subjects.

ET indicates subjects in Engineering Technology Program.

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

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

3.3 Numbers are composed of 3 digits.

- The first unit-place-digit indicates the subject order.
- 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 Plan 1.1

Code  Course Title  Credits
ES900  Doctoral Dissertation  60

4.2 Plan 2.1

4.2.1 Compulsory Courses, 6 Credits

Code  Course Title  Credits
ES803  Special Study  3(3-0-9)
ES805  Research Methodology  2(2-0-6)
ES806  Research Seminar  1(0-3-1)

4.2.2 Compulsory Elective Course, 3 Credits

Code  Course Title  Credits
ES801  Advanced Engineering Mathematics  3(3-0-9)
or ES811  Theory of Computation  3(3-0-9)
or ES812  Advanced Business Statistics  3(3-0-9)
or ET600  Numerical Methods for Engineers  3(3-0-9)
or ICT600  Computational Mathematics  3(3-0-9)
or SE600  Decision Making and Optimization  3(3-0-9)

4.2.3 Elective Course, 3 credits

Code  Course Title  Credits
ES804  Selected Topic  3(3-0-9)

4.2.4 Doctoral Thesis, 48 or 60 credits

Code  Course Title  Credits
ES900  Doctoral Dissertation  48 or 60
**Course Descriptions**

**Compulsory Courses**

**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's 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.

**Compulsory Elective 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.

**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.

**ES812  Advanced Business Statistics  3(3-0-9)**
This course exposes students to the application of statistical techniques used to address business and economic problems. Topics include linear regression and correlation, multiple regression, model building, analysis of variance, multivariate statistics, time series analysis, and chi-square test of significance.

**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; Queueing theory and decision analysis techniques; Advanced topics in optimization.

**Elective Course**

**ES804  Selected Topic  3(3-0-9)**
The student may select, by consultation with the student's thesis advisor, to undertake a course or an in-depth study of an approval topic which is relevant to the student's thesis. For the latter case, a written report and oral presentation have to be given at the end of the semester to the student's thesis committee. The course/topic of the in-depth study has to be approved by the student's thesis committee.

**Doctoral Thesis**

**ES900  Doctoral Dissertation  48 or 60 Credits**
This course guides students how to develop and carry out doctoral research in the field of engineering and technology: thesis writing, thesis presentation, publication, and research ethics.
## 2012 Faculty Members and Research Interests

### School of Bio-Chemical Engineering and Technology  

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<td>Dr. Chongrak Polprasert (Until July 31, 2012)</td>
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<td>Dr. Paiboon Sreearunothai</td>
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<td>Dr. Pakorn Opaprapasit</td>
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<td>Dr. Pisanu Toodooinda</td>
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<td>Dr. Rachnarin Nitisaravut</td>
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<td>Dr. Sandhya Babel</td>
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<td>Dr. Siwarutt Boonyarattanakalin</td>
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<tr>
<td>Dr. Wanwipa Siriwatwechakul</td>
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<td>Dr. Mongkut Piantanakulchai</td>
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<td>Dr. Prueettha Nanakorn</td>
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<td>Dr. Boontawee Suntisirivaraporn</td>
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<td>Dr. Bunyarit Uyyanonvara</td>
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<td>Dr. Chalie Charoenlarpnopparut</td>
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<td>Dr. Cholwich Nattee</td>
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<td>Dr. Gun Srijuntongsiri</td>
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<td>Dr. Itthisek Nikhamhang</td>
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<td>Dr. Komwut Wipisitwarakun</td>
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<td>Dr. Nirattaya Khamsemanan</td>
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DUAL DEGREE PROGRAM IN SERVICE SCIENCES AND SERVICE INNOVATION PROGRAM (SSSIP)

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DR. ALICE SHARP

Associate 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

Specialization and Research Areas: 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.

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.

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, a mobile phone and its batteries, as an example in order to develop waste management plan and minimize the amount of waste before hand.
Dr. Apichit Svang-Ariyaskul

Lecturer
B.Eng. (Honors) in Chemical Engineering, Kasetsart University, Thailand  
M.A.Sc. in Chemical Engineering, University of Waterloo, Canada  
Ph.D. in Chemical Engineering, Georgia Institute of Technology, USA  
Specialization and Research Areas: Process design and green energy.

Research Interests:

Process Design
Process design to improve production through mathematical simulations is being focused on because it can save resources such as money, time, and energy before establishing a new process. Process design assesses the process feasibility and the production profit. The major goal is to maximize the profits of the production. This goal can be achieved by increasing product yield and quality but also decreasing waste production and energy consumption compared to existing processes. Current processes of interest include global concern issues such as green energy and pharmaceutical production.

Biofuel
Biofuel receives great attention from both academia and industry as an alternative green energy. The use of biofuel expands across the globe as it is the best way to reduce the emission of greenhouse gases. Bioethanol is an alcohol produced by the fermentation of sugar molecules in plant materials. Biodiesel is produced through transesterification of vegetable oils or animal fats. Thailand produces enormous amounts of agricultural products and wastes annually. Therefore, Thailand’s agricultural waste is an attractive feedstock for biofuel production. Currently, biofuel has been blended in a small portion with petroleum fuel as the price of biofuel is still high in comparison. Therefore, it is important to select an appropriate feedstock, design a process, investigate the process feasibility, and assess the process profitability through process simulations before establishing a sustainable process to produce biofuel in Thailand. Current processes of interest include reactive distillation and reactive adsorption.

Dr. Chongrak Polprasert

Professor
B.Eng. in Civil Engineering, Chulalongkorn University, Bangkok, Thailand  
Grad. Diploma in Sanitary Engineering, Chulalongkorn University, Bangkok, Thailand  
M.Eng. in Environmental Engineering, Asian Institute of Technology (AIT), Bangkok, Thailand  
Ph.D. in Civil/Environmental Engineering, University of Washington Seattle, Washington, USA  
Specialization and Research Areas: Water pollution control, Waste recycling and recovery, Hazardous wastes engineering and management.

Research Interests:

Water Pollution Control, Waste Recycling and Recovery, Hazardous Wastes Engineering and Management
Rapid population growth and industrialization have resulted in resources depletion and environmental pollution. Research on appropriate technologies of wastewater management for municipal, agricultural and industrial reuses is essential. The application of biotechnology and nanotechnology for degradation of toxic/hazardous chemicals and their impact on climate changed including sustainable development should be evaluated.
**Dr. Luckhana Lawtrakul**

**Associate 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  

Specialization and Research Areas: *Computer-aided molecular modeling and molecular design, Computational Science and Engineering.*

**Research Interests:**

*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-property relationship (QSPR) studies of inclusion complexes of various guests with cyclodextrins.

**Dr. Paiboon Sreearunothai**

**Lecturer**
B.A., M.Sc. & Ph.D. in Physics, University of Cambridge, UK

Specialization and Research Areas: *Nanomaterials, Photo-Active Materials, Sensors, Environmental Technology, Optical and Time-resolved Instrumentation*

**Research Interests:**

*Nanomaterials for environmental/sensing applications*

One crucial property of nanomaterials is large active surface area compared to that of conventional size materials. Several phenomena in nature such as adsorption and catalysis rely on interaction at the material interfaces and the use of nanomaterials can help to amplify or to better utilize these interface effects. The focus here has been on utilization of magnetic nanoparticles in separation of contaminants/active components in several systems such as in environmental remediation, biomedical system and in heterogeneous catalysis. Ability of these nanoparticles to bind specifically to the interested target and to be separated or concentrated magnetically can also be exploited in sensing applications. Optical detection based mainly in infrared and UV-Visible regions are also being developed.

**Dr. Pakorn Opaprakasit**

**Associate 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  

Specialization and Research Areas: *Infrared spectroscopy, Electrospinning, Lactide-based polyesters, Biocompatible/degradable polymers, Natural rubber, Coal/fossil fuels, Biodiesel.*

**Research Interests:**

*Lactide-based (biocompatible/degradable) Polyesters*

Polylactide (PLA) is an aliphatic polyester that is of interest in various applications, due to its biodegradability, biocompatibility, and renewable monomer resources. In addition, properties of this polymer can be modified for use in specific applications by copolymerization or blending with other polymers. In our lab, various lactide-based copolymers have been synthesized, e.g., poly
(D-lactide), poly(L-lactide), poly(DL-lactide), poly(lactide-co-ethylene glycol), poly(lactide-co-glycidol), poly(lactide-co-ethylene terephthalate). The copolymers are then used in various applications, for example, as fertilizer controlled-release materials, packaging materials, and in medical, environmental and energy applications. Micro- and nanoencapsulation techniques and electrospinning methods are employed in the preparation of the materials.

**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, which provides 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 FTIR and 2D-FTIR techniques have been applied in characterizations of various materials, e.g., polymers, fuels, and minerals.

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**Dr. Pisanu Toochinda**

Assistant Professor  
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  
Specialization and Research Areas:  
Photo-catalytic synthesis of hydrocarbons from CO₂/H₂O, Photochemical solar cells, Gas-solid reactor design, Heterogeneous catalysis, Molecular encapsulation/zeolite syntheses, Bio-molecular imprinted materials.

**Research Interests:**

**The Development of a Novel Catalyst for Hydrogen Production from Alcohol 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. 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 alcohol 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 objective of this research is to study the performance of various catalysts from different preparation methods to identify the proper catalyst for alcohol reforming. The optimization of the catalytic reactor design and reaction conditions are also investigated to enhance the reaction system for effective hydrogen production from alcohol reforming.

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

The high performance of amine solid sorbents could provide an alternative for CO₂ capture from power plant flue gases. The concept is to capture carbon dioxide (CO₂) 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 CO₂ capture, cost effectiveness, and easy handling for various applications. The preliminary design of a scaled up plant for the CO₂ capture from solid sorbents is also considered in the study.
**Dr. Rachnarin Nitisoravut**

**Assistant Professor**
- Diploma (Honors) in Analytical Chemistry, Institute of Analytical Chemistry Training, Ministry of Science, Technology, and Environment, Bangkok, Thailand
- B.S. in 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

**Specialization and Research Areas:** Environmental Biotechnology/Microbiology, Biological treatment of water and wastewater, Biosystem engineering, Water and wastewater treatment/management, Low-carbon technologies.

**Research Interests:**

**Biohydrogen Production**

Hydrogen is a promising alternative to fossil fuels. It is a 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.

**ANaerobic AMMonium OXidation (ANAMMOX)**

The ANaerobic AMMonium OXidation (ANAMMOX) process involves the use of nitrite as an electron 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. 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

**Specialization and Research Areas:** Physico-chemical treatment of Water and wastewater; Membrane technology; Solid and hazardous waste treatment and management; Biohydrogen production.

**Research Interests:**

**Removal of Heavy Metals from Aqueous Solution/Sludges using Agriculture Waste Materials and other Low Cost Adsorbents**

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.

**Biohydrogen Production**

Hydrogen produced from biomass in a sustainable way is recognized as an important component of the fuel market for future low or non-carbon based energy systems. A combination of hydrogen with fuel cells can help in saving energy. Agro-industrial wastewater rich in organics can be used for biohydrogen production using a dark fermentation process. Biohydrogen production can be enhanced by using an enzyme which can degrade complex organics to simpler compounds. This can be coupled with a Microbial Fuel Cell (MFC). Microbial Fuel Cell (MFC), a bioreactor, can convert chemical energy in the chemical bonds in organic compounds into electrical energy through catalytic reactions of microorganisms under anaerobic conditions. Thus, waste can be changed to a clean source of energy.

**Phytoremediation for Treatment of Contaminated Soil**

Phytoremediation uses plants to clean contaminated sites. It is the use of plants to partially or substantially remediate selected contaminants in contaminated soil, sludge, sediment, ground water, surface water and wastewater. It utilizes a variety of plant biological processes and the physical characteristics of plants to aid in site remediation. Phytoremediation is widely viewed as the ecologically viable alternative to the environmentally destructive physical remediation methods currently practiced. Plants have several endogenous genetic, biochemical and physiological properties that make them ideal agents for soil and water remediation. Phytoremediation uses hyperaccumulator and accumulator plants that can remove excess heavy metals from contaminated soils and other contaminants.

**Dr. Siwarutt Boonyarattanakalin**

*Assistant Professor*

*B.S. in Chemistry (Distinction), Colorado State University, USA*

*Ph.D. in Organic Chemistry, The Pennsylvania State University, USA*

Specialization and Research Areas: *Chemical Biology, Organic Chemistry, Glycochemistry, and Glycobiology.*

**RESEARCH INTERESTS:**

**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.

**Synthesis**

Our research has focused on developments of alternative chemical methods for rapid and efficient syntheses of compounds for therapeutic and material purposes. The robust synthetic protocols allow access to a large scale quantity of novel compounds. The synthetic compounds provide tools for physical and biological studies.

**Developments of Chemical and Biological Methods for Carbon Recycling**

Industrial wastes increasingly have become a financial burden for many production processes. We are investigating ways to recycle these wastes and make them become resources. Both biological and chemical methods offer potential protocols to recycle wastes.
Dr. Wanwipa Siriwatwechakul

Lecturer
B.S. in Chemical Engineering, Massachusetts Institute of Technology, USA
M.S. in Chemical Engineering, Princeton University, USA
Ph.D. in Chemical Engineering, Princeton University, USA

Specialization and Research Areas: Biomaterials and drug delivery.

Research Interest:

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 the 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.
**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-assemblies, 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 effects. The cost-effective strengthening methods will be proposed for critical sub-assemblies 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
Specialization and Research Areas:

- Multi criteria decision making in transportation planning,
- Activity based travel demand modeling,
- Computable general equilibrium modelling for energy policy studies.

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
Specialization and Research Areas:

- Computational mechanics, Finite element technology,
- Structural optimization, Design automation.

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
Specialization and Research Areas: Modeling of concrete behavior, Durability evaluation and service life design of concrete structures, High performance cementitious based materials, Special concrete such as SCC and RCC, Use of wastes and recycled materials in cement and concrete, Health monitoring, repair 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, workability loss, bleeding, strength, thermal cracking, autogenous and drying shrinkages, 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 Binders and Fillers 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, etc.
- Optimizing the use of these materials and development of multibinder systems 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: high strength concrete, zero-slump concrete, low-heat concrete, sulfate-resistant concrete and expansive concrete, etc.

Maintenance of Concrete Structures
Research works and their applications on inspection, repair, maintenance and life cycle evaluation of concrete structures are carried out. The works are parts of the program to develop appropriate maintenance codes and standards for concrete structures in Thailand.

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
Specialization and Research Areas:
Advanced design methods of steel and composite structures, Shear lag behavior of thin-walled structures, Development of run-off-river hydropower projects, Public participation in infrastructure project development, Development of efficient composting system for solid waste treatment, Application of Three-Dimensional Finite Element Methods to the Design of Steel Structures.

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 engineering, 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 overlooked 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

Specialization and Research Areas: *Mathematical modeling, Coastal engineering, Hydraulics of open channel, Hydrology.*

**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.
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. in Electrical Engineering, University of Manchester Institute of Science and Technology, UK
Ph.D. in Electrical Engineering, University of Manchester Institute of Science and Technology, UK
Specialization and Research Areas: Microelectronics, Chaotic Oscillators, Sinusoidal Oscillators, and Analogue Filters.

Research Interests:
Chaotic Oscillators

Sinusoidal Oscillators and Analogue Filters
Integer-order and fractional-order sinusoidal oscillators and filter.

Dr. Boontawee Suntisrivaraporn

Lecturer
B.Eng. (1st Class Honors) in Computer Engineering, King Mongkut's Institute of Technology Ladkrabang, Thailand
M.Sc. in Computer Science, Technical University Dresden, Germany
D.Eng. in Computer Science (Summa Cum Laude), Technical University Dresden, Germany
Specialization and Research Areas: Logic-based knowledge representation and reasoning, Description logics, Knowledge engineering, Ontology modeling, Semantic web.

Research Interests:
Description Logic
Knowledge Representation and Reasoning (KRR) is a prominent research field of Artificial Intelligence (AI). In essence, the goal of knowledge representation is to describe and store knowledge in a systematic and machine understandable way. Having knowledge stored properly in this way, automated reasoning can be employed in order to, for instance, detect inconsistencies and infer implicit knowledge. Several approaches to KRR have been proposed and considered in the AI literature, but some of the most important approaches are based on logic, in particular Description Logics. Description Logics form a successful family of knowledge representation formalisms with two key assets: formally well-defined semantics which allows representing knowledge in an unambiguous way and automated reasoning which allows inferring implicit knowledge from knowledge given explicitly.

Semantic Web Ontologies
The eXtensible Markup Language (XML) has been introduced to address the limitations of the Hyper-Text Markup Language (HTML), namely the lack of document structures. Despite a big success in several applications, XML still fails to fulfill the Semantic Web vision, which aims at describing the meaning (semantics) of Web data in a way suitable for automated reasoning. To solve this issue, the Resource Description Framework (RDF) and RDF Schema (RDFS) are used to construct a data model and define a domain-specific terminology, respectively. With a logical underpinning based on Description Logics, RDF and RDFS have been considerably extended to the Web Ontology Language (OWL), a W3C recommendation of ontology language for the Semantic Web. A collection of OWL ontologies will form an indispensable ingredient toward realization of the Semantic Web vision. Although several tools and reasoning techniques are readily available for modeling OWL ontologies, further challenges still remain.
DR. BUNYARIT UYYANONVARA  

**Associate 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  
Specialization and Research Areas: *Medical image processing, Texture segmentation, Relaxation labeling, Pattern recognition.*

**Research Interest:**  
*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. CHALIE CHAROENLARPNOPPARUT  

**Associate 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  
Specialization and Research Areas: *Multidimensional systems and signal processing, Robust control, Image processing, Wavelet and filter bank, Signal processing for communication, Convolutional code design, Minimax controller design.*

**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. Cholwich Nattee
Assistant Professor
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
Specialization and Research Areas: 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. in Computer Science, Asian Institute of Technology (AIT), Thailand
D.Eng. in Computer Science, Asian Institute of Technology (AIT), Thailand
Specialization and Research Areas: Knowledge representation, Automated reasoning, Semantic web, Information extraction, Computational logics, Computation theory, Object-oriented system analysis and design.

Research Interest:
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 and information extraction 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. A need arises for a framework for comparing the expressiveness of correctness relations across computation models.

Dr. Gun Srijuntongsiri

Assistant Professor
B.S., M.S. & Ph.D. in Computer Science, Cornell University, USA
Specialization and Research Areas: Scientific computing and numerical analysis, with focus on intersection problems and optimization.

Research Interests:

Constrained Optimization

Constrained optimization is the problem of minimizing or maximizing a function, typically in many variables, subject to some constraints on the variables. It has applications in many fields such as engineering, finance, and biology. I am interested in developing efficient algorithms for many classes of constrained optimization, with focus on medium and large scale problems.

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.
**Dr. Itthisek Nilkhamhang**

*Lecturer*

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  

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

**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. Komwut Wipusitwarakun**

*Associate 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  

Specialization and Research Areas: **Mobile Code, Dynamic Internet and Computer Networking including: Wireless Mesh Networks, Heterogeneous internetworking, Active Networks, Mobile Agents, Overlay Service Networks, Self-healing Networks, Cross-layer Protocol Design and Analysis.**

**Research Interests:**

**Overlay Networks**

Overlay networks are user-definable networks created over the underlying Internet (IP) networks which typically serve end-users with the best-effort service model. In overlay networks, overlay nodes which serve as the access point and data forwarding facility utilize redundant paths and bandwidths of the Internet to transfer their service data. Since the overlay nodes are owned by the application-service providers (ASP) instead of the Internet Service Provider (ISP), all aspects of the overlay network including topology and application-specific QoS (Quality of Service) can be customized. Several research topics are still open in designing such an overlay network. These include overlay network creation strategy, overlay network topology adaptation, multipath flow routing protocol, application-oriented overlay routing protocol, overlay network service provisioning protocol, etc.

**Dynamic Topology Wireless Network**

Recently, wireless network services are widely available due to the availability of smaller, smarter and cheaper portable devices, inexpensive wireless technology, and mobile user’s demand for “anyone anywhere anytime” information access. There has been much interest in dynamic wireless networks which can evolve/adapt themselves according to the changes of the volume and...
geographical distribution of services’ demands generated by the end users. One possible solution is to let network equipment such as the wireless service access points or mobile routers change their positions appropriately to such demand changes in order to maintain the service quality and best utilize networking resources. The research topics include user tracking algorithms, users’ demand anticipation algorithms, topology adaptation algorithms, very fast dynamic routing algorithms, etc.

**Active Network**

Currently, networks become more and more dynamic in terms of both their size and their provided services. The existing execution paradigm of the routers may not react well to such networks’ dynamism. Active networking is the framework which allows sending code (executed at any intermediate network node) with the users’ information inside the data packets. This allows the possibility of highly tailored and rapid “real-time” changes to the underlying network operation according to the dynamism of the networks. For an example, the data packets can decide to change their way themselves when facing link failure or finding better paths. The overlay node is one of the potential applications of the active networking. Active network research addresses the nature of how best to incorporate extremely dynamic capability within networks. The research topics include active code structure, active node execution architecture, active code security, etc.

### Dr. Nirattaya Khamsemanan

Assistant Professor  
B.A. in Mathematics (Cum Laude), Cornell University, USA  
M.A. in Mathematics, University of California, Los Angeles (UCLA), USA  
Ph.D. in Mathematics, University of California, Los Angeles (UCLA), USA  
Specialization and Research Areas: **Cryptography, Algebraic topology, Discrete geometry.**

### Research Interests:

**Cryptography** can be summarized at a high level as the theory and practice of controlling information. Simple examples of its applications can be found in many places in modern society—perhaps the most prominent is that of securing electronic commerce. Branches of cryptography touch many areas of mathematics and computer science, including algebra, number theory, combinatorics and complexity theory, to name a few.

**Algebraic Topology** is a branch of mathematics which uses tools from abstract algebra to study topological spaces. The basic goal is to find algebraic invariants that classify topological spaces up to homeomorphism. The word “Topology” comes from the Greek words “topos”, which means place, and “logos”, which means study. Topology is the study of the properties of spaces that are invariant (preserved) under deformations, twisting, and stretching. It is often said that a topologist is a person who cannot tell the difference between their doughnut and their coffee mug, since each can be continuously deformed to the other (each is a solid sphere with one handle).

**Discrete Geometry** may be loosely defined as study of geometrical objects and properties that are discrete or combinatorial, either by their nature or by their representation; the study does not essentially rely on the notion of continuity. Discrete geometry as part of discrete mathematics has become popular in recent decades because of its applications to computer science. Concepts and notations from discrete mathematics are useful to study or describe objects or problems in computer algorithms and programming languages.
**Dr. Pakinee Aimmanee**

**Assistant Professor**
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
Specialization and Research Areas: Information retrieval, Data mining, Applied linear algebra.

**Research Interests:**

*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.

**Dr. Prapun Suksompong**

**Lecturer**
B.S. in Electrical and Computer Engineering (Summa Cum Laude), Cornell University, Ithaca, New York, USA
M.S. & Ph.D. in Electrical and Computer Engineering, Cornell University, Ithaca, New York, USA

**Research Interests:**

*Computational Neuroscience*

Understanding how biological neurons work has been a major goal in neuroscience. We approach this issue from a communication engineering perspective. The goal is to construct models which are simple yet biologically realistic and provide insights into the neuron codes. Our study involves ideas from probability theory, communication theory, information theory, and the analysis of signal and noise.

*Wireless Communications*

We are particularly interested in the OFDM (Orthogonal Frequency Division Multiplexing) technology which has been widely accepted as a technology of choice for broadband wireless access.
**DR. SOMSAK KITTIPIYAKUL**

Lecturer  
S.B. and M.Eng. in Electrical Engineering and Computer Science, Massachusetts Institute of Technology, USA  
Ph.D. in Electrical and Computer Engineering, University of California at San Diego, USA  
Specialization and Research Areas: *Wireless communications and networking, Resource allocation and scheduling, Performance analysis of queuing systems, and Stochastic control.*

**RESEARCH INTERESTS:**

*Wireless Networking and Communications*

We are interested in a wide range of topics in wireless networking and communications in both single-hop and multi-hop networks. For single-hop wireless networks, we have done research on queuing performance analysis of dynamic schedulers using asymptotic approximation based on large-deviations theory. We have also studied OFDMA (Orthogonal Frequency Division Multiple Access) systems, in particular, in a) showing delay-optimality of a dynamic load-balancing scheduler in multi-queue multi-server systems; b) studying dynamic scheduling of OFDMA subcarriers with partial feedback of the channel information but full knowledge of queue information; and c) studying the interplay between rate-adaptive sources such as TCP and dynamic OFDMA schedulers.

For multi-hop wireless networks, we are currently studying the following topics: a) a channel reservation multiple access (MAC) scheme in IEEE 802.11s; b) channel assignment for multi-radio, multi-channel networks that could provide Quality of Service (QoS) to real-time traffic; c) real-time video transmission from an unmanned boat; d) real-time prediction of real-time traffic such as video or voice using artificial neural networks, and e) crash notification broadcast in vehicular networks to avoid road accidents.

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**DR. STANISLAV S. MAKHANOV**

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  
Specialization and Research Areas: *Robotics, Image processing, Pattern recognition, 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

Associate Professor
B.Eng. in Computer Systems Engineering, University of South Australia, Australia
Ph.D. in Telecommunications, University of South Australia, Australia

Specialization and Research Areas: 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).
**RESEARCH INTERESTS:**

**Body Sensor Networks, Pervasive Sensing and Applications**

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, I am also interested in applying BSNs in various fields of applications such as game control, music composition, assistive devices for elderly and disable patients, sleep monitoring, rehabilitation and sport performance analysis. I focus on both the analysis of the heterogeneous sensory signals, as well as application development.

**Applications for Intelligent Homes and Assistive Robots**

In order to provide an intelligent assistive environment to users, we are oriented towards building a system for enabling an automation of domestic tasks, as well as providing human-friendly interfaces for controlling electronic, electrical devices, and service robotics. The main goal of this concept is to provide logical responses to users in order to enhance their comfortability, pleasure and improved quality of life in both home and hospital environments.

In order to provide such a smart environment experience, three major subtasks being considered are: 1) monitoring the status of users, robots and environment, 2) suitable methods for device and robot control, and 3) system feedback to users (in forms of services provided by the system and intelligent robots).

**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 was 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 important 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 a strong theory or model, and (2) data-driven support systems, which are based on database technologies and statistical methods.

**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

Specialization and Research Areas:  
- Digital image processing (esp. feature detection and segmentation in 2-D and 3-D)  
- Computer vision (esp. depth estimation and motion estimation)  
- Pattern recognition (esp. 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  
Specialization and Research Areas: *The theory in $H^\infty$ control, Control theory, Robust control, System identification, Modeling, Adaptive control, Learning control, Neural network, and Fuzzy control.*

**Research Interests:**

**$H^\infty$ 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 are faced with is 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 is the most popular area that is expected to deal with model uncertainty.
DUAL DEGREE PROGRAM IN SERVICE SCIENCES AND SERVICE INNOVATION PROGRAM (SSSIP)

Faculty Members of SSSIP from Japan Advanced Institute of Science and Technology (JAIST)

• Dr. Hieu Chi Dam
  Associate Professor
  B.S. in Physics, the University of Tokyo, Japan
  M.S. and Ph.D. in Materials Science, Japan Advanced Institute of Science and Technology (JAIST), Japan
  Specialization and Research Areas: Data mining, Computational Materials Science.

Research Interests:
Design of heterogeneous catalysis using nanoparticles on carbon nanotube supports

Catalysis plays an innovative role in developing new technologies and catalyst design has become a big issue in industrialization. Nanotechnology is believed to be important in heterogeneous catalysis because of its peculiar properties and potential applications. Nanoparticles have invited much attention because of their potential applications as building blocks for functional nanostructured materials, electronic devices, and nanocatalysts. On the other hand, the carbon nanotube, with its beautiful tubular structure and large effective surface, is promising for facilitating the absorption of catalyst small particles. The combination of nanoclusters and carbon nanotube supports are proposed as a solution for superior heterogeneous catalysis. Our research targets are to explore the novel family of heterogeneous catalysts using nanoparticles on carbon nanotube supports, to clarify the nature of the catalytic activity of the new catalysts, and to establish concepts for heterogeneous catalysis design.

• Dr. Kunihiko Hiraishi
  Professor
  B.E. and M.E. in Control Engineering, Tokyo Institute of Technology, Japan
  Ph.D. in Systems Science, Tokyo Institute of Technology, Japan
  Specialization and Research Areas: Formal modeling and analysis of concurrent systems, Discrete event systems, Hybrid systems.

Research Interests:
Modeling and analysis of discrete-event systems and hybrid systems

A discrete event system (DES) is a dynamic system such that the state of the system changes only at discrete instances of time instead of continuously. DESs arise in the domains of manufacturing, robotics, vehicular traffic, logistics, and computer and communication networks. We are studying modelling and analysis of DESs by means of various kinds of formal models, such as automata-based models, graph models, algebraic models, and logical models. We are also interested in hybrid systems, which are systems with both continuous dynamics and discrete dynamics.

Efficient analysis and verification of concurrent systems

In the analysis of concurrent systems, there are several problems that do not happen in sequential systems. For example, the size of the state space often increases exponentially in the size of the model. This phenomenon is called state space explosion and it makes the analysis very difficult. We are studying efficient analysis and verification techniques for such systems.
Modeling of complex processes in nursing and caregiving services

In 2010, JST/RISTEX in Japan started a new R&D program "Service Science, Solutions and Foundation Integrated Research Program". "Innovation for Service Space Communication by Voice Tweets in Nursing and Caring" is one of the selected projects by the above program. The aim of the project is to develop a stress-free information assisting system based on smart voice messaging. By providing voice messaging environment optimized for the current situation of nurses, the system helps nurses in their cooperation, knowledge sharing, and making work records, and as a result the system reduces various kinds of stresses associated with their work. To estimate current situation of nurses, it is important to have detailed process models that described working schedules and how they behave in various situations.

Moreover, computer simulation based on the process models is useful for quantitative evaluation of the system. In this research, we first observe and analyze complex processes in nursing and caregiving services, and then propose an appropriate modeling architecture.

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Dr. Michitaka Kosaka

**Professor**

B.E., M.E. and Dr.Eng. in Applied Mathematics and Physics, Kyoto University, Japan

Specialization and Research Areas: R&D management, Service innovation, Integration of system engineering and knowledge science, System control theory (Estimation theory).

Research Interests:

**Education system for service innovation**

Development of curriculum for service innovation based on the following 4 disciplines; knowledge science, information science, business science, and multidisciplinary science and technology and its application to Management of Service courses in JAIST.

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Dr. Mineo Kaneko

**Professor**

B.E., M.E. and Ph.D. in Electrical and Electronic Engineering, Tokyo Institute of Technology, Japan

Specialization and Research Areas: Circuit theory and CAD for VLSIs, Fault Tolerant VLSI Computing, VLSI Signal Processing.

Research Interests:

**Circuit theory and CAD for VLSIs**

VLSI is a collection of a huge number of transistors and interconnections between them, and its design is to find one or some configurations which satisfy specifications in the functional behaviour. Various kinds of performances associated with each configuration, such as area, speed, power and testability, are necessary also to be optimized. Hierarchical design is inevitably introduced to transform the problem to be computationally manageable. Hence, besides optimization algorithms, the design model for each abstract level, by which the final VLSI performance can be well estimated/ controlled and at the same time the problem size can be reduced to be a manageable level, is also a key for successful CAD for VLSIs. High level synthesis for application specific embedded VLSIs is one of our major interests. Our challenge includes high level synthesis for extremely high performance VLSIs considering post-silicon tuning, integrated formulation of whole tasks in high level synthesis and its solution for deeply optimized VLSIs, etc.

**Fault tolerant VLSI computing**

Parallelism and pipelining together with the well structured multiple processing elements are promising solutions to various computation problems in the field. Fault-tolerance and dependability as well will become the important functions for WSI/VLSI systems. Multiple modular redundancy in mixed spatial-temporal space, algorithm based fault tolerance, reconfiguration and unified theory of these techniques are studied with emphasis on WSI/VLSI computation. We are also interested in High-level synthesis for application specified fault tolerant VLSI systems and related design theory and algorithms.
**VLSI signal processing**

The evolution in VLSI technology allows various complicated and computationally intensive algorithms to be implemented on a VLSI chip. Performance measures for such VLSI computation include function and performance of a computation algorithm itself, area (hardware cost), computation time, throughput rate, accuracy (finite word length effects), power, etc. We are trying to find solutions through an approach of the algorithm/software/hardware co-design. Modularity and regularity analysis of numerical computation algorithms, algorithm transformation and optimization and interaction between algorithm transformation and software/hardware co-design are the central interests of ours.

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**Dr. Mitsuru Ikeda**

*Professor*

B.Eng. and M.Eng. in Information Engineering, Utsunomiya University, Japan  
Dr. Eng. in Electrical and Electronic Systems, Osaka University, Japan  
Specialization and Research Areas: *R&D management, Service innovation, Integration of system engineering and knowledge science, System control theory (Estimation theory).*

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**Research Interests:**

**Ontology-based Intelligent Educational Systems**

Research and development on how to exemplify the benefits of task ontology through the development of an ontology based authoring tool for Computer Based Training (CBT) systems. The work tackles the basic issues on the concept of task ontology and then describe the design principle of an ontology-based authoring tool for Computer Based Training (CBT) systems. Also research and development on learner models in an educational supported system. The model is a specific form of cognitive models that capture human factors to perform meta-cognitive activities as a basis of learning systems development for facilitating meta-cognition based on the knowledge in cognitive system engineering and cognitive psychology fields.

**Ontological Engineering**

Research and development on the methods and methodologies for building ontologies: formal representations of a set of concepts within a domain and the relationships between those concepts, including abstract concepts such as actions, time, physical objects and beliefs. Research will focus applications to several areas such as medical areas, educational areas, etc.

**Semantic Web**

Research and Development on a collaborative movement led by the World Wide Web Consortium (W3C). The topics include implementation of semantic content in web pages, conversions of unstructured documents into a web of data, based on the W3C’s Resource Description Framework (RDF).
Dr. Susumu Kunifuji

Vice President and Professor of School of Knowledge Science
B.Eng. and M.Eng. in Control Engineering, Tokyo Institute of Technology, Japan
Dr.Eng. in Computer Science, Tokyo Institute of Technology, Japan
Specialization and Research Areas: Creativity Support Systems, Groupware, and Knowledge-Based Systems.

Research Interests:

Abductive Thinking (Ideal Generation, Inspiration) Support Systems

Our research currently focuses on creative thinking support systems, groupwares, and knowledge-based systems, e.g., brainstorming system, convergent thinking support system, group decision support system, real world workflow software, awareness support system, abductive and inductive logic programming, and legal expert system.

Groupware

In Japan, there are several manual creation thinking techniques such as KJ method, NM method, and Equivalent Transformation theory. They are methods for getting new ideas from given data. By getting a hint from these techniques, we are now designing and implementing a new type of creative thinking support system, that is, a hybrid system with divergent thinking support function and convergent thinking support function.

Knowledge-based Systems

Combining an appropriate system analysis methodology united with a system modelling methodology, we designed and implemented and a knowledge acquisition support groupware GRAPE. GRAPE is a bottom-up type group decision support system. From the experience of developing GRAPE, we implemented new ideas of decision support groupwares. They include a QDA (Quality Deployment Approach) based requirement analysis system and a consensus-making support system with trade-off resolution functions.
Dr. Chai Wutiwiwatchai
B.E. in Telecommunications, Thammasat University, Thailand
M.E. in Digital Signal Processing, Chulalongkorn University, Thailand
Ph.D. in Computer Science, Tokyo Institute of Technology, Japan
Specialization and Research Areas: Speech processing, Natural language processing, Human-Computer Interaction.

RESEARCH INTERESTS:

*Speech and Audio Processing*

**Automatic audio transcription**
Large vocabulary continuous speech recognition (LVCSR) for Thai is expected to be used for transcribing monologue audio recordings such as parliament meetings, Buddhadasa sermons. Challenges raise from fundamental components such as audio-transcription alignment for building training corpora and speech segmentation, to core components such as matched acoustic modeling, language modeling in non-segmented script languages like Thai.

**Expressive speech synthesis**
While existing text-to-speech synthesizers (TTS) have been deployed commercially, an advanced step lies on its capability to build expressive speech i.e. speech with natural stress and emotion. Research mainly requires deep understanding of human speech prosody and ways to model such prosodic events. The rest is how to integrate such models in existing speech synthesizers.

**Speaker verification**
With the current global trend of information technology, information security and privacy become more and more important. One useful technology is voice authentication or speaker verification in order to protect imposters from accessing information. Speaker verification has a long research story but not much for Thai. Also the robustness of the current state-of-the-art algorithms is still an unsolved issue.

*Pronunciation Assessment*
The pronunciation assessment technology has been widely exploited especially for language learning in many languages. There are only few systems available for Thai and also for non-native English learning. Research needs to start from incomplete Thai speech recognition to pronunciation assessment. The technology can be employed also for medical areas such as assessing speaking capability in oral surgical patients.

*Natural Language Processing*

**Language Resources and Fundamental Language Processing Tools**
Yet many fundamental language processing tools in Thai are still far from practical use. Recently, the BEST corpus, a large word-annotated text corpus has been systematically developed and used for building efficient Thai word segmentation. Similarly, this corpus should be extended to cope with necessary tags for advanced language processing such as named-entity (NE) detection and recognition, part-of-speech (POS) tagging, and clause or phrase segmentation.

*Human-Computer Interaction*

**Thai Input/Output Methods**
With a lot of Thai language resources available, novel and efficient Thai input methods, especially for mobile devices, are of interest. Integration of word approximation search, word prediction, and statistical language models could significantly improve the performance of Thai input methods. Combination with multimodal inputs such as voice and writing, the input model could be much better.
**DR. KALAYA UDOMVITID**

B.A. in Economics, Thammasat University, Thailand  
M.A. in Economics, Chulalongkorn University, Thailand  
Ph.D. in Economics, Colorado State University, USA  
Specialization and Research Areas: Technology Economics, Technology and Innovation Management, Service Innovation.

**RESEARCH INTERESTS:**

*Technology Economics*
Technology and innovation are key drivers of competitive advantage in today’s global knowledge economy. Technology and innovation-originated market power could provide better results than the invisible hand and price competition mentioned in Classical economics theory. Then for economists, we need to understand and apply economics principles and theories for analyzing the role of technology and innovation and their influence to economic growth in both firm and country levels.

*Technology and Innovation Management*
Technology change and innovation impact a firm’s competitive advantage, particularly for technology-based companies. Therefore, we need to understand, integrate, and promote the management of technology in industry, thereby improving business productivity and global competitiveness. It is important to improve skills and knowledge to access the power of technology, research, innovation, new product/service development, and commercialisation in organisations.

*Service Innovation*
Service innovation is driving forces in much of the public and private sector. In service innovation, existing and/or emerging technologies are used to leverage services value to fulfil the satisfaction of the needs of individuals involving in business processes. With service innovation, an industry can reduce its cost or increase its productivity.
**Dr. Thepchai Supnithi**

B.E. in Mathematics, Faculty of Science Chulalongkorn University, Thailand  
M.E. in Knowledge Science, Electronics Engineering, Osaka University, Japan  
Ph.D. in Knowledge Science, Electronics Engineering, Osaka University, Japan  

Specialization and Research Areas: *Natural language processing, Ontology and Semantic Web, Learning.*

**Research Interests:**

**Natural Language Processing**

*Thai Language Processing*
To improve the Thai language in daily life use, improving Thai fundamental language processing is essential. This research aims to understand Thai language and develop a useful tool as a fundamental for further system development. We are interested in the integration between a statistical approach and an expert based approach. Our interested basic component is segmentation, syntax and semantic, chunking, parsing, grammar generation, and sentence similarity.

*Corpus Engineering*
Resource development is the essential component for a statistical based system. It is a data-driven approach. With our fruitful number of linguists, there are a lot of fundamental resources that we are currently developing. At the word level, Lexitron is our data which is widely used in many areas. We are going to extend to a number of specific dictionary under Lexitron's data format. Framenet is another research area that we are focusing on. At the sentence level, BEST word segmentation standard/guideline are the first result. We are developing POS guideline, Chunking guideline. We are collecting monolingual, bilingual and multi-lingual corpus to serve a lot of applications.

*Language Processing Applications*
Based on the fundamental language processing, we are focusing on machine translation, text simplification and summarization, and computer assisted language learning.

**Ontology and Semantic Web**

*Knowledge as a service platform*
The trend of semantic web and ontology become the important issue for linking and giving a meaningful Web. We are focusing on the platform for semantic based system construction to enable a non-expert user to develop their own knowledge based system. A lot of components such as, ontology and database mapping, ontology merging, integration between language, and knowledge platform are our ongoing projects.

*Ontology based applications*
We are focusing on three main ontology based applications, semantic search, recommendation, and decision support system. A new paradigm on using ontology and sensors to monitor human behavior is another interesting issue.

*Learning*
We are focusing on developing an e-learning platform and applying Artificial intelligence in Education. Cognitive skill and metacognitive skill development process are our interesting topics.

*Service knowledge Science*
Service research in Thailand is one important topic.

We try to apply knowledge science to enable an added value, and for all stake-holders. A knowledge acquisition, knowledge co-creation, and knowledge circulation are our key issues to improve the service system.
School of Management Technology

Dr. Aussadavut Dumrongsiri

Assistant Professor
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, Thailand
Ph.D. in Business Administration (Operations Management), University of Washington, Seattle, WA, USA

Specialization and Research Areas: Operations management, Supply chain management, E-Business, E-Word of Mouth, 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 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

Assistant Professor

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

Specialization and Research Areas: 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 algorithms and utilize available computational technology such as parallelism or grid computing to solve problems where their resulting models are very large. This technology also enables researchers to have a detailed model which is close to the real world problem. Some examples of these problems are transportation problem in urban areas (where there consists of millions of people driving on thousands of streets), financial simulation, bioinformatics, and large-scale planning.

Supply Chain Management (SCM)

The research in SCM involves 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 modeled by simulation and optimization models.
Research Interests:

Information Sharing Between Partners in a Supply Chain

Knowledge and information are widely recognized as a potential competitive advantage in supply chain management. Several studies have shown that cooperation and information sharing can increase benefits, reduce cost, or both. On the other hand, firms may experience a negative reverse-impact, when a receiving partner uses the transferred information to manage its supply chain, resulting in an outcome that hurts the sharing partner. In general, every firm attempts to maintain the competitiveness of a monopoly, while at the same time tries to gain the additional benefit of interorganization cooperation. To balance these risks and benefits, firms need quantitative tools to assist in making decisions regarding information sharing. Such tools would be most valuable if they determine how much and what information should be shared as well as when, with whom, and under what conditions. This research explores these issues through a methodology based on game theory.

Agri-Food Supply Chain Management

Agri-food supply chains widely range from food safety and quality assurance to logistics and business modeling. In modern food retail and food service industries, safe and nutritional food in excellent quality with just-in-time delivery, is expected by customers, especially in developed countries. Developing countries such as Thailand, as food suppliers, have sought opportunities in cross border trade, to developed countries. To expand markets, there are needs in product and process improvement, in both food quality assurance and value creation. However, other important considerations including agriculture sustainability, energy efficiency, and welfare of workforce, should be considered together with cost reduction and profit maximization. This research studies assessment and effectiveness of current configurations and investigates balance and sustainable improvement of food supply chains in developing countries. This research is conducted and validated based on supply chain analysis, optimization, and simulation models.

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.

Dr. Pisit Chanvarasuth

Assistant Professor

Doctor of Veterinary Medicine, Chulalongkorn University, Bangkok, Thailand
M.B.A. in Finance, Loyola University Chicago, 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

Specialization and Research Areas: 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 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 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.
**DR. PORNPIMOL CHONGPHAISAL**

**Assistant Professor**  
B.B.A. in Marketing, Assumption University, Thailand  
M.A. in Comparative Management, Ritsumeikan University, Japan  
Ph.D. in Management, Ritsumeikan University, Japan  
Specialization and Research Areas: Competency in human resources management, Human behaviors in the organization, Motivations in performance management, Compensation and performance management, Career path, Career planning, and Career management, Intercorporate relations, Competencies and their applications in Human Resources Management, Organizational Behavior and Development.

**RESEARCH INTERESTS:**

**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 have their 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 their 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. 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  
Specialization and Research Areas: Industrial ergonomics, Workforce scheduling, Industrial noise, Product and workstation design.

**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 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...
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 productivity 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 deliver 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**  
*Assistant Professor*  
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  
Specialization and Research Areas: *Applied linear algebra, Matrix theory, Energy input-output analysis.*

**Research Interests:**  
*Applied Linear Algebra and Matrix Theory*  
Matrix theory, applied linear algebra and their applications in manufacturing are the research interests. 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 problems.

**Dr. Thanwadee Chinda**  
*Assistant Professor*  
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  
Specialization and Research Areas: *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*  
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.
Assistant Professor
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

Specialization and Research Areas: Decision support systems; Risk management, Economic analysis, Transporations maintenance management system.

DR. VEERIS AMMARAPALA

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.
RESEARCH INTERESTS:

**Vehicle Routing and Time Windows Problem**

The Vehicle routing problem (VRP) is one of the most challenging combinatorial optimization and nonlinear programming problems. The problem is to design a set of routes for a fleet of vehicles serving a number of customers or cities. The objective of the problem is to serve every customer with known demands at minimum vehicle routing cost. VRP arises in the fields of transportation, distribution and logistics planning; often in the context of delivering or picking up goods. The vehicle routing problem with time windows (VRPTW) is more specific than VRP such that the customers have time windows constraints within which the deliveries (or pickups) must be satisfied. Both VRP and VRPTW are integer programming problems categorized as NP-hard problems, in which the computational effort required to solve a problem increases exponentially with the problem size. With large size problems, the approximate solutions are obtained by numerical methods. Various heuristic methods have been proposed. These methods rely on the intrinsic nature of the problems. With advanced technologies, heuristic methods can be efficiently used to generate a promising solution.

**Large-scale Optimization**

Optimization is a challenging problem that involves determination of the action parameters that best achieve a desired or overall goal or objective. The overall objective may consist of several objectives that have conflicts. In order to achieve the overall objective, some objectives may not be at the maximum or minimum. Optimization arises in decision problems in business or production activity planning. In a production problem, the objective may be to find the combination of input variables (resources) that minimizes the production costs or maximizes the profits. In a capital budgeting problem, the objective may be to select those projects that maximize the net present value of the investments. Usually, a large number of input parameters are involved in the problem and the exact solution may not be possible to obtain.

Several heuristic methods such as Simulated Annealing, Genetic algorithm, etc. have been investigated and provide promising solutions. Each method may be suitable to certain types of problems.
Energy Conservation and Energy Efficiency

Energy management is the effective use of energy to maximise profits (minimise 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. Energy conservation and energy efficiency in residential and commercial buildings, transportation and industries are necessary to the country, as an energy importing country. To achieve energy saving targets, information on end-use devices in residential and commercial buildings, industries, and transport demand is necessary.

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 total costs. This has concentrated almost exclusively on conventional supply-side fossil-based 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 options in the energy sector are evaluated in the IRP process. In addition to energy efficiency improvement, CO₂ emissions and other environmental emissions are mitigated in the IRP process when both DSM options and renewable energy technologies & low-carbon technologies are included.

Energy-Environment Modeling and CO₂ Mitigation

The energy-environment modeling accounts for how energy is consumed, converted and produced in a given energy system under a range of alternative assumptions on population and GDP, economic development, technology, price, market penetration rates for new technologies such as efficient end-use devices and renewable energy technologies, fuel availability and trade, and CO₂ emissions.

Methodologies include both top-down projections of energy demand based on macroeconomic indicators (price, GDP), and detailed bottom-up forecasts based on end-use analysis. In addition, both final and useful energy demand analyses, transport demand modeling for transportation, and technology and environmental databases, such as GHG emissions database, are included.

The alternative energy demand and supply strategies under different user defined and physical constraints can be formulated and evaluated under simulation methods in scenario-based modeling or optimisation methods using Linear Programming (LP) and Non-Linear Programming (NLP).
**Dr. Jirachai Buddhakulsomsiri**  

**Associate 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  

**Specialization and Research Areas:** 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  

**Specialization and Research Areas:** 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).

**Production Planning and Control (PPC)**

Production planning uses the information from product and sales planning to plan the aggregate rates of production and the inventory levels. The objective of production planning is to provide sufficient finished goods in a period to meet the sales plan objectives while staying within financial and production capacity constraints. It is one of the richest areas that still require further research.
Economic and Strategic Justification Methods

The main objective of justification processes is to justify an investment to see whether or not it is worth investing. However, in justifying new manufacturing technologies, traditional justification methods, with their overemphasis on short-term savings, cause these projects to be rejected while others fail to come up to expectation. Many forms of the integration of economic analysis which provides results in monetary terms with strategic analysis showing results from evaluator rating of his or her subjective feeling are an interesting area for further research.

Dr. Pisal Yenradee

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

Specialization and Research Areas: Production and Inventory Control (P&IC) systems, JIT, MRP, and TOC; P&IC systems for Thai industries; P&IC in supply chain; Applied operations research; Systems simulation; 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.
Research Interests:

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 work-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.

Selective Data Acquisition for Supporting Direct Integration between Reverse Engineering (RE) and Rapid Prototyping (RP)

Reverse engineering (RE) has been used closely with rapid prototyping (RP) for fabricating one object from another. Existing RE-RP integrations all begin with the data acquisition of the entire surface of an object. This large point cloud data contains redundancy that must be reduced to avoid unnecessary difficulty in a subsequent surface reconstruction step. Rather than performing data reduction after capturing the data of an entire object, data are acquired selectively and locally layer by layer based on the part complexity to minimize the number of scans. The results of each scan are contour data points, which can be directly used to generate commands for fabricating a prototype.

Application of Image Processing in Rapid Prototyping Process

Build time and accuracy are two contradicting issues that have been a major concern in rapid prototyping, and have led to the development of many slicing approaches, including those applying adaptive slicing, direct slicing, and adaptive direct slicing concepts. Applying image processing has become an interesting technique to determine appropriate thickness for each sliced layer in an adaptive direct slicing process and to recommend slicing positions on a 3D CAD model.
Structured Light System (SLS)

A structured light system is a non-contact measurement technique that has been developed based on active triangulation method where a known pattern of light is projected onto an object. Using the SLS technique on an object surface appears explicitly through phase distortion of the projected patterns. The deformed patterns are captured by a camera or some other image detection device with cheap and fast operation.

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
Specialization and Research Areas: Thermal engineering, Solar energy, Energy conservation and management, Energy policy and planning.

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 an 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 CO₂ 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

Professor

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

Research Interests:

Mechatronics in Application-oriented Control

The primary research interests cover mechatronics in application-oriented control for practical implementation in process modelling and control, as well as design and optimization. The current topics include intelligent control of pneumatic artificial muscles, remote measurement systems, and novel techniques for computational intelligence in system and control engineering, etc.
**Dr. Thawatchai Onjun**  
Associate 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  
Specialization and Research Areas: Plasma physics, Nuclear fission, Nuclear fusion, Thermal and particle transport, Magneto hydrodynamic instability, Plasma-surface interactions, Plasma fuelling system, Neutron and radiation sources.

**Research Interests:**  
**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.

**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  
Specialization and Research Areas: 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 (NOx, CO2, CO, SOx, 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.
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    Senior Researcher of National Science and Technology Development Agency (NSTDA), Thailand

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    Associate Fellow of the Royal Institute

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   Director, Thailand Advanced Institute of Science and Technology (THAIST), the National Science Technology and Innovation Policy Office

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   Department of Civil Engineering, Faculty of Engineering, King Mongkut's University of Technology Thonburi (KMUTT)

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   Department of Accountancy, Faculty of Commerce and Accountancy, Chulalongkorn University

6. Professor Dr. Pramuan Tangboriboonrat
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   Ph.D. in Chemistry, Université de Haute Alsace, France
   Department of Chemistry, Faculty of Science, Mahidol University

7. Professor Dr. Somchart Soponronnarit
   Member of the ARRAC
   Dr.Ing. in Production and Processing of Vegetable Raw Materials, Ecole Nationale Supérieure Agronomique de Toulouse, France
   School of Energy, Environment and Materials, King Mongkut's University of Technology Thonburi (KMUTT)
   Fellow of the Royal Institute

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   Associate Fellow of the Royal Institute

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Vice Rector for Academic Affairs, TU

Legal Advisor
Assistant Professor Dr. Eakaboon Wongsawatgul
Faculty of Law, TU

TU Vice Rector for Administration, Rangsit Center
Associate Professor Dr. Kampol Ruchiwit

External Auditor
Assistant Professor Rawewan Peyayopanakul
Faculty of Commerce and Accountancy, TU

Internal Processes Auditor
Mr. Nuttapol Sribunruangrit
A.S.K.N. International Audit Services
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   Assistant Director for Admission and Public Relations

8. Assoc. Prof. Dr. Thawatchai Onjun  
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9. Asst. Prof. Dr. Pisanu Toochinda  
   Head, School of Bio-Chemical Engineering and Technology (BCET)

10. Asst. Prof. Dr. Mongkut Piantanakulchai  
    Head, School of Civil Engineering and Technology (CET)

11. Assoc. Prof. Dr. Thanaruk Theeramunkong  
    Head, School of Information, Computer, and Communication Technology (ICT)

12. Asst. Prof. Dr. Chawalit Jeenanunta  
    Head, School of Management Technology (MT)

13. Prof. Dr. Thananchai Leephapkreada  
    Head, School of Manufacturing Systems and Mechanical Engineering (MSME)

14. Assoc. Prof. Dr. Alice Sharp  
    Head, Department of Common and Graduate Studies (CGS)  
    Member and Secretary of the Committee

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   Director of SIIT  
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2. Prof. Dr. Somnuk Tangtermsirikul  
   Deputy Director of SIIT  
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   Assoc. Prof. Dr. Supachart Chungpaibulpatana  
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   Coordinator of Computer Science Curriculum  
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   Coordinator of Electronics & Communication Engineering Curriculum

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TESL/TEFL Certificate, TEFLPlus Teaching Training, Patong Language School, Phuket, Thailand.
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Ms. Chanpen Huabnarin ext. 1400 Chief of Academic Services, Registration, and Curriculum Division
Ms. Ratchaneekorn Visudthimark ext. 1431 Acting Chief of Curriculum and Academic Services Section
Ms. Waraporn Hinkaew ext. 1432 Acting Chief of Registry Section

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Ms. Vanatchaporn Surthanasarn ext. 1320 Chief of Accounting Section (Bangkadi)
Ms. Woraluk Petchtaeh ext. 1318 Chief of Financial Accounting Section (Rangsit)

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Mr. Jedsada Sangnak ext. 1308 Chief of Building and Ground Section (Rangsit) and Engineer

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Ms. Ajarathorn Tivanon ext. 1206 Chief of Personnel Section
Ms. Orapin Khaewtham ext. 1302 Chief of Administrative Section
Ms. Rapeepan Narkruksa ext. 1305 General Documentation Coordinator

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Mr. Peerasak Raksanont ext. 1610 Chief of Audiovisual Section, Rangsit
Ms. Saowaphan Srisophon ext. 1609 Secretary

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Ms. Yaowaluk Laothoh ext. 1319 Chief of Finance and Budget Section (Rangsit)

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Ms. Netnapa Anutarakul ☎ ext. 1203 Chief of Finance and Budget Section (Bangkadi)

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Mr. Saengjan Kwang-Khwang ☎ ext. 1300 Chief of Building and Ground Division (Bangkadi) and Acting Manager of SIIT Residential Hall at Bangkadi
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Mr. Teerasak Ngoksakda ☎ ext. 1302 Chief of Building and Ground Section (Bangkadi)

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SCHOOL OF BIO-CHEMICAL ENGINEERING AND TECHNOLOGY

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5. Dr. Paiboon Sreearunothai - Lecturer
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8. Dr. Sandhya Babel - Associate Professor
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10. Dr. Rachnarin Nitisoravut - Associate Professor
11. Dr. Wanwipa Siriwatwechakul - Lecturer

INTERNATIONAL JOURNALS


11. S. Jaiarree; Amnat Chidthaisong; Nipon Tangtham; Chongrak Polprasert; Ed Sarobol; and Stanley C. Tyler (2011). Soil organic carbon loss and turnover resulting from forest conversion to maize fields in eastern Thailand, Pedosphere, Vol. 21, No. 5, October 2011, pp 581-590.


INTERNATIONAL CONFERENCES


BOOK CHAPTER


**International Conferences**


**National Conferences**


Remark: * Joint-publication with the Construction and Maintenance Technology Research Center (CONTEC)
CONSTRUCTION AND MAINTENANCE TECHNOLOGY RESEARCH CENTER (CONTEC)

RESEARCHERS
1. Dr. Chalermchai Wanichlamlerd Researcher
2. Dr. Pakawat Sancharoen Researcher
3. Dr. Parnthep Julnipitawong Researcher
4. Dr. Pongsak Choktaweekarn Researcher
5. Dr. Raktipong Sahamitmongkol Researcher
6. Dr. Warangkana Saengsoy Researcher

ADDITIONAL PUBLICATIONS

INTERNATIONAL JOURNALS

NATIONAL JOURNAL

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NATIONAL CONFERENCE
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1. Dr. Banlue Srisuchinwong  Associate Professor
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4. Dr. Chalie Charoenlarpnopparat  Associate Professor
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6. Dr. Ekawit Nantajeewarawat  Associate Professor
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19. Dr. Waree Kongprawechnon  Associate Professor

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4. Dr. Navee Chiadamrong Associate Professor
5. Dr. Pisal Yenradee Associate Professor
6. Dr. Satha Aphornratana Associate Professor
7. Dr. Suchada Rianmora Lecturer
8. Dr. Supachart Chungpaibulpatana Associate Professor
9. Dr. Thananchai Leephakpreeda Professor
10. Dr. Thawatchai Onjun Associate Professor
11. Dr. Vladimir I. Kuprianov Associate Professor

INTERNATIONAL JOURNALS


**National Journals**


**International Conferences**


NATIONAL CONFERENCES


## Summary of Contracted Research Projects, Academic Year 2011

<table>
<thead>
<tr>
<th>Principal Investigator</th>
<th>Title</th>
<th>Sponsoring Organization</th>
<th>Total Project Budget (Baht)</th>
<th>Duration</th>
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<tbody>
<tr>
<td>Dr. Alice S. Dr. S. Babel</td>
<td>MRV Capacity Building in Asia for the Establishment of New Market Mechanisms</td>
<td>Institute for Global Environmental Strategies</td>
<td>801,243</td>
<td>Jun.-Oct. 2011</td>
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<tr>
<td>Dr. Alice S. Dr. Janya S.</td>
<td>Capacity building in Environmental Engineering and Management (Germany, SIIT, Vietnam, Laos)</td>
<td>German Academic Exchange Service (DAAD)</td>
<td>588,000</td>
<td>Jan. 2011-Dec. 2014</td>
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<td>Dr. Alice S. Dr. Apinan P.</td>
<td>Environmental Management in Greater Mekong Sub Region</td>
<td>Office of the Higher Education Commission</td>
<td>820,000</td>
<td>Oct. 2010-Sep. 2011</td>
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<tr>
<td>Dr. Amorn P.</td>
<td>Application of metal lath in structural strengthening</td>
<td>V&amp;P Expanded Metal Co., Ltd.</td>
<td>253,000</td>
<td>Jul.-Dec. 2011</td>
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<td></td>
<td>Investigation and Analysis on the Structural Integrity of Burapha Withi Expressway</td>
<td>Expressway Authority of Thailand (EXAT)</td>
<td>1,900,000</td>
<td>May 2010-May 2012</td>
</tr>
<tr>
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<td>Prototype seismic structural design and retrofitting of existing RC structures</td>
<td>The Thailand Research Fund (TRF)</td>
<td>583,000</td>
<td>Apr. 2012-Mar. 2014</td>
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<td></td>
<td>Structural evaluation and load test of SRT red line (Bangsue-Talingchan) elevated structure</td>
<td>Unique Engineering and Construction PCL</td>
<td>1,295,000</td>
<td>Jan.-Dec. 2011</td>
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<td>Dr. Aussadavut D.</td>
<td>Heuristic Algorithm for Mathematical Programming Model for Production and Transportation Planning with Direct Factory-Sea Port Shipment</td>
<td>Thammasat University Research Fund</td>
<td>100,000</td>
<td>May 2011-May 2012</td>
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<td>Principal Investigator</td>
<td>Title</td>
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<td>Dr. Aussadavut D.</td>
<td>A Study on the efficiency improvement of healthcare logistics in emergency room</td>
<td>The Thailand Research Fund (TRF)</td>
<td>1,767,040</td>
<td>May 2012-Apr. 2013</td>
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<tr>
<td>Dr. Pisit C.</td>
<td>Hydrogen Production from Agro-industrial Wastewater Using Microorganisms</td>
<td>Joint Graduate School of Energy &amp; Environment (JGSEE)</td>
<td>538,400</td>
<td>Nov. 2007-Oct. 2011</td>
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<td>Dr. Nattharika R</td>
<td>Leaching of nanoparticles from nanoparticles existing in Thailand and their presence in simulated landfill</td>
<td></td>
<td>1,375,000</td>
<td>Nov. 2011-Mar. 2015</td>
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<td>Dr. Suebsak N.</td>
<td>Phytoextraction of Cadmium from Contaminated Paddy Soils</td>
<td>Joint Graduate School of Energy &amp; Environment (JGSEE)</td>
<td>538,400</td>
<td>Nov. 2008-Mar. 2013</td>
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<td>(SIIT’s part)</td>
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<td>Dr. Boontariga K.</td>
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<tr>
<td>Dr. Bundit L.</td>
<td>Analyses of energy intensity and CO₂ mitigation in households, transportation and industry for long-term energy planning in Thailand</td>
<td>Joint Graduate School of Energy &amp; Environment (JGSEE)</td>
<td>694,000</td>
<td>Jun. 2011-May 2012</td>
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<td></td>
<td>Dynamic LCS of biofuels: the energy emission approach</td>
<td>Royal Thai Government</td>
<td>1,195,000</td>
<td>Nov. 2008-Present</td>
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<td>Energy efficiency improvement and CO₂ mitigation in the Thai Industries</td>
<td>Joint Graduate School of Energy &amp; Environment (JGSEE)</td>
<td>694,000</td>
<td>Jun. 2011-May 2012</td>
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<td>Multi-objective optimisation for power generation expansion planning and unit commitment</td>
<td>The Royal Golden Jubilee PhD Program, The Thailand Research Fund (RGJ-TRF)</td>
<td>1,195,000</td>
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<td>Dr. Bundit L. Dr. Supachart C. Dr. Rachnarin N.</td>
<td>Nationally Appropriate Mitigation Actions (NAMAs) for Thailand</td>
<td>Thailand Greenhouse Gas Management Organization (Public Organization) - TGO</td>
<td>1,750,000</td>
<td>Apr.-Oct. 2011</td>
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<td>NAMAs Workshop for Thailand</td>
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<td>1,499,000</td>
<td>Feb.-Jun. 2012</td>
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<td></td>
<td>Thailand’s Low-Carbon Society Scenario (3rd year)</td>
<td>National Institute for Environmental Studies, Japan</td>
<td>760,000</td>
<td>Mar. 2012-Feb. 2013</td>
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<td>Knowledge Management System for Thai Local Knowledge</td>
<td>Royal Forest Department</td>
<td>763,400</td>
<td>Sep. 2011-Feb. 2012</td>
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<td>Dr. Chalie C. Dr. Prapun S.</td>
<td>Multidimensional Signal Processing for Multiuser Wireless Access</td>
<td>Telecommunications Research and Industrial Development Institute (TRIDI)</td>
<td>1,303,300</td>
<td>Nov. 2010-Oct. 2011</td>
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<td>Dr. Chalie C. Dr. Thanaruk T. Dr. Banlue S. Dr. Ekawit N. Dr. Komwut W. Dr. S. Gordon Dr. Cholwich N. Dr. Itthisek N. Dr. Pakinee A. Dr. Prapun S. Dr. Somsak K.</td>
<td>Development of Research Center of Excellence in Wireless Communication, Network and Application Research (3rd Year)</td>
<td>Telecommunications Research and Industrial Development Institute (TRIDI)</td>
<td>2,510,000</td>
<td>Dec. 2011-Nov. 2012</td>
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<td>Dr. Chongrak P. Dr. Rachnarin N. Dr. S. Babel</td>
<td>Hazardous Waste Treatment and Management for Industry</td>
<td>Office of the Higher Education Commission</td>
<td>1,710,000</td>
<td>Oct. 2010-Sep. 2012</td>
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<td>Measures for Development of Low-Carbon Society in the Cities of Thailand</td>
<td>Kyushu University</td>
<td>347,833</td>
<td>Apr.-Nov. 2011</td>
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<td>Maezawa Industries Co., Ltd., Japan</td>
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<td>Dr. Ekawit N.</td>
<td>Real-time fall detection system</td>
<td>The Thailand Research Fund (TRF)</td>
<td>1,591,000</td>
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<td>Real-time ECG monitoring</td>
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<td>1,591,000</td>
<td>Jun. 2010-May 2013</td>
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<td>Dr. T. Kondo Mr. Pramuk B.</td>
<td>Automatic gesture recognition in real image sequences</td>
<td>Thammasat University</td>
<td>70,000</td>
<td>Oct. 2011-Present</td>
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<td>Dr. Pished B. Dr. T. Kondo Dr. Waree K. Dr. Annita M.</td>
<td>Feasibility study of angleclosure glaucoma screening device</td>
<td>National Science and Technology Development Agency (NSTDA)</td>
<td>60,000</td>
<td>Jan.-Aug. 2012</td>
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<td>Dr. T. Kondo Dr. Waree K. Dr. Itthisek N.</td>
<td>Development of an eye tracking system for ophthalmic diagnosis, treatment and surgery</td>
<td>National Science and Technology Development Agency (NSTDA)</td>
<td>540,000</td>
<td>Jun. 2010- Jun. 2011</td>
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<td>Dr. V.I. Kuprianov Ms. Kanokthip B.</td>
<td>Development and Study of a Fluidized-bed Combustor for Firing Some Unconventional Biomass Fuels</td>
<td>The Thailand Research Fund (TRF) and Thammasat University</td>
<td>1,000,000</td>
<td>May 2010-Present</td>
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<td>Dr. Nattharika R.</td>
<td>Impact of Knowledge Management on Educational Institutes</td>
<td>Thammasat University</td>
<td>800,000</td>
<td>Apr. 2010-Apr. 2012</td>
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<td>Dr. Navee C. Dr. Jirachai B. Dr. Suchada R. Dr. Boontrariga K. Dr. Chawalit J.</td>
<td>Implementing Lean Techniques in SMEs</td>
<td>Small and Medium Industry Institute (SMI), FTI and Office of Small and Medium Enterprises Promotion (SME)</td>
<td>420,000</td>
<td>Jun.-Oct. 2011</td>
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<td>Dr. Nirattaya K.</td>
<td>Estimation and calculation of the Nielsen Number of maps on a space.</td>
<td>The Thailand Research Fund (TRF)</td>
<td>360,000</td>
<td>Jun. 2010- Jun. 2012</td>
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<td>Dr. Pakorn O.</td>
<td>Preparation and Characterization of Drug Controlled-Release Materials from Nanofibers Polylactide and Its Derivatives</td>
<td>TRF Research-Team Promotion Grant: (TRF Senior Research Scholar: Prof. Dr. Pramuan Tangboriboonrat – phase I)</td>
<td>Sub-project of 7,500,000 baht project</td>
<td>Jul. 2008-Jun. 2011</td>
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<tr>
<td>Dr. Pakorn O.</td>
<td>Development of Lactide-based Nanomaterials for Biomedical Applications</td>
<td>TRF Research-Team Promotion Grant: (TRF Senior Research Scholar: Prof. Dr. Pramuan Tangboriboonrat - phase II)</td>
<td>Sub-project of 7,500,000 baht project</td>
<td>Aug. 2011-Jul. 2014</td>
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<td>Dr. Pisal Y. &amp; Dr. Satha A. &amp; Dr. Rachnarin N.</td>
<td>Development of ultraviolet germicidal irradiation prototype</td>
<td>Innovation Coupon Project NIA</td>
<td>393,162</td>
<td>May 2011-Jan. 2012</td>
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<td>Dr. Pisanu T.</td>
<td>Study of the Hydrogen Production from Methanol Steam Reforming over Cu-Zn/Al2O3 with Zirconia and Urea</td>
<td>Thailand Graduate Institute of Science and Technology (TGIST)</td>
<td>585,000</td>
<td>Jun. 2010-May 2013</td>
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<tr>
<td>Dr. Pisit C. &amp; Dr. Suebsak N. &amp; Dr. Chawalit J. &amp; Dr. Thanwadee C. &amp; Dr. Nattharika R. &amp; Dr. Boontarika K. &amp; Dr. Pornpimol C.</td>
<td>A Study of Logistics Processes in Emergency Room</td>
<td>The Thailand Research Fund (TRF)</td>
<td>1,231,890</td>
<td>May 2012-Jun. 2013</td>
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<tr>
<td>Dr. Pisit C. &amp; Dr. Thanwadee C. &amp; Dr. Suebsak N. &amp; Dr. Nattharika R. &amp; Dr. Pornpimol C. &amp; Dr. Aussadavut D. &amp; Dr. Chawalit J. &amp; Dr. Morrakot R. &amp; Dr. Boontharika K.</td>
<td>A Study on the Need for Logistics Personnel in Hospitals</td>
<td>The Thailand Research Fund (TRF)</td>
<td>1,521,900</td>
<td>Oct. 2010-Sep. 2011</td>
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<tr>
<td>Dr. Pruetha N.</td>
<td>Layout Design of Columns, Beams, and Slabs of Rectilinear Floors Using a Genetic Algorithm, RMU5380026</td>
<td>The Thailand Research Fund (TRF)</td>
<td>1,200,000</td>
<td>Jun. 2010-May 2012</td>
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<td>Mr. Kasem T.</td>
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<td>Maezawa Industries Inc., Japan</td>
<td>196,683.73</td>
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<tr>
<td>Dr. Somnuk T.</td>
<td>A study of critical chloride content in concrete to initiate corrosion of reinforcing steel in RC structures of Thailand</td>
<td>National Metal and Materials Technology Center (MTEC)</td>
<td>493,000</td>
<td>Sep. 2011-Mar. 2013</td>
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<td></td>
<td>A Study of Factors Affect Deterioration Rate of Steel Structure for Maintenance Planning of Structure of High Voltage Transmission Line of EGAT</td>
<td>Electricity Generating Authority of Thailand (EGAT)</td>
<td>5,256,000</td>
<td>Aug. 2009-Jul. 2011 (Extended to Nov. 2012)</td>
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<td></td>
<td>A Study on Determination of Critical Chloride Content in Concrete Structures in Marine Environment</td>
<td>Department of Public Work and Town and Country Planning</td>
<td>2,690,000</td>
<td>Jan. 2009-Present</td>
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<td>Development of standard to prevent cracking of RC structures due to shrinkage of concrete</td>
<td>National Science and Technology Development Agency (NSTDA)</td>
<td>400,000</td>
<td>Mar. 2012-Feb. 2013</td>
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<td></td>
<td>Development of Standard Specification of Limestone Powder for Concrete Applications in Thailand and Manual for Practicing of Concrete with Limestone Powder and Durability Design for Concrete with Limestone Powder (PART 1)</td>
<td>Surint omya</td>
<td>50,000</td>
<td>Apr-Jul. 2012</td>
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<td>Durability of Concrete under Marine Environment of Thailand</td>
<td>Siam Research and Innovation Co., Ltd.</td>
<td>3,500,000</td>
<td>Apr. 2008-Mar. 2013</td>
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<td>Evaluate the new crystalline additive (Admix C-5000) on its performance to improve the durability of concrete structures</td>
<td>Xypex Australia &amp; Xypex Thailand</td>
<td>3,259,590</td>
<td>Sep. 2011-Sep. 2014</td>
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<td>Improvement of BPC concrete production by advanced concrete technology</td>
<td>BESTPAC Concrete Co., Ltd.</td>
<td>299,000</td>
<td>Apr. 2011-Apr. 2012</td>
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<td>Inspection and Evaluation of Bhumibol Dam Core Concrete Specimens Properties</td>
<td>Electricity Generating Authority of Thailand (EGAT)</td>
<td>302,510</td>
<td>Jul. 2011-Aug. 2013</td>
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<td>Inspection and maintenance planning of clear water tank No. 2 of MWA</td>
<td>Metropolitan Waterworks Authority of Thailand</td>
<td>990,000</td>
<td>Feb.-Nov. 2012</td>
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<td>Structural Integrity Evaluation of Burapa Withi Expressway</td>
<td>Asian Institute of Technology (AIT)</td>
<td>8,500,000</td>
<td>Jul. 2010-Jan. 2012</td>
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<td>Study on Properties of BLCP Fly Ash</td>
<td>BLCP Power Limited</td>
<td>1,850,000</td>
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<td>Use of High Workability Concrete to Improve Precast Concrete Production</td>
<td>Saraburi Technic Concrete Co., Ltd.</td>
<td>300,000</td>
<td>Sep. 2010-Aug. 2012</td>
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<td>Utilization of Bottom Ash as an Internal Curing Material</td>
<td>BLCP Power Limited</td>
<td>1,450,000</td>
<td>May 2009-Apr. 2011</td>
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<td>Dr. Somsak K.</td>
<td>Consulting Service to Thaicom Plc.</td>
<td>Thaicom Public Company Limited</td>
<td>108,000</td>
<td>Apr.-Sep. 2011</td>
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<td>Scheduling in OFDMA Wireless Networks with Partial Channel Information</td>
<td>Thammasat University Young Researchers Fund</td>
<td>100,000</td>
<td>Oct. 2010-Present</td>
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<tr>
<td>Dr. Suchada R.</td>
<td>Guidelines for selecting the appropriate heel insert for long-standing people by applying the concepts of reverse engineering and finite element analysis</td>
<td>Thammasat University Young Researchers Fund</td>
<td>100,000</td>
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<td>Dr. Navee C.</td>
<td>Prototype Development of Balloon-type Anemometer</td>
<td>Thammasat University Research Fund</td>
<td>300,000</td>
<td>May 2012-Apr. 2014</td>
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<td>Dr. Booniterva K.</td>
<td>A Study on Potential of Wind Energy for Power Plant in Central Region of Thailand</td>
<td>National Research Council of Thailand (NRCT)</td>
<td>4,600,000</td>
<td>Aug. 2010-Jul. 2011</td>
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<td>Dr. Suchada R.</td>
<td>A Project of Academic Activities for Supporting Information Technology Professional Examination (ITPE)</td>
<td>NSTDA Academy</td>
<td>597,770</td>
<td>Jun. 2011- Jun. 2013</td>
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<td>Dr. Booniterva C.</td>
<td>Consultant for TOR drafting for Ministry of Culture Web Portal</td>
<td>Ministry of Culture</td>
<td>2,000,000</td>
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<td>Dr. Thanwadee C.</td>
<td>Development of an ergonomics culture model for Thai chemical industry</td>
<td>Thammasat University Research Fund</td>
<td>100,000</td>
<td>Mar. 2011-Apr. 2012</td>
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<td>Dr. Veeris A.</td>
<td>The Preliminary Study of Weigh Station Establishment of Thai Rural Roads</td>
<td>Department of Rural Roads</td>
<td>3,890,000</td>
<td>Feb. 2011-Aug. 2011</td>
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<td>Dr. Veeris A.</td>
<td>The Strengthening for the Manufacturing Sector of Small and Medium enterprises toward the Joining of ASEAN Economic Community (AEC) Project</td>
<td>Small and Medium Industry Institute (SMI)</td>
<td>1,200,000</td>
<td>Jun. 2011-Aug. 2011</td>
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<td>Dr. Veeris A.</td>
<td>The Development of Routine Maintenance Budgeting System</td>
<td>Department of Highways (DOH)</td>
<td>19,850,000</td>
<td>Sep. 2010-Sep. 2011</td>
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<td>Dr. Warangkana S.</td>
<td>Assessment of Concrete Deterioration caused by Sulfate Attack, Alkali-Aggregate Reaction and Delayed Etrtingite Formation</td>
<td>National Science and Technology Development Agency (NSTDA)</td>
<td>891,000</td>
<td>Mar. 2012-Mar. 2013</td>
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<td>Dr. Waree K.</td>
<td>Market Based Robots Task Planning for Flexible Production System</td>
<td>Thammasat University Research Fund</td>
<td>100,000</td>
<td>Jun. 2011-Present</td>
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<td>Dr. Waree K.</td>
<td>A Developing framework on infrastructure and human capacity to support service informatics research</td>
<td>National Electronics and Computer Technology Center (NECTEC)</td>
<td>13,926,000</td>
<td>Jul. 2011-Jun. 2017</td>
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<td>Dr. Winyu R.</td>
<td>Mathematical Model for Computing Representative Wave Heights Transformation</td>
<td>The Thailand Research Fund</td>
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<td>Sep. 2008-Sep. 2011</td>
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## Numbers of SIIT Graduates, Academic Years 1998-2011

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* including Joint Program with TU Faculty of Engineering

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### SIIT Graduate Students, 2nd/2001 Semester

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### SIIT Doctoral Faculty Members’ 2011 Publications

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| No. of International Journal Papers/Faculty Member | 0.60      |
| No. of Equivalent International Journal Papers/Faculty Member | 1.09      |

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 0.25
3. 29.94 International Journal Papers in International Databases (x 1.0) and 8.00 International Journal Papers (x 0.75)
### ROYAL GOLDEN JUBILEE SCHOLARSHIPS FOR GRADUATE STUDENTS, 1999-2011

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<td>Dr. Satha Aphornratana, Assoc. Prof.</td>
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<td>Dr. Somnuk Tangtermsirikul, Prof.</td>
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<td>Dr. Stanislav S. Makhanov, Prof.</td>
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SIIT at Rangsit

- School of Bio-Chemical Engineering and Technology
- School of Civil Engineering and Technology
- School of Manufacturing Systems and Mechanical Engineering
- Department of Common and Graduate Studies

SIIT at Bangkadi

- School of Information, Computer, and Communication Technology
- School of Management Technology
2012

Graduate Catalog and
2011 Annual R & D Report

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Thammasat University
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