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
Undergraduate Catalog
Academic Year
2018

Sirindhorn International Institute of Technology
Thammasat University

A Leading Teaching/Learning and Research Institute
### SIIT at Rangsit

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### SIIT at Bangkadi

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**Mailing Address**: P.O. Box 22, Thammasat-Rangsit Post Office  
Pathum Thani 12121, Thailand  
**Email**: admissions@siit.tu.ac.th  
**Website**: http://www.siit.tu.ac.th
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 in engineering and related technological development

3. To conduct research and development in engineering and related technologies relevant to teaching, modern industries, and societal needs
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Sirindhorn International Institute of Technology
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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. His Majesty, the late 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.

Backgrounds of the three founding organizations of Sirindhorn International Institute of Technology are briefly described as follows.

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 Thailand. 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, technology, 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 has 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 economies of Japan and countries around the world.

In May 2002, Keidanren merged with Nihon Keikai (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 organization that brings together industrial leaders to promote Thailand’s socioeconomic 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 (SIIT) offers undergraduate and graduate programs which lead to the Bachelor of Engineering (BEng), Bachelor of Science (BSc), Master of Engineering (MEng), Master of Science (MSc), and Doctor of Philosophy (PhD) degrees. The bachelor’s degree is offered in the following areas: chemical engineering (ChE), civil engineering (CE), computer engineering (CPE), electrical engineering (EE), engineering management (EM), industrial engineering and logistics systems (IE), information technology (IT), management technology (MT), and mechanical engineering (ME).

SIIT offers three master of engineering programs, namely, Master of Engineering Program in Engineering Technology, Master of Engineering Program in Information and Communication Technology for Embedded Systems, and Master of Engineering Program in Logistics and Supply Chain Systems Engineering. It also offers Master of Science Program in Engineering and Technology, Master of Science Program in Management Mathematics, and a Doctor of Philosophy Program in Engineering and Technology.

At the present time, the Institute has established faculty member, student, and staff 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 to a certain degree 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, an academic committee, the Academic Review and Rank Assessment Committee (ARRAC), comprising reputable scholars in various fields, provides recommendations on rank promotions 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 the Department of Common and Graduate Studies (CGS).

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 Phaholyothin Road (northbound). The campus can be conveniently reached by car via a multi-lane divided superhighway (Phaholyothin), the Chaengwattana-Bangsai Expressway, and both outer East-Ring and West-Ring Highways. It can also be reached by buses No. 29, 39 (non air-conditioned), and 510 (air-conditioned). The nearest train station, the Thammasat Station, is near the northwest corner of the Rangsit Campus.

Facilities

Buildings

Two five-story buildings and one four-story building are located at the SIIT Rangsit Campus. The first building is the main building with an area of 20,677 m², housing offices and classrooms. The first floor and a section of the second floor are mainly 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 fourth floors. Classrooms of various sizes are on the first, 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 I 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 Building and Ground Division on the first floor, and classrooms of various sizes on the second, third, and fourth floors.

A new 8-story Advanced Laboratory Building II with a total area of approximately 7,000 m² is equipped with advanced laboratory and research equipment that are necessary for conducting advanced researchers by faculty members, graduate students and senior-year undergraduate students.

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, intranet, and the internal email system for faculty members and staff. There are a number of servers for academic purposes in various programs. The local area network is connected to the Internet via the Thammasat-Rangsit fiber optic backbone. Students, faculty members, and staff are provided with an individual email address and service. Wireless Internet (WiFi) is accessible from all areas 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 on the first floor. For group discussion, students can meet and discuss in the group study rooms, 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

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 student activities center is located on the first floor of the SIIT Edutivity Building. There is a range of facilities available for student to 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. At the Rangsit Campus of SIIT, there is a convenience store on the first floor of the Main Building.

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.

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, Thanachart 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.

Sport Facilities

The Rangsit Center has a wide range of sport facilities for students including swimming pools and practice fields for soccer, basketball, volleyball, and tennis. All 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. In addition, the Rangsit Campus of SIIT has an outdoor basketball court in front of the main building.
Bangkadi Campus

Campus and Transportation

The Bangkadi Campus is located 14 kilometers from the Rangsit Campus on Tiwanon Road. The campus can be conveniently reached by SIIT shuttle bus (air-conditioned) and can also be reached by bus No.6249 (no air-conditioned).

Facilities

Buildings

In 1999, FTI, with co-operation 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 (BIP) 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. This 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. It houses the School of Information, Computer, and Communication Technology (ICT), the School of Management Technology (MT), the Library and Information Services Center, 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 on Tiwanon 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 is located on the second floor. On the upper floors, there are graduate student offices and research laboratories.

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 of the campus 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 notebook computers.

Infirmary

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 International 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 cafeteria on the ground floor of the Sirindhralai building. Additionally, there is a coffee shop 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 International Residence. There is also a badminton gymnasium beside the dormitory buildings.
Student Life

SIIT students have many opportunities to participate in a variety of activities, both academic and extracurricular, to develop self-discipline, self-responsibility, professional attitudes, and for relaxation. The SIIT Student Committee and other student clubs, such as the Sports Club, Music and Chorus Club, Academic Club, Volunteer Club, and Createch Club, organize a wide range of programs and activities throughout the year. Additionally, individual academic programs have student clubs which collaborate with faculty members in academic related activities. Student activities are supervised by academic advisors and the Assistant Director for Student Affairs and Alumni Relations.

SIIT provides a stimulating international learning atmosphere. All courses, both lecture and laboratory, are taught in English by foreign and Thai professors who have extensive overseas educational and work experiences. The number of international students at SIIT has been increasing due to SIIT’s widely accepted reputation for quality education and faculty members. Students frequently receive lectures on a variety of topics by visiting professors from abroad, providing them exposure to new and emerging subjects. Academic exchange programs with selected universities in Australia, Finland, France, Germany, Japan, Czech Republic, China, Denmark, Korea, the United Kingdom, Portugal, Taiwan, Switzerland, and the United States of America have been established to provide qualified students with an opportunity for studying abroad.

SIIT Graduates

Graduates of SIIT receive a wide range of job offers due to their proficiency in English and their competency in technical knowledge. While most graduates work for government agencies, state enterprises, and private corporations, a large number have chosen to pursue graduate studies immediately after graduation. Examples of universities that have accepted SIIT graduates into their graduate programs are The University of Melbourne (Australia), University of New South Wales (Australia), RWTH Aachen University (Germany), Hokkaido University (Japan), Japan Advanced Institute of Science and Technology (Japan), Keio University (Japan), Kochi University of Technology (Japan), Kyot UNIVERSITY (Japan), Tohoku University (Japan), Tokyo Institute of Technology (Japan), University of Tokyo (Japan), Waseda University (Japan), Chalmers University of Technology (Sweden), Cambridge University (UK), Imperial College (UK), Oxford University (UK), University of Manchester Institute of Science and Technology-UMIST (UK), University of Nottingham (UK), University of Warwick (UK), Columbia University (USA), Georgia Institute of Technology (USA), Stanford University (USA), University of Colorado (USA), University of Michigan/Ann Arbor (USA), and University of Wisconsin/Madison (USA). Several graduates have received scholarships for their graduate studies, such as the Thai Government Scholarships, Japanese Government Scholarships, a Fulbright Scholarship, and teaching/research assistantships from the universities where they enroll.

Admissions

Each year the Institute’s faculty members and staff visit a number of high schools to provide information about the Institute, its admission procedures, academic programs, etc. The Institute also welcomes high school students and parents to visit the Institute. The Admission and Public Relations Division can help to arrange a meeting with faculty members and staff to discuss academic options for interested students.

For further information, contact:

Admission and Public Relations Division
Sirindhorn International Institute of Technology (SIIT)
Thammasat University, Rangsit Center
P.O. Box 22, Thammasat-Rangsit Post Office
Pathum Thani 12121, Thailand.
Tel: +66-2-986-9009–13, +66-2-986-9103–10
Fax: +66-2-986-9112–3
E-mail: admission@siit.tu.ac.th
Website: http://www.siit.tu.ac.th
Online Application: www.siit.tu.ac.th/undergrad_app
Applicant’s Qualifications

- equivalent from other countries (grade 12 or equivalent).
- An applicant must not carry any seriously contagious disease, or any disease that would be detrimental to his/her education, or any mental disorder.

Admission Methods

A prospective student may apply for admission through one of the following methods:

1. Submission of Portfolio
2. TU Quota
3. General Direct Admission
4. Central University Admission System (CUAS)
5. Submission of National Test Scores:
   - GAT/PAT
   - Common 9 Subjects
6. Submission of Standardized Test Scores:
   - Scholastic Aptitude Test I (SAT I)
   - American College Testing (ACT)
   - International General Certificate of Secondary Education (IGCSE) or General Certificate of Secondary Education (GCSE) or General Certificate of Education (GCE), ‘O’ and ‘AS’ or ‘A’ Level
   - International Baccalaureate (IB) Diploma
   - 6th Form
   - National Certificate of Educational Achievement (NCEA)
7. Transfer from other accredited universities

Application

Applicants who wish to apply through the national university entrance selection process must follow the procedures set by the Office of the Higher Education Commission. Those who choose the other methods must complete the online applications by the deadlines and bring the required documents on the Interview date. Announcement of application periods are available on the SIIT website.

Interview

All candidates who have passed the written examination or the initial screening are interviewed by faculty members. The interview is conducted in English.

English Placement Test

All admitted students are given an English Placement Test to determine their English language proficiency. Depending upon their level of proficiency, they may receive exemption of some English courses, or may be required to take an additional English course.

Exemption: An applicant who is a native English speaking student from Australia, Canada, New Zealand, United Kingdom, or USA may be exempted from the above English proficiency requirements if he/she passes an interview by an SIIT interviewing committee consisting of 3 native English speaking instructors.
Tuition and Educational Support Fees

Sirindhorn International Institute of Technology reserves the rights to revise the tuition and educational support fees and to establish new fees as may be required by increased costs of providing educational services.

Tuition Fees
Tuition fees include charges for services directly and indirectly related to instruction, such as classroom facilities, lecturing, publications, counseling, placement, etc., but does not cover the cost of damage or loss to university property.

Tuition fees: 3,100 Baht per lecture credit
4,200 Baht per laboratory credit

Educational Support Fees
These fees provide funds for library, computer facilities, equipment, student services and activities, athletic facilities, etc.

Fees: 27,805 Baht per semester

Approximately, the total tuition and educational support fees per semester is 97,165 Baht. The actual amount depends on the number of credits registered in each semester.

Damage Deposit
A deposit of 5,000 Baht is collected from a new student for damaged equipment and non-returned library books. The deposit, after deduction of damages caused by the student, is returned to the student when he/she graduates or leaves SIIT.

Matriculation Free
A one-time fee of 400 Baht is collected by TU as the matriculation fee.

Fine on Unpaid Fees
Any outstanding balance of the tuition and educational support fees will be charged a fine at the rate of 0.05% per day starting from the first day after the addition/withdrawal period and at the rate of 0.1% per day starting from the first day of the midterm exam.

Status Maintaining Fee
A fee of 5,000 Baht per semester is charged during a student’s leave of absence.

Reinstatement Fee
A student who has resigned or has been dismissed due to non-academic reasons may apply for readmission. A fee of 2,500 Baht is charged for readmission, in addition to payment of any previous outstanding debt.

Late Registration Fee
A fee of 45 Baht per day is charged for late registration.

Students may be subject to other fees, such as a fee for late return of borrowed books, etc. For details, consult the Academic Services and Registration Division, Student Affairs and Alumni Relations Division, or Finance Division.

Non-TU Students Enrollment

Students or interested individuals may apply to register for courses as non-TU students.

Tuition fees: 4,000 Baht per Lecture Credit
5,000 Baht per Lab Credit

Financial Aid

Each year, the Institute has set aside a number of scholarships and awards for students who have demonstrated academic excellence, have strong financial needs, or both. In addition to these scholarships arranged by the Institute, the public/private sector and individuals have provided support through scholarships for students each year. The scholarship recipients are screened by a committee and selected on the basis of academic records, conduct, financial need, and conditions set by the scholarship donors.
Currently, the Institute receives scholarships and/or donations to the Sirindhorn Technology Scholarship Fund from individuals, institutions, and business corporations, for example:

- Alumni Association of SIIT (ASIIT)
- Ajinomoto Foundation
- Bangchak Petroleum PCL
- Bangkok Bank PCL
- Bank of Ayudhaya PCL
- CIMB Bank Berhad
- Fuji Electric Co., Ltd., Japan
- Krung Thai Bank PCL
- Mitsubishi UFJ Foundation, Japan
- Nippon Keidanren, Japan
- Namheng Concrete (1992) Co., Ltd.
- National Science and Technology Development Agency (NSTDA)
- Siam Cement Group (SCG) Cement-Building Materials
- SIIT Development Foundation
- Thai Military Bank PCL
- Thanpuying Niramol Suriyasat Fund
- Prof. Fumio Nishino Fund
- Mrs. Kobkarn Wattanawrangkul
- Prof. Dr. Sornnuk Tangtermsirikul
- SIIT Faculty Members

A scholarship recipient’s academic progress is reviewed at the end of each semester to determine the recipient’s continued eligibility for an award. For further information on scholarships, contact the Student Affairs and Alumni Relations Division.

### Academic Policies and Procedures

Sirindhorn International Institute of Technology (SIIT), although independently administered and self financed, is an academic unit of Thammasat University. Graduates of the Institute receive Thammasat University degrees. Thus, students must comply with the policies and regulations set forth by Thammasat University. For more details, consult the student’s academic advisor.

Students must successfully complete the required number of credits (set by each academic curriculum) and demonstrate their English proficiency to be eligible for graduation. Some students who do not possess sufficient background may be required to take additional courses not listed in the curriculum. Normally, it takes eight regular semesters (four years) to complete the requirements. The schedule of academic semesters is as follows:

- **First Semester:** August - December
- **Second Semester:** January - May
- **Summer Session:** June - July

### Academic Regulations

#### Student Dress Code

All students are encouraged to wear Thammasat University (TU) uniforms, which are as follows:

1. Men’s uniform:
   - Plain white shirt (shirt must be properly tucked in and sleeves must not be folded back)
   - Trousers in black or dark blue
   - Belt with TU belt buckle
   - Black shoes with socks
2. Women’s uniform:
   - Plain white shirt with short sleeves (shirt must be properly tucked in)
   - Buttons: at the shirt seam binding (4 buttons) and shirt collar (1 button) using TU silver metal buttons
   - TU pin worn on the left side of shirt above the chest
   - Plain skirt in black or dark blue
   - Belt with TU belt buckle
   - Black shoes

A TU pin is a yellow “Thammaraj” with red lines, available at the University Bookstores. A TU belt buckle is a “Thammaraj” in a rectangular shape, also available at the University Bookstores.
In the case that it is inconvenient to wear a uniform, students may wear polite dress as follows:

Men  - Plain shirt with collar and short or long sleeves, properly buttoned and tucked in
- Trousers in dark color
- Shoes (sandals are not allowed during official hours on campus)

Women - Plain shirt with collar and short or long sleeves
- Plain skirt in dark color
- Shoes (sandals are not allowed during official hours on campus)

Dress Code for Taking Examinations
- All SIIT students are required to wear TU student uniforms.
- Other types of dresses, including any kind of jeans, are not allowed.
- Students are required to wear dress shoes (closed toes and heels) or sport shoes (plain: white, black, brown, or navy blue).
- Other types of shoes and colors are not allowed.
- Failure to comply with this dress code will result in a deduction of student conduct score and other penalties.

Conduct Score and Disciplinary Actions
Students who are found “improperly dressed” or “smoking in a non-smoking area” will be deducted conduct scores as follows:

<table>
<thead>
<tr>
<th>Offence</th>
<th>Conduct Scores to be Deducted</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Improperly Dressed</td>
<td>Smoking in a Non-Smoking Area</td>
</tr>
<tr>
<td>1st Offence</td>
<td>0</td>
<td>20</td>
</tr>
<tr>
<td>2nd Offence</td>
<td>10</td>
<td>20</td>
</tr>
<tr>
<td>3rd Offence</td>
<td>10</td>
<td>30</td>
</tr>
<tr>
<td>4th Offence</td>
<td>20</td>
<td>30</td>
</tr>
<tr>
<td>5th Offence</td>
<td>30</td>
<td>-</td>
</tr>
<tr>
<td>6th Offence</td>
<td>30</td>
<td>-</td>
</tr>
</tbody>
</table>

The following disciplinary actions will be taken upon the cumulative deducted scores:

<table>
<thead>
<tr>
<th>Offence #</th>
<th>Smoking Improper</th>
<th>Dress</th>
<th>Cumulative Deducted Scores</th>
<th>Disciplinary Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>-</td>
<td>1</td>
<td>0</td>
<td>Action 1: Verbal and written warning 1, and</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Permission to attend a class or laboratory, or get service from library is revoked.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- No prompt service from SIIT faculty and/or staff members</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- No consideration for scholarships and awards for 1 academic year</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(Except for the Good Academic Performance and Good Conduct Scholarships)</td>
</tr>
<tr>
<td>2</td>
<td>-</td>
<td>2</td>
<td>10</td>
<td>Action 2: Verbal and written warning 2, and</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>3</td>
<td>20</td>
<td>Action 3: Verbal and written warning 3, and</td>
</tr>
<tr>
<td>4</td>
<td>2</td>
<td>4</td>
<td>40</td>
<td>Action 4: Written probation signed by student and guardian</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Action 3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- No re-entry and re-admission to SIIT</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>5</td>
<td>70</td>
<td>Action 5: Suspension from study for 1 semester</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Action 4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Suspension from study for one semester (next semester), except for a student</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>studying in the last semester, in which case the student is suspended in the semester</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>6</td>
<td>100</td>
<td>Action 6: Postponement of graduation approval for 1 academic year</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Action 4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Postponement of graduation approval for 1 academic year</td>
</tr>
</tbody>
</table>
Registration for New Students

1. A successful applicant must possess all qualifications set by Sirindhorn International Institute of Technology.
2. A successful applicant must register in person as a TU student within 14 days from the start of the student’s first academic semester.

The successful applicant who cannot register during the registration period due to a special reason may register at a later time with the approval of the TU rector. However, the applicant must complete all processes with no later than the student’s first academic semester. Otherwise, his/her rights to register as a student will be revoked.

3. A successful applicant who graduated from abroad must submit the graduation certificate to SIIT in person on the registration period or days.

With the approval of the TU rector, the applicant who cannot submit the graduation certificate within the time limit may be able to submit the document no later than the student’s first academic semester; otherwise, his/her rights to register as a student will be revoked.

4. If the qualification of the applicant has not met the regulations of Thammasat University and/or the documents submitted from the applicant have proven to be falsified, the registration of that applicant will be revoked.

Registration for Current Students

1. An undergraduate student is required to register for a minimum of 9 credits and a maximum of 22 credits in each regular semester. Registration for fewer than 9 credits is possible only for a student who anticipates to graduate at the end of the current semester or by the Director’s approval with a special reason, such as illness. A fourth year student may register for more than 22 credits with the Director’s approval. The number of credits registered in the summer session shall not exceed 6 credits. However, a student who anticipates in graduating at the end of the current semester or with the director’s approval may register more than 6 credits but no more than 9 credits in the summer session.
2. A student must register during the scheduled period and follow the registration procedures set by the Institute.
3. Course registration must be approved by the academic advisor.
4. Late registration is subject to a fine of 45 Baht/day (including holidays), starting from the first day of classes. Course registration after the first 14 days of a semester will not be allowed.
5. A student who does not register for any courses in a regular semester has to file an applications for leave of absence to the academic program and pay a fee for maintaining student status within the first 30 days of a semester; otherwise his/her student status will be revoked.
6. Registration for courses is considered incomplete unless fees have been paid by the specified date.
7. The number of students enrolling in a course may be restricted due to some constraints, such as limited laboratory equipment and classroom size.

Auditing a Course

1. With permission from the instructor and the advisor, a student may audit a course without evaluation. However, the student must pay the tuition fee for the course.
2. Auditing may not be changed to regular evaluation after the second week of a regular semester.
3. A grade report will bear “AUD” for the audited course after such a course is completed.
4. The number of credits for an audited course will be counted towards the upper limit of the number of credits allowed in a semester, but will not be counted towards the lower limit.
5. The credit(s) of an audited course will not be counted towards the total credit accumulation.
6. An audited course cannot be re-registered at a later time for formal evaluation unless there is a change in the student’s study program that warrants the need for formal evaluation of the course.
Course Addition/Withdrawal

1. If authorized by the instructor and the advisor, course addition must be processed within the first 14 days of a regular semester or within the first 7 days of a summer session. Addition of courses after the first 14 days of a regular semester or after the first 7 days of a summer session needs to receive an approval from the Director with provided reasons by 14 days before the end of classes. In addition, the total hour of study has to meet the TU regulation.

2. If authorized by the instructor and the advisor, course withdrawal will result in one of the following cases:
   2.1. If a course is withdrawn within the first 14 days of a regular semester or within the first 7 days of a summer session, the academic record will not bear the title of such a course.
   2.2. If a course is withdrawn after the first 14 days of a regular semester or after the first 7 days of a summer session, but not later than the first 10 weeks of a regular semester or not later than the first 4 weeks of a summer session, the academic record will bear the title of the course and a W grade.
   2.3. Course withdrawal after the first 10 weeks of a regular semester or after the first 4 weeks of a summer session is not allowed. Withdrawal of courses after the first 10 weeks of a regular semester or the first 4 weeks for a summer session needs to receive an approval from the student’s advisor and the Director with provided reasons by 14 days before the end of classes. With approval from the director, the course will bear a W grade.

3. A course withdrawal that reduces the number of credits to less than 9 credits is prohibited.

Leave and Suspension

1. A student can apply for a leave of absence. This must be approved by the director on the condition that the student has an appropriate reason. However, a student cannot take a leave during the first two semesters of his/her undergraduate study unless the Rector of Thammasat University approves the request.

2. A student cannot apply for a leave for more than two consecutive semesters unless the Rector of Thammasat University specially permits it.

3. A leave will result in one of the following cases:
   3.1. If the first day of leave falls within the first 14 days of a regular semester or the first 7 days of a summer session, the academic record will not bear any of the titles of the registered courses.
   3.2. If the first day of leave falls after the first 14 days of a regular semester or the first 7 days of a summer session, but no later than the first 10 weeks of a regular semester or the first 4 weeks of a summer session, the academic record will bear W grades for all the courses registered in the current semester.
   3.3. A student can apply for leave after the first 10 weeks of a regular semester or the first 4 weeks of summer session only if there is an uncontrollable reason. A student or a student’s trustworthy representative is required to submit an application for leave with credible evidence to the academic program. With approval from the Rector of Thammasat University, the course will bear a W grade.

4. A student who is suspended from studying during a semester due to the disciplinary cause will not be permitted to continue with the courses he/she registered. This penalty will be recorded as “Suspended” on the student’s academic record and change to “Leave” after graduation. No grades or credits for the courses registered in that semester will be given. A suspended student must pay a fee to maintain his/her student status unless he/she has paid the educational support fees. A student who is permitted to take a leave or is suspended before paying the educational support fees must pay a fee for maintaining his/her student status.

5. Leave, suspension, or re-admission cannot be used as a reason to extend the maximum limit of 8 years to complete the degree requirements.
Reinstatement

1. A student who has been dismissed for a reason other than not meeting academic performance, such as failure to register within the time limit of a semester or no payment of a debt owed to SIIT, may request for reinstatement by submitting a request to the Academic Services and Registration Division. If approved, the semesters in which the student did not register are treated as semesters that the student has taken leave. To process the request, all previous outstanding debts, status maintaining fees, and reinstatement fees must be paid. Reinstatement has to be approved by the Rector of Thammasat University.

2. A student who has been resigned for no longer than 1 semester can request for reinstatement by submitting a request to the Academic Services and Registration Division. If approved, the semesters in which the student did not register are treated as semesters that the student has taken leave. To process the request, all previous outstanding debts, status maintaining fees, and reinstatement fees must be paid. Reinstatement has to be approved by the Rector of Thammasat University.

Refund of Fees

1. A student who takes a leave of absence or resigns before the semester starts is entitled to a full refund of the education support and tuition fees.

2. A student who takes a leave of absence or resigns by the first 14 days of a semester is entitled to a half refund of the education support and tuition fees. A student taking a leave after the first 14 days of the semester will not receive any refund, but does not need to pay a fee to maintain his/her student status.

3. A student is entitled to a full refund if the course has been cancelled by the Institute.

4. A student who withdraws from a course within the first 14 days of a regular semester or within the first 7 days of a summer session is entitled to a half refund of the tuition fee of that course.

5. A student who withdraws from a course after the first 14 days of a regular semester or after the first 7 days of a summer session will not receive any refund for the tuition fee.

Regulations on the Use of the Library

All students must observe the following Library’s regulations:

1. Students are entitled to check out no more than 5 books from the library at any given time, and they must return the books within 7 days, starting from the check-out date.

2. Any student who returns a book(s) after the due date will be fined: 10 Baht/day per copy of a book, 20 Baht/hour per copy of a reserved book.

3. Students must reimburse the Institute for loss or damage of a book they have checked out from the library.

4. Eating, drinking, smoking, and making excessive noise are strictly prohibited in the library.

5. Students are not permitted to remain in the library after the service hours. For more details, consult the librarian for the semester service hours.

6. As a deterrent measure, violators will not be entitled to receive any services from the library throughout the current semester.

7. In the case that students do not return a book within the due date and do not pay the fine for overdue books, they will not be allowed to check out any additional books or register in the following semester.
Academic Performance

1. The academic performance of students is evaluated using the grade point average (GPA) system. 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>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>Fair</td>
</tr>
<tr>
<td>D+</td>
<td>1.5</td>
<td>Minimum</td>
</tr>
<tr>
<td>D</td>
<td>1.0</td>
<td>Minimum</td>
</tr>
<tr>
<td>F</td>
<td>0.0</td>
<td>Fail</td>
</tr>
</tbody>
</table>

In some courses, such as practical training, an S (satisfactory) or U (unsatisfactory) grade is given. These grades have no point values. Therefore, they are not included in the calculation of semester and cumulative grade point averages (CGPA).

An “I” grade may be temporarily given for courses where coursework evaluations have not been completed, and it is not the student’s fault. Issuance of this grade is very rare and must be based on circumstances that are beyond the control of the involved student.

The student with an “I” grade must be evaluated by the course instructor within 80 days after the semester ends. If a complete evaluation is not possible, the instructor must grade the student’s performance based on his/her available scores obtained from previous evaluation assignments of the course. Beyond the 80-day period, if no grade is given by the instructor, the grade must be considered by the institute. In any case, the “I” grade must be removed within 90 days after the semester ends, otherwise a “W” grade is given.

Course withdrawals after the first two weeks, but still within the first twelve weeks are given a W grade. No withdrawals are permitted after twelve weeks of a regular semester, except under special circumstances.

2. A placement test of some courses can be substituted for a regular evaluation. A student whose placement test result is “Accredit” will earn the credits without having to study such a course, and his/her academic record will bear “ACC,” which carries no grade point and will not be used in the calculation of a GPA.

3. A student may retake a course in which he/she received a grade of D or D+. All the grades received in the same subject will be used for the calculation of the cumulative grade point average, but the credits will be earned only once.

4. An F grade will be counted as zero points and the course credits will be used for the calculation of both the semester and the cumulative grade point averages.

5. A compulsory course with either an F or a U grade must be retaken until a passing grade is obtained.

6. A student may choose to retake an elective course with either an F or a U grade or to take another course instead.

7. Only courses that are given at least a D grade or an S grade or “ACC” are counted towards earned credit accumulation.

8. In the case that a student is required to repeat a course or take another course as a substitute, the credit(s) of such a course will be accumulated only once.

9. A student who misses an examination due to an uncontrollable cause must immediately submit evidence stating the cause of his/her obstacle to the instructor and his/her advisor for initial consideration. If the matter is deemed adequate and approved by the instructor, the instructor and the advisor will submit the matter to obtain the director’s approval for arranging an appropriate process in accordance with the SIIT Examination Regulations for SIIT students.

10. The maximum time limit to complete a bachelor’s degree is 8 years.
**Warning and Probation Status**

1. The Institute evaluates the status of each student based on his/her academic performance at the end of every semester. Each student must maintain CGPA of at least 2.00. Otherwise, he/she will be issued a “warning 1,” “warning 2,” or “probation” status in the following semester, wherever appropriate. Grades of the summer session are considered as a part of the second semester’s grades. However, for students who are dismissed at the completion of the second semester, their registration of the following summer session will be void.

2. At the end of the first two semesters of his/her undergraduate study, a student must possess a CGPA of at least 1.50. Otherwise he/she will be dismissed from the Institute.

3. A “warning 1” status will be issued in the following semester if the CGPA falls below 2.00 for the first time. A “warning 2” status is issued in the following semester if a student is under the “warning 1” status and still cannot improve the CGPA to 2.00 or above.

4. If a student has a “warning 2” status and still possesses a CGPA below 2.00, he/she is issued a “probation” status in the following semester, which is recorded in the student’s academic record.

5. A student under the “probation” status must improve his/her CGPA to 2.00 or above by the end of that semester. Otherwise, he/she will be dismissed from the Institute.

6. If a student has completed all the courses required by the curriculum, but his/her CGPA is below 2.00, but not less than 1.80, then he/she is allowed to continue taking courses for no more than 3 semesters (subject to a total time limit of 8 years for the entire enrollment) to improve the CGPA to 2.00 or above.

**Class Attendance**

Students are required to attend a class for not less than 70 percent of the total class periods throughout a semester. If the attendance is less than 70 percent, he/she may not be allowed to take the final examination of that course.

**Transfer Students**

A student may be admitted as a transfer student if he/she has previously enrolled in a Bachelor’s degree program. The total number of transfer credits cannot exceed half of the total number of credits required by the SIIT program.

A request for transferring credits must be done within the first registered semester. No transfer credits can be granted if the student has been dismissed from an institution.

**Application for Graduation**

1. To qualify for graduation, a student must fulfill the course requirements of the curriculum with a minimum CGPA of 2.00, and demonstrate his/her English proficiency with:

   - A paper-based TOEFL score of at least 500 (or 173 for computer-based test, or 61 for Internet-based test, or 500 for Institutional TOEFL), or
   - IELTS of at least 6.0, or
   - TUGET of at least 500, or
   - TOEIC of at least 650, or
   - First Certificate in the English (FCE) in Cambridge ESOL Exam, or
   - Level B2, Grade “B” in the Council of Europe’s Common European Framework of Reference (CEFR), or
   - Grade “S” in GTS401 Intensive English Proficiency.
In addition, the student must have been enrolled for no fewer than 7 regular semesters, except for transfer students.

Exemption: A student who is a native English speaker from Australia, Canada, New Zealand, United Kingdom, or USA may be exempted from the above English proficiency requirements if he/she passes an interview by an SIIT interviewing committee consisting of 3 English native speaking instructors.

2. A graduate is granted a degree with honors if he/she has earned at least 3/4 of the total required credits from SIIT/TU and meets the following conditions:

**First Class Honors**
1. The study is completed within the time specified by the curriculum.
2. The final cumulative grade point average is not lower than 3.50.
3. None of the courses is given a U grade or grade lower than C.
4. None of the courses has been repeated.
5. The student has never been officially recorded of parole punishment.

**Second Class Honors**
1. The study is completed within the time specified by the curriculum.
2. The final cumulative grade point average is not lower than 3.50.
3. The cumulative grade point average of the courses in the major is not lower than 2.00.
4. None of the courses is given an F grade or a U grade.
5. None of the courses has been repeated.
6. The student has never been officially recorded of parole punishment.

In addition, a graduate possessing the following eligibility is also qualified for second class honors.

1. The study is completed within the time specified by the curriculum.
2. The final cumulative grade point average is not lower than 3.25.
3. None of the courses in the major is given a grade lower than C.
4. None of the courses is given an F grade or a U grade.
5. None of the courses has been repeated.
6. The student has never been officially recorded of parole punishment.

3. Application for graduation must be submitted to the university within the first 14 days of the final semester (7 days of the summer session) in which an applicant expects to graduate.

4. If a student financially owes SIIT or the university, all his/her debt must be cleared before applying for graduation.

**Degree Approval**

1. The Thammasat University Council normally approves degrees at the end of the first and second semesters, and the summer session.
2. The university organizes a graduation ceremony once a year.

**Academic Programs**

SIIT offers international programs leading to Bachelor of Engineering (B.Eng.) and Bachelor of Science (B.Sc.) in the following fields:

**B.Eng.**
- Chemical Engineering
- Civil Engineering
- Computer Engineering
- Electrical Engineering
- Industrial Engineering and Logistics Systems
- Mechanical Engineering

**B.Sc.**
- Information Technology
- Management Technology
- Engineering Management
The structure and components of individual curricula of the undergraduate programs are listed below.

1. General Basic Courses
   1.1 Part I
      1.1.1 Social Sciences
      1.1.2 Humanities
      1.1.3 Science and Mathematics
      1.1.4 Languages
   1.2 Part II

2. Major/Core Courses
   2.1 Basic Courses/ Compulsory Courses
   2.2 Specialized Courses/ Compulsory Elective Courses
   2.3 Technical Elective Courses (Optional)

3. Free Elective Courses
   A practical training course is normally offered during the summer session of the third academic year of the curriculum. Students are placed at business corporations, government agencies, or industrial facilities to receive on-the-job training and to learn to adapt to the work environment.

   Instead of the practical training course, students may be approved to enroll in an extended training program in the second semester of the fourth year, with continuation into the following summer session. During the training, students usually work on a project which addresses and solves a technical problem in industry.

   SIIT has established student exchange programs with many foreign universities and organizations. Qualified students may take advantage of these programs. Students may request that credits of courses taken during the exchange period be transferred. In some cases, there is some financial assistance.

   Details of the curriculum for each academic program are given in the following pages. For additional information, students may consult the individual programs.
Chemical Engineering (ChE)

Curriculum Outline

Chemical engineering (ChE) is a branch of engineering that deals with the chemical and physical processes used to develop and make products such as Pharmaceuticals, artificial organs, semiconductors, oil refineries, solar panels, clean water, and biocompatible polymers. Chemical engineers have made major contributions to modern society. With the additional knowledge of biology, chemical engineers are devising new ways for living organisms to perform molecular transformation, and discovering new schemes for delivery of medicines to specific sites in the body.

The Chemical Engineering Program intends to prepare chemical engineers for life-long achievement through education in the principles of chemical engineering: to encourage development of communication, teamwork, and leadership skills.

The basic foundation in mathematics, chemistry, physics, and engineering is established in the first two years of the curriculum. A core of required chemical engineering courses is followed by a selection of electives. One group of electives will prepare students to be biochemical engineers, and another group to be chemical process and material engineers.

In addition, ChE students can choose one among three special studies (Senior Project, Foreign Exchange, and Extended Training).

- **Senior Project** is for students who would like to conduct their projects under the supervision of ChE faculty members.
- **Foreign Exchange** is designed for students who would like to participate in a student exchange program with foreign partner universities.
- **Extended Training** is designed for students who would like to participate in a longer training period (for the entire semester) under a co-operative training program with companies or organizations.

Structure and Components

1. **General Basic Courses** 30 Credits
   1.1 Part I 21 Credits
   1.1.1 Social Sciences 6 Credits
   1.1.2 Humanities 3 Credits
   1.1.3 Science and Mathematics 3 Credits
   1.1.4 Languages 9 Credits
   1.2 Part II 9 Credits

2. **Major Courses** 112 Credits
   2.1 Basic Courses 37 Credits
   2.1.1 Basic Mathematics and Science Courses 21 Credits
   2.1.2 Basic Engineering Courses 16 Credits
   2.2 Specialized Courses 75 Credits
   2.2.1 Compulsory Engineering Courses 60 Credits
   2.2.2 Elective Engineering Courses 15 Credits

3. **Free Elective Courses** 6 Credits

Total 148 Credits

Details of the Curriculum

<table>
<thead>
<tr>
<th>1. General Basic Courses</th>
<th>30 Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1 Part I</td>
<td>21 Credits</td>
</tr>
<tr>
<td>1.1.1 Social Sciences</td>
<td>6 Credits</td>
</tr>
<tr>
<td>1.1.2 Humanities</td>
<td>3 Credits</td>
</tr>
<tr>
<td>1.1.3 Science and Mathematics</td>
<td>3 Credits</td>
</tr>
<tr>
<td>1.1.4 Languages</td>
<td>9 Credits</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2.1 Basic Courses</th>
<th>37 Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1.1 Basic Mathematics and Science Courses</td>
<td>21 Credits</td>
</tr>
<tr>
<td>2.1.2 Basic Engineering Courses</td>
<td>16 Credits</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>2.2 Specialized Courses</th>
<th>75 Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.2.1 Compulsory Engineering Courses</td>
<td>60 Credits</td>
</tr>
<tr>
<td>2.2.2 Elective Engineering Courses</td>
<td>15 Credits</td>
</tr>
</tbody>
</table>

| 3. Free Elective Courses | 6 Credits |

Total Credit Requirement 148 Credits
### ChE Curriculum: 148 Credits

#### First Year

**Semester I**
- **MAS116** Mathematics I 3(3-0-6)
- **SCS126** Chemistry for Engineers 3(3-0-6)
- **SCS138** Applied Physics I 3(3-0-6)
- **SCS176** Chemistry Laboratory 1(0-3-0)
- **TU100** Civic Engagement 3(3-0-6)
- **TU103** Life and Sustainability 3(3-0-6)
- **TU104** Critical Thinking, Reading, and Writing 3(3-0-6)

**Sub-Total** 20(18-6-36)

**Semester II**
- **GTS133** Environmental Studies 3(3-0-6)
- **ITS100** Introduction to Computers and Programming 3(2-3-4)
- **MAS117** Mathematics II 3(3-0-6)
- **SCS139** Applied Physics II 3(3-0-6)
- **SCS184** Physics Laboratory II 1(0-3-0)
- **TU105** Communication Skills in English 3(3-0-6)
- **TU106** Creativity and Communication 3(3-0-6)

**Sub-Total** 19(17-6-34)

#### Second Year

**Semester I**
- **CHS211** Organic Chemistry 3(3-0-6)
- **CHS212** Physical Chemistry 3(3-0-6)
- **CHS241** Material and Energy Balance 3(3-0-6)
- **EES203** Basic Electrical Engineering 3(3-0-6)
- **EES204** Basic Electrical Engineering Laboratory 1(0-3-0)
- **GTS202** English Language Structures 3(3-0-6)
- **MAS210** Mathematics III 3(3-0-6)
- **MES300** Engineering Drawing 3(2-3-4)

**Sub-Total** 22(20-6-40)

**Semester II**
- **CHS213** Applied Mathematics in Chemical Engineering 3(3-0-6)
- **CHS242** Thermodynamics I 3(3-0-6)
- **CHS251** Fluid Dynamics 3(3-0-6)
- **CHS261** Chemical Engineering Laboratory I 1(0-3-0)
- **CHS316** Statistics for Chemical Engineering 3(3-0-6)
- **GTS302** Technical Writing 2(2-1-3)
- **MES231** Engineering Mechanics 3(3-0-6)
- **MES371** Material Science for Engineers 3(3-0-6)

**Sub-Total** 21(20-4-39)

#### Third Year

**Semester I**
- **CHS315** Environmental Chemical Engineering 3(3-0-6)
- **CHS317** Safety in Chemical Operations 3(3-0-6)
- **CHS343** Thermodynamics II 3(3-0-6)
- **CHS352** Heat Transfer 3(3-0-6)
- **CHS362** Chemical Engineering Laboratory II 1(0-3-0)
- **TU101** Thailand, ASEAN, and the World 3(3-0-6)
- **CHSxxx** Optional Course 3(3-0-6)

**Sub-Total** 19(18-3-36)

**Semester II**
- **CHS331** Chemical Reaction Kinetics and Reactor Design 3(3-0-6)
- **CHS353** Mass Transfer 3(3-0-6)
- **CHS363** Chemical Engineering Laboratory III 1(0-3-0)
- **CHS355** Chemical Engineering Process Design 3(3-0-6)
- **CHS364** Experimental Design and Methods for ChE 3(3-0-6)
- **CHS302** Seminar 1(0-2-1)
- **IES341** Engineering Economy 3(3-0-6)
- **CHSxxx** Optional Course 3(3-0-6)

**Sub-Total** 20(18-5-37)

#### Summer

Students can choose one among three special study

1) **Senior Project and Foreign Exchange**
   - **CHS301** Chemical Engineering Training 1(0-40-0)

   **Sub-Total** 1(0-40-0)

2) **Extended Training**
   - **XXXxxx** Free Elective 3(x-x-x)
   - **XXXxxx** Free Elective 3(x-x-x)

   **Sub-Total** 6(x-x-x)

3) **Foreign Exchange**
   - **CHS486** Special Studies in ChE I 3(3-0-6)
   - **CHS487** Special Studies in ChE II 3(3-0-6)
   - **CHS488** Special Studies in ChE III 3(2-0-4)
   - **XXXxxx** Free Elective 3(x-x-x)
   - **XXXxxx** Free Elective 3(x-x-x)

   **Sub-Total** 11(x-x-x)

#### Fourth Year

**Semester I**
- **CHS456** Transport Phenomena 3(3-0-6)
- **CHS457** Chemical Engineering Plant Design 3(3-0-6)
- **CHS461** Process Dynamics and Control 3(3-0-6)
- **CHSxxx** CHS Technical Elective 3(3-0-6)
- **TU102** Social Life Skills 3(3-0-6)

**Sub-Total** 15(15-0-30)

1) **Senior Project**
   - **CHS484** Chemical Engineering Project I 1(0-3-0)

   **Sub-Total** 16(15-3-30)

2) **Foreign Exchange**
   - **CHS486** Special Studies in ChE I 3(3-0-6)
   - **CHS487** Special Studies in ChE II 3(3-0-6)
   - **CHS488** Special Studies in ChE III 3(2-0-4)
   - **XXXxxx** Free Elective 3(x-x-x)
   - **XXXxxx** Free Elective 3(x-x-x)

   **Sub-Total** 11(x-x-x)

3) **Extended Training**
   - **CHS489** Extended Chemical Engineering Training 6(0-40-0)

   **Sub-Total** 6(0-40-0)
Civil Engineering (CE)

Curriculum Outline

The Civil Engineering Program aims to produce graduates with sufficient fundamental knowledge in broad fields, and at the same time with strong knowledge in a specific area. This will enable graduates to serve the industrial sectors in Thailand where the need for specialists is increasing day by day.

The curriculum gives emphasis to various major fields of civil engineering, which include 1) structural engineering, 2) concrete engineering, 3) soil and foundation engineering, 4) water resources engineering, and 5) transportation engineering.

The total credits for major engineering subjects are uniformly distributed to all five major fields, except for the field of structural engineering, which has a slightly larger number of credits.

Further specialization can be achieved through the elective courses and the project. A practical training course is also provided to let students have a chance to practice civil engineering during their studies. In the practical training course, students will be placed in organizations that are related to their specialty in order to provide them with some practical experiences in their specialized field. In this curriculum, it is possible for students to study their elective courses at other universities, including foreign universities, as exchange students during the final semester. With special arrangements, it will also be possible for students to have thorough practical training during the final semester.

Structure and Components

1. General Basic Courses 30 Credits
   1.1 Part I 21 Credits
      1.1.1 Social Sciences (2 courses) TU100 TU101 6 Credits
      1.1.2 Humanities (1 course) TU102 3 Credits
      1.1.3 Science and Mathematics (1 course) TU103 3 Credits
      1.1.4 Languages (3 courses) TU104 TU105 TU106 9 Credits
   1.2 Part II 9 Credits
      GTS133 GTS202 ITS100

2. Major Courses 114 Credits
   2.1 Basic Courses 50 Credits
      2.1.1 Basic Mathematics and Sciences Courses 21 Credits
         MAS116 MAS117 MAS210 SCS126 SCS138 SCS139 SCS176 SCS183 SCS184
      2.1.2 Basic Engineering Courses 29 Credits
         CES201 CES202 CES215 CES361 CES362 CES371 CES381 CES382 CES403 GTS302 MES300 MES350
   2.2 Specialized Courses 64 Credits
      2.2.1 Compulsory Engineering Courses 49 Credits
         2.2.1.1 Structural Engineering & Materials CES311 CES312 CES315 CES321 CES322 CES351 CES352 CES354 CES414
         2.2.1.2 Soil & Hydraulics Engineering CES302 CES331 CES332 CES333 CES444
         2.2.1.3 Surveying & Engineering Management CES341 CES343 CES353
      2.2.2 Elective Engineering Courses 15 Credits
         2.2.2.1 Special Study (select 1 group) 6 Credits
            CES303 CES407
         or
            2.2.2.2 Foreign Exchange Track 6 Credits
            CES303 CES405 CES409
         or
            2.2.2.3 Extended Training Track 6 Credits
            CES408
      2.2.2 Technical Elective Courses 9 Credits
         Select 9 credits from the list of courses offered by the Civil Engineering Program, except basic courses.
         CESxxx

3. Free Elective Courses 6 Credits
   Total 150 Credits

Details of the Curriculum

Students may choose any free elective courses (not less than 6 credits in total) offered by SIIT or TU, including general basic courses, except:
1. General basic courses in Science and Mathematics.
2. General basic TU courses.
3. Courses with contents similar to those of other courses in the curriculum already taken by the students.

Total Credit Requirement 150 Credits
# CE Curriculum: 150 Credits

## First Year

### Semester I

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>TU104</td>
<td>Critical Thinking, Reading, and Writing</td>
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<td>MAS116</td>
<td>Mathematics I</td>
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<td>SCS126</td>
<td>Chemistry for Engineers</td>
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<td>SCS138</td>
<td>Applied Physics I</td>
<td>3(3-0-6)</td>
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<td>SCS176</td>
<td>Chemistry Laboratory</td>
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<tr>
<td>SCS183</td>
<td>Physics Laboratory I</td>
<td>1(0-3-0)</td>
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<td>TU100</td>
<td>Civic Engagement</td>
<td>3(3-0-6)</td>
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<tr>
<td>TU103</td>
<td>Life and Sustainability</td>
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Sub-Total: 20(18-6-36)

### Semester II

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<td>Communication Skills in English</td>
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<td>GTS133</td>
<td>Environmental Studies</td>
<td>3(3-0-6)</td>
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<tr>
<td>ITS100</td>
<td>Introduction to Computers and Programming</td>
<td>3(2-3-4)</td>
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<td>MAS117</td>
<td>Mathematics II</td>
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<td>SCS139</td>
<td>Applied Physics II</td>
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<td>SCS184</td>
<td>Physics Laboratory II</td>
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<td>TU106</td>
<td>Creativity and Communication</td>
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Sub-Total: 19(17-6-34)

## Second Year

### Semester I

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<tr>
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<td>Engineering Materials</td>
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<tr>
<td>CES215</td>
<td>Applied Mathematics in Civil Engineering</td>
<td>3(3-0-6)</td>
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<tr>
<td>CES361</td>
<td>Surveying</td>
<td>3(2-3-4)</td>
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<tr>
<td>GTS202</td>
<td>English Language Structures</td>
<td>3(3-0-6)</td>
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<td>MAS210</td>
<td>Mechanics III</td>
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<td>MES300</td>
<td>Engineering Drawing</td>
<td>3(2-3-4)</td>
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<td>MES350</td>
<td>Engineering Statics</td>
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Sub-Total: 21(19-6-38)

### Semester II

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<td>3(3-0-6)</td>
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<tr>
<td>CES371</td>
<td>Mechanics of Solids I</td>
<td>3(3-0-6)</td>
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<td>GTS302</td>
<td>Technical Writing</td>
<td>2(2-1-3)</td>
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<tr>
<td>CES381</td>
<td>Hydraulics</td>
<td>3(3-0-6)</td>
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<tr>
<td>CES382</td>
<td>Hydraulics Laboratory</td>
<td>1(0-3-0)</td>
</tr>
<tr>
<td>TU102</td>
<td>Social Life Skills</td>
<td>3(3-0-6)</td>
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<tr>
<td>CES302</td>
<td>Engineering Hydrology</td>
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Sub-Total: 18(17-4-33)

### Summer

<table>
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<tbody>
<tr>
<td>CES362</td>
<td>Field Surveying Camp</td>
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Sub-Total: 1(0-80-0)

## Third Year

### Semester I

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</tr>
<tr>
<td>CES331</td>
<td>Soil Mechanics</td>
<td>3(3-0-6)</td>
</tr>
<tr>
<td>CES333</td>
<td>Soil Mechanics Laboratory</td>
<td>1(0-3-0)</td>
</tr>
<tr>
<td>CES351</td>
<td>Concrete Technology</td>
<td>3(2-3-4)</td>
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<tr>
<td>CES315</td>
<td>Computational Methods in Civil Engineering</td>
<td>3(3-0-6)</td>
</tr>
<tr>
<td>CES341</td>
<td>Transportation Engineering and Planning</td>
<td>3(3-0-6)</td>
</tr>
<tr>
<td>CES444</td>
<td>Hydraulic Engineering</td>
<td>3(3-0-6)</td>
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Sub-Total: 19(17-6-34)

### Semester II

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<thead>
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<th>Course Title</th>
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<tbody>
<tr>
<td>CES312</td>
<td>Structural Analysis</td>
<td>3(3-0-6)</td>
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<tr>
<td>CES321</td>
<td>Timber and Steel Design</td>
<td>4(3-3-6)</td>
</tr>
<tr>
<td>CES322</td>
<td>Reinforced Concrete Design</td>
<td>4(3-3-6)</td>
</tr>
<tr>
<td>CES332</td>
<td>Foundation Engineering</td>
<td>3(3-0-6)</td>
</tr>
<tr>
<td>CES343</td>
<td>Highway Engineering</td>
<td>3(3-0-6)</td>
</tr>
<tr>
<td>CES352</td>
<td>Material Testing</td>
<td>1(0-3-0)</td>
</tr>
<tr>
<td>CES354</td>
<td>Maintenance of Structures</td>
<td>3(3-0-6)</td>
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</table>

Sub-Total: 21(18-9-36)

### Summer

Select either Senior Project Track, Foreign Exchange Track, or Extended Training Track.

1. **Senior Project Track and Foreign Exchange Track**
   - CES303 Civil Engineering Training                1(0-40-0)
   - Sub-Total: 1(0-40-0)

2. **Extended Training Track**
   - XXXXXX Free Elective                             3(x-x-x)
   - Sub-Total: 6(x-x-x)

## Fourth Year

### Semester I

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>CES353</td>
<td>Construction Engineering and Management</td>
<td>3(3-0-6)</td>
</tr>
<tr>
<td>CES403</td>
<td>Seminar</td>
<td>1(0-3-0)</td>
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<tr>
<td>CES414</td>
<td>Finite Element Methods in Engineering</td>
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<td>CESxxxx</td>
<td>Technical Elective</td>
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<td>Technical Elective</td>
<td>3(x-x-x)</td>
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<tr>
<td>TU101</td>
<td>Thailand, ASEAN, and the World</td>
<td>3(3-0-6)</td>
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</table>

Sub-Total: 19(x-x-x)

### Semester II

1) **Senior Project Track**
   - CES407 Civil Engineering Project                5(0-15-0)
   - XXXXXX Free Elective                            3(x-x-x)
   - XXXXXX Free Elective                            3(x-x-x)
   - Sub-Total: 11(x-x-x)

2) **Foreign Exchange Track**
   - CES405 Special Studies in Civil Engineering I   3(3-0-6)
   - CES409 Special Studies in Civil Engineering III | 3(2-0-4)
   - XXXXXX Free Elective                            3(x-x-x)
   - XXXXXX Free Elective                            3(x-x-x)
   - Sub-Total: 11(x-x-x)

3) **Extended Training Track**
   - CES408 Extended Civil Engineering Training      6(0-40-0)
   - Sub-Total: 6(0-40-0)

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Sirindhorn International Institute of Technology
Thammasat University
Computer Engineering (CPE)

Curriculum Outline

The computer engineering curriculum is designed to prepare students for new trends in hardware and software development, as well as frontiers in computing technology. Students are exposed to a wide range of subjects covering all aspects of computer engineering and their applications.

The compulsory core courses help students to:
1. Gain fundamental concepts related to computers and information technology that lead to high performance digital processing,
2. Know the essence of hardware and software systems that leads to the effective and efficient development of computer systems, and
3. Understand applications of fundamental knowledge in frontier multi-disciplinary fields.

After gaining enough background through the compulsory core courses, the students are allowed to tailor their courses according to their personal interest. Twelve credits of elective courses, which are required for graduation, can be selected from one of these:

1. Artificial Intelligence,
2. Cloud Computing and Cyber Security, or
3. General Computer Engineering

Structure and Components

1. General Basic Courses 30 Credits
   1.1 Part I 21 Credits
   1.1.1 Social Sciences (2 courses) 6 Credits
   TU100 TU101
   1.1.2 Humanities (1 course) 3 Credits
   TU102
   1.1.3 Science and Mathematics (1 course) 3 Credits
   TU103
   1.1.4 Languages (3 courses) 9 Credits
   TU104 TU105 TU106
   1.2 Part II 9 Credits
   GTS133 GTS202 ITS100

2. Major Courses 114 Credits
   2.1 Core Courses 40 Credits
      2.1.1 Core Engineering Courses
         CSS322 CSS331 CSS400 EES203
         EES204 GTS116 GTS117 GTS121
         GTS122 GTS210 GTS231 GTS302
         IES302 MT5252 MT5258
      2.2 Specialized Courses 53 Credits
         2.2.1 Technologies for Applications 7 Credits
         CSS325 CSS332 ITS229
         2.2.2 Technologies and Software Processes 17 Credits
         CSS323 ITS102 ITS103 ITS221
         ITS227 ITS231 ITS329
         2.2.3 System Infrastructure 19 Credits
         CSS221 CSS225 CSS321 CSS324
         CSS334 ITS201 ITS352
         2.2.4 Hardware and Computer Architecture 10 Credits
         CSS224 CSS332 EES370 EES371
      2.3 Elective Courses 15 Credits
         2.3.1 Select one of the following options
            2.3.1.1 Option I: Artificial Intelligence 12 Credits
            CSS431 CSS432 CSS433 CSS434
            2.3.1.2 Option II: Cloud Computing and Cyber Security 12 Credits
            CSS451 CSS452 CSS453 CSS454
            2.3.1.3 Option III: General Computer Engineering 12 Credits
            Select 4 courses from the following courses:
            CSS431 CSS432 CSS433 CSS434
            CSS451 CSS452 CSS453 CSS454
            2.3.2 Technical Elective Course 3 Credits
            Select 3 credits from the list of courses offered by SIIT, except for basic courses.

2.4 Field-Experience Courses 6 Credits
   Select one of the following tracks
   2.4.1 Senior Project Track
      CSS300 CSS403
   2.4.2 Foreign Exchange Track
      CSS300 CSS495 CSS497
   2.4.3 Extended Training Track
      CSS499

3. Free Elective Courses 6 Credits
   Students may choose any free elective courses (not less than 6 credits in total) offered by SIIT or TU, including general basic courses, except:
   1. General basic courses in Science and Mathematics.
   2. General basic TU courses.
   3. Courses with contents similar to those of other courses in the curriculum already taken by the students.

Total Credit Requirement 150 Credits

Details of the Curriculum

1. General Basic Courses 30 Credits
   1.1 Part I 21 Credits
   1.1.1 Social Sciences (2 courses) 6 Credits
   TU100 TU101
   1.1.2 Humanities (1 course) 3 Credits
   TU102
   1.1.3 Science and Mathematics (1 course) 3 Credits
   TU103
   1.1.4 Languages (3 courses) 9 Credits
   TU104 TU105 TU106
   1.2 Part II 9 Credits
   GTS133 GTS202 ITS100

2. Major Courses 114 Credits
   2.1 Core Courses 40 Credits
      2.1.1 Core Engineering Courses
         CSS322 CSS331 CSS400 EES203
         EES204 GTS116 GTS117 GTS121
         GTS122 GTS210 GTS231 GTS302
         IES302 MT5252 MT5258
      2.2 Specialized Courses 53 Credits
         2.2.1 Technologies for Applications 7 Credits
         CSS325 CSS332 ITS229
         2.2.2 Technologies and Software Processes 17 Credits
         CSS323 ITS102 ITS103 ITS221
         ITS227 ITS231 ITS329
         2.2.3 System Infrastructure 19 Credits
         CSS221 CSS225 CSS321 CSS324
         CSS334 ITS201 ITS352
         2.2.4 Hardware and Computer Architecture 10 Credits
         CSS224 CSS332 EES370 EES371
      2.3 Elective Courses 15 Credits
         2.3.1 Select one of the following options
            2.3.1.1 Option I: Artificial Intelligence 12 Credits
            CSS431 CSS432 CSS433 CSS434
            2.3.1.2 Option II: Cloud Computing and Cyber Security 12 Credits
            CSS451 CSS452 CSS453 CSS454
            2.3.1.3 Option III: General Computer Engineering 12 Credits
            Select 4 courses from the following courses:
            CSS431 CSS432 CSS433 CSS434
            CSS451 CSS452 CSS453 CSS454
            2.3.2 Technical Elective Course 3 Credits
            Select 3 credits from the list of courses offered by SIIT, except for basic courses.

2.4 Field-Experience Courses 6 Credits
   Select one of the following tracks
   2.4.1 Senior Project Track
      CSS300 CSS403
   2.4.2 Foreign Exchange Track
      CSS300 CSS495 CSS497
   2.4.3 Extended Training Track
      CSS499

3. Free Elective Courses 6 Credits
   Students may choose any free elective courses (not less than 6 credits in total) offered by SIIT or TU, including general basic courses, except:
   1. General basic courses in Science and Mathematics.
   2. General basic TU courses.
   3. Courses with contents similar to those of other courses in the curriculum already taken by the students.

Total Credit Requirement 150 Credits
### CPE Curriculum: 150 Credits

#### First Year

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<thead>
<tr>
<th>Semester I</th>
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<tbody>
<tr>
<td>TU102</td>
<td>Social Life Skills</td>
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<tr>
<td>TU104</td>
<td>Critical Thinking, Reading, and Writing</td>
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<td>GTS116</td>
<td>Mathematics for Technologists I</td>
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<tr>
<td>GTS133</td>
<td>Environmental Studies</td>
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<td>GTS121</td>
<td>General Science I</td>
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<td>ITS110</td>
<td>Introduction to Computers and Programming</td>
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<td>MTS252</td>
<td>Materials Science</td>
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<th>Semester II</th>
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<tbody>
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<td>Mathematics for Technologists II</td>
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<td>Object-Oriented Programming Laboratory</td>
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#### Second Year

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<td>GTS231</td>
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<td>CSS221</td>
<td>Computer Graphics and Applications</td>
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#### Third Year

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<td>Fundamentals of Data Communications</td>
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<td>CSS324</td>
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<td>CSS332</td>
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<td>CSS323</td>
<td>Software Engineering</td>
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<td>CSS334</td>
<td>Computer Networks and Internetworking</td>
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<tr>
<td>GTS302</td>
<td>Technical Writing</td>
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<td>ITS329</td>
<td>System Analysis and Design</td>
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#### Fourth Year

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<tr>
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<td>Economics for Technologists</td>
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<tr>
<td>CSS400</td>
<td>Project Development</td>
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<td>TU101</td>
<td>Thailand, ASEAN, and the World</td>
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#### Option I: Artificial Intelligence

- CSS431 | Machine Learning and Pattern Recognition | 3(3-0-6) |
- CSS432 | Natural Language Processing and Information Retrieval | 3(3-0-6) |
| **Sub-Total** | **21(19-7-37)** |  |

#### Option II: Cloud Computing and Cyber Security

- CSS451 | Cloud Computing | 3(3-0-6) |
- CSS452 | Internet of Things | 3(3-0-6) |
| **Sub-Total** | **21(19-7-37)** |  |

#### Option III: General Computer Engineering

- CSSxxx | Compulsory Elective | 3(x-x-x) |
- CSSxxx | Compulsory Elective | 3(x-x-x) |
| **Sub-Total** | **21(x-x-x)** |  |

#### Summer

1) **Senior Project Track and Foreign Exchange Track**

- CSS300 | Computer Engineering Training | 1(0-40-0) |
| **Sub-Total** | **1(0-40-0)** |  |

2) **Extended Training Track**

- XXXxxx | Free Elective | 3(x-x-x) |
- XXXxxx | Free Elective | 3(x-x-x) |
| **Sub-Total** | **6(x-x-x)** |  |

#### Fourth Year

<table>
<thead>
<tr>
<th>Semester I</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>MTS258</td>
<td>Economics for Technologists</td>
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<td>CSS400</td>
<td>Project Development</td>
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<td>TU101</td>
<td>Thailand, ASEAN, and the World</td>
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<tr>
<td><strong>Sub-Total</strong></td>
<td><strong>16(x-x-x)</strong></td>
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</tbody>
</table>

#### Option I: Artificial Intelligence

- CSS433 | Computer Vision | 3(3-0-6) |
- CSS434 | Knowledge Representation and Reasoning | 3(3-0-6) |
| **Sub-Total** | **16(x-x-x)** |  |

#### Option II: Cloud Computing and Cyber Security

- CSS453 | Cyber Crimes and Digital Forensics | 3(3-0-6) |
- CSS454 | Network Security | 3(3-0-6) |
| **Sub-Total** | **16(x-x-x)** |  |

#### Option III: General Computer Engineering

- CSSxxx | Compulsory Elective | 3(x-x-x) |
- CSSxxx | Compulsory Elective | 3(x-x-x) |
| **Sub-Total** | **16(x-x-x)** |  |

#### Semester II

1) **Senior Project Track**

- CSS403 | Computer Engineering Project | 5(0-15-0) |
- XXXxxx | Free Elective | 3(x-x-x) |
- XXXxxx | Free Elective | 3(x-x-x) |
| **Sub-Total** | **11(x-x-x)** |  |

2) **Foreign Exchange Track**

- CSS495 | Special Studies in Computer Engineering I | 3(3-0-6) |
- XXXxxx | Free Elective | 3(x-x-x) |
- XXXxxx | Free Elective | 3(x-x-x) |
| **Sub-Total** | **11(x-x-x)** |  |

3) **Extended Training Track**

- CSS499 | Extended Computer Engineering Training | 6(0-40-0) |
| **Sub-Total** | **6(0-40-0)** |  |
Electrical Engineering (EE)

Curriculum Outline

The areas of study in electrical engineering are quite diverse. The curriculum is therefore developed to provide fundamental knowledge in several major study areas so that students will be well-prepared for work in the highly competitive and fast-moving electrical engineering professions.

The compulsory courses are designed to provide students a broad understanding of the principles, illustrated by current applications, in electrical engineering. The compulsory courses include four laboratory courses, providing hands-on learning of electric circuits, digital circuits, electronics, and feedback control. They also include two project design courses emphasizing the applications of the principles under the framework of the CDIO (conceiving, designing, implementing, and operating) process.

By the end of the first semester of their third year, students complete the study of most compulsory courses. The students then choose to study in one of the two options: communication engineering or power engineering. Each option includes one laboratory course and six lecture courses covering several important areas in the corresponding options. Furthermore, through technical elective courses, students can further extend their knowledge with courses from another option and/or explore topics in other areas such as electronics or mechatronics.

In the last semester, students can choose from three main tracks: academic exchange programs abroad, extended training programs with leading local companies, or senior projects with SIIT advisors. The last two tracks provide a project-based learning opportunity, in which students must integrate and apply the knowledge they have acquired throughout their study in the program.

Structure and Components

1. General Basic Courses 30 Credits
   1.1 Part I 21 Credits
      1.1.1 Social Sciences 6 Credits
      1.1.2 Humanities 3 Credits
      1.1.3 Science and Mathematics 3 Credits
      1.1.4 Languages 9 Credits
   1.2 Part II 9 Credits

2. Major Courses 114 Credits
   2.1 Basic Courses 38 Credits
      2.1.1 Basic Mathematics and Science Courses 21 Credits
      MAS116  MAS117  MAS210  SCS126
      SCS138  SCS139  SCS176  SCS183
      SCS184
   2.1.2 Basic Engineering Courses 17 Credits
      GTS302  IES303  MES211  MES300
      MES361  MES371
   2.2 Specialized Courses 76 Credits
      2.2.1 Compulsory Engineering Courses 64 Credits
      Select one of the following two options:
      Option I: Communication Engineering
      2.2.1.1 Basic Electrical Engineering
      EES210  EES211  EES212  EES216
      EES221  EES281  EES298  EES315
      EES330  EES331  EES332  EES341
      EES370  EES371  EES390  EES381
      EES382  EES398
      2.2.1.2 Communications Theory
      EES351
      2.2.1.3 Signal Processing
      EES372
      2.2.1.4 Communication Devices and Transmission Lines
      EES450  EES454
      2.2.1.5 Communication systems and Networks
      EES451  EES452  EES455  EES457
      Option II: Power Engineering
      2.2.1.1 Basic Electrical Engineering
      EES210  EES212  EES216  EES221
      EES281  EES298  EES315  EES330
      EES331  EES332  EES351  EES370
      EES371  EES382  EES398
      2.2.1.2 Measurement, Instrument and Control System
      EES211  EES380  EES381
      2.2.1.3 Energy Conversion and Transportation
      EES340  EES341  EES445  EES446
      2.2.1.4 Electrical System, High Voltage Engineering, and Installation Standard
      EES442  EES444  EES445  EES448
      2.2.2 Elective Engineering Courses 12 Credits
      2.2.2.1 Special Study 6 Credits
      Select one of the following tracks
      • Senior Project Track
        EES300  EES496
      • Foreign Exchange Track
        EES300  EES497
      • Extended Training Track
        EES498
      2.2.2.2 Technical Elective courses 6 Credits
      Select 6 credits from the list of courses offered by Electrical Engineering Program, except basic courses.
      EESxx  EESxx

3. Free Elective Courses 6 Credits

Total Elective Courses 6 Credits

Total Credit Requirement 150 Credits

Details of the Curriculum

1. General Basic Courses 30 Credits
   1.1 Part I 21 Credits
      1.1.1 Social Sciences (2 courses) 6 Credits
      TU100  TU101
   1.1.2 Humanities (1 course) 3 Credits
      TU102
   1.1.3 Science and Mathematics (1 course) 3 Credits
      TU103
   1.1.4 Languages (3 courses) 9 Credits
      TU104  TU105  TU106
   1.2 Part II 9 Credits

2. Major Courses 114 Credits
   2.1 Basic Courses 38 Credits
      2.1.1 Basic Mathematics and Science Courses 21 Credits
      MAS116  MAS117  MAS210  SCS126
      SCS138  SCS139  SCS176  SCS183
      SCS184
      2.1.2 Basic Engineering Courses 17 Credits
      GTS302  IES303  MES211  MES300
      MES361  MES371

2.2 Specialized Courses 76 Credits
   2.2.1 Compulsory Engineering Courses 64 Credits
      Select one of the following two options:
      Option I: Communication Engineering
      2.2.1.1 Basic Electrical Engineering
      EES210  EES211  EES212  EES216
      EES221  EES281  EES298  EES315
      EES330  EES331  EES332  EES341
      EES370  EES371  EES390  EES381
      EES382  EES398
      2.2.1.2 Communications Theory
      EES351
      2.2.1.3 Signal Processing
      EES372
      2.2.1.4 Communication Devices and Transmission Lines
      EES450  EES454
      2.2.1.5 Communication systems and Networks
      EES451  EES452  EES455  EES457
      Option II: Power Engineering
      2.2.1.1 Basic Electrical Engineering
      EES210  EES212  EES216  EES221
      EES281  EES298  EES315  EES330
      EES331  EES332  EES351  EES370
      EES371  EES382  EES398
      2.2.1.2 Measurement, Instrument and Control System
      EES211  EES380  EES381
      2.2.1.3 Energy Conversion and Transportation
      EES340  EES341  EES445  EES446
      2.2.1.4 Electrical System, High Voltage Engineering, and Installation Standard
      EES442  EES444  EES445  EES448
      2.2.2 Elective Engineering Courses 12 Credits
      2.2.2.1 Special Study 6 Credits
      Select one of the following tracks
      • Senior Project Track
        EES300  EES496
      • Foreign Exchange Track
        EES300  EES497
      • Extended Training Track
        EES498
      2.2.2.2 Technical Elective courses 6 Credits
      Select 6 credits from the list of courses offered by Electrical Engineering Program, except basic courses.
      EESxx  EESxx

3. Free Elective Courses 6 Credits

Students may choose any free elective courses (not less than 6 credits in total) offered by SIIT or TU, including general basic courses, except:
1. General basic courses in Science and Mathematics.
2. General basic TU courses.
3. Courses with contents similar to those of other courses in the curriculum already taken by the students.

Total Credit Requirement 150 Credits
# EE Curriculum: 150 Credits

## First Year

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<tr>
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<th>Course</th>
<th>Credits</th>
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<td>Mathematics I</td>
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<td>SCS126</td>
<td>Chemistry for Engineers</td>
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<tr>
<td>SCS138</td>
<td>Applied Physics I</td>
<td>3(3-0-6)</td>
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<td>SCS176</td>
<td>Chemistry Laboratory</td>
<td>1(0-3-0)</td>
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<td>SCS183</td>
<td>Physics Laboratory I</td>
<td>1(0-3-0)</td>
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<td>TU100</td>
<td>Civic Engagement</td>
<td>3(3-0-6)</td>
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<td>TU104</td>
<td>Critical Thinking, Reading, and Writing</td>
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<td>TU103</td>
<td>Life and Sustainability</td>
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### Second Year

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<td>EES221</td>
<td>Computational Tools in EE</td>
<td>3(2-3-4)</td>
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<td>EES298</td>
<td>EE Project Design I</td>
<td>3(3-0-6)</td>
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<td>GTS202</td>
<td>English Language Structures</td>
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<td>MAS210</td>
<td>Mathematics III</td>
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<td>MES300</td>
<td>Engineering Drawing</td>
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<td>EES211</td>
<td>Electrical Measurement and Instrumentation</td>
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<td>EES212</td>
<td>Electromagnetics</td>
<td>3(3-0-6)</td>
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<td>EES281</td>
<td>Signals and Systems</td>
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<td>EES331</td>
<td>Electronic Circuits I</td>
<td>3(3-0-6)</td>
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<td>EES371</td>
<td>Digital Circuits</td>
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<td>Technical Writing</td>
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## Third Year

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<td>Electrical Circuits II</td>
<td>3(3-0-6)</td>
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<td>EES341</td>
<td>Electrical Machines</td>
<td>3(3-0-6)</td>
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<td>EES351</td>
<td>Principles of Communications</td>
<td>3(3-0-6)</td>
</tr>
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<td>EES370</td>
<td>Digital Circuit Laboratory</td>
<td>1(0-3-0)</td>
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<td>EES381</td>
<td>Feedback Control Systems</td>
<td>3(3-0-6)</td>
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<td>EES382</td>
<td>Microprocessors and Embedded System</td>
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<td>EES398</td>
<td>EE Project Design II</td>
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<tr>
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</tbody>
</table>

### Fourth Year

#### Semester I

- EESxxx | Technical Elective | 3(x-x-x) |
- IES303 | Engineering Management and Cost Analysis | 3(3-0-6) |
- MES371 | Material Science for Engineers | 3(3-0-6) |
- TU101 | Thailand, ASEAN, and the World | 3(3-0-6) |

#### Option I: Communication Engineering

- EES450 | Signal Processing and Communication Laboratory | 1(0-3-0) |
- EES454 | Communication Networks and Transmission Lines | 3(3-0-6) |
- EES457 | Broadband Communication | 3(3-0-6) |

#### Option II: Power Engineering

- EES340 | Electrical Machines Laboratory | 1(0-3-0) |
- EES442 | Power Electronics | 3(3-0-6) |
- EES445 | Renewable Energy | 3(3-0-6) |
| **Sub-Total** | | 19(x-x-x) |

## Summer

- Select either Senior Project Track, Foreign Exchange Track, or Extended Training Track.

### 1. Senior Project Track and Foreign Exchange Track

- EES300 | Electrical Engineering Training | 1(0-40-0) |
| **Sub-Total** | | 1(0-40-0) |

### 2. Extended Training Track

- XXXxxx | Free Elective | 3(x-x-x) |
| **Sub-Total** | | 6(x-x-x) |

### 3. Extended Training Track

- EES499 | Extended Electrical Engineering Training | 6(0-40-0) |
| **Sub-Total** | | 6(0-40-0) |
Engineering Management (EM)

Curriculum Outline

The Engineering Management Program is designed for qualified individuals who plan to assume a management role in a technology-based, project-oriented environment within a manufacturing, service, or government organization. It offers an interdisciplinary course of study that combines the unique capabilities of industrial engineering, management, and information technology. As a result, the program focuses on technological leadership through the integration of people and technology.

Students are prepared for leadership roles in technologically oriented businesses through courses that present both the theoretical, and the practical aspects of managing complex engineering projects. The curriculum enables students to understand and manage the complex interactions among people, technology, finance, and the socio-political environment in which organizations operate. Upon completion of the program, graduates are equipped with broad-based knowledge, and quantitative and qualitative analytical skill to succeed as managers, from project conceptualization through implementation.

In order to gain practical experiences, fourth-year students are allowed to choose among three tracks of special studies. For more details on the academic options and special studies, please contact the EM Program Coordinator.

Details of the Curriculum

1. General Basic Courses  30 Credits
   1.1 Part I  21 Credits
      1.1.1 Social Sciences (2 courses)  6 Credits
         TU100  TU101
      1.1.2 Humanities (1 course)  3 Credits
         TU102
      1.1.3 Science and Mathematics (1 course)  3 Credits
         TU103
      1.1.4 Languages (3 courses)  9 Credits
         TU104  TU105  TU106
   1.2 Part II  9 Credits
      GTS133  GTS202  ITS100

2. Core Courses  114 Credits
   2.1 Compulsory Courses  108 Credits
      2.1.1 Science and Mathematics (6 courses)  18 Credits
         GTS111  GTS112  GTS121  GTS122
         GTS212  GTS213
      2.1.2 Fundamental of Engineering and Technology (7 courses)  20 Credits
         GTS303  MTS214  MTS252  MTS254
         MTS256  MTS257  MTS258
      2.1.3 Information Technology (4 courses)  12 Credits
         MTS280  MTS381  MTS382  MTS487
      2.1.4 General Management (6 courses)  18 Credits
         MTS213  MTS312  MTS313  MTS314
         MTS315  MTS412
      2.1.5 Engineering Management (14 courses)  40 Credits
         MTS331  MTS332  MTS333  MTS351
         MTS352  MTS394  MTS403  MTS431
         MTS451  MTS481
   2.2 Special Study  6 Credits
      1) Senior Project Track (2 courses)  6 Credits
         MTS309  MTS404
      2) Foreign Exchange Track (3 courses)  12 Credits
         MTS309  MTS493  MTS496
      3) Extended Training Track (1 course)  6 Credits
         MTS304

3. Free Elective Courses  6 Credits

Total  150 Credits

Structure and Components

1. General Basic Courses  30 Credits
   1.1 Part I  21 Credits
      1.1.1 Social Sciences  6 Credits
      1.1.2 Humanities  3 Credits
      1.1.3 Science and Mathematics  3 Credits
      1.1.4 Languages  9 Credits
   1.2 Part II  9 Credits

2. Core Courses  114 Credits
   2.1 Compulsory Courses  108 Credits
      2.1.1 Science and Mathematics  18 Credits
      2.1.2 Fundamental of Engineering and Technology  20 Credits
      2.1.3 Information Technology  12 Credits
      2.1.4 General Management  18 Credits
      2.1.5 Engineering Management  40 Credits
   2.2 Special Study  6 Credits

3. Free Elective Courses  6 Credits

Total Credit Requirement  150 Credits

Students may choose any free elective courses (not less than 6 credits in total) offered by SIIT or TU, including general basic courses, except:  
1. General basic courses in Science and Mathematics.
2. General basic TU courses.
3. Courses with contents similar to those of other courses in the curriculum already taken by the students.

Total Credit Requirement  150 Credits
## EM Curriculum : 150 Credits

### First Year

#### Semester I

<table>
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<tr>
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<th>Course Title</th>
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<tr>
<td>GTS122</td>
<td>General Science II</td>
<td>3(3-0-6)</td>
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<tr>
<td>GTS133</td>
<td>Environmental Studies</td>
<td>3(3-0-6)</td>
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<tr>
<td>ITS100</td>
<td>Introduction to Computers and Programming</td>
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<td>MTS213</td>
<td>Principles of Business and Management</td>
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<td>Statistical Methods for Managers</td>
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<td>Communications in Business</td>
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### Fourth Year

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<td>MTS333</td>
<td>Production and Inventory Management</td>
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<td>MTS403</td>
<td>Management Technology Seminar</td>
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<td>Special Study in Engineering Management III</td>
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#### 3) Extended Training Track

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### Summer

- Select Senior Project Track, Foreign Exchange Track, or Extended Training Track.
- **1. Senior Project Track and Foreign Exchange Track**
  - MTS309 Engineering Management Training 1(0-40-0)
  - **Sub-Total** 1(0-40-0)

- **2. Extended Training Track**
  - XXXxx Free Elective 3(x-x-x)
  - **Sub-Total** 3(x-x-x)

### Notes

- Tuition ranges from 3(3-0-6) to 6(0-40-0).
## Industrial Engineering and Logistics Systems (IE)

### Curriculum Outline

Modern industrial engineering is a combination of basic engineering knowledge and quantitative analysis techniques to support managerial decision making. It is concerned with the efficiency in which work is performed by machines and people. Industrial engineers (IEs) use the information and techniques from physical, biological, mathematical, behavioral, and engineering sciences to plan, control, design, and manage complex manufacturing and business systems. Specifically, they utilize knowledge and principles in manufacturing systems and processes, operations research, ergonomics, and management in specifying, predicting, and evaluating the performance measures of such systems.

The study of industrial engineering and logistics systems places emphasis upon developing a student’s abilities to analyze and design systems that integrate technical, economic, and social behavior factors in manufacturing, service, social, and government organizations. This study leads to a variety of professional opportunities in the manufacturing and logistics industry, health care services, research and development, financial centers, public service enterprises, and business corporations.

In order to accomplish these objectives, the Industrial Engineering and Logistics Systems Program offers a curriculum that is specifically designed, not only to distinguish itself from the curricula offered at other Thai universities, but is also at a standard comparable to those offered at renowned international universities. The IE curriculum offers courses that cover four major industrial engineering areas, namely, operations research/quantitative analysis, management, logistics, and manufacturing systems. The offering of courses is carefully arranged so that the basic and fundamental courses are taught in the early years to build adequate technical background. Then, applications are discussed in depth in courses presented in the later years. IE students can choose their preferred area of concentration, either “industrial engineering” or “manufacturing engineering,” in their third year. The industrial engineering option is suitable for students who wish to pursue a career as an engineering consultant or systems analyst for a business corporation or to continue graduate study either locally or abroad after graduation. For students who like working with industrial equipment and machines and prefer the factory environment to the business office, the manufacturing engineering option provides them with practical knowledge and experience to help them quickly adapt to the work environment.

In addition, IE students can choose among three optional tracks (Senior Project Track, Foreign Exchange Track, and Extended Training Track).

- **Senior Project Track** is for students who would like to conduct their projects under the supervision of IE faculty members.
- **Foreign Exchange Track** is designed for students who wish to participate in a student exchange program with foreign partner universities.
- **Extended Training Track** is designed for students who would like to participate in a longer training period (for the entire semester) under a co-operative training program with companies.

### Structure and Components

#### 1. General Basic Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
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<tbody>
<tr>
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<tr>
<td>TU101</td>
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<td>TU102</td>
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<td>Mathematics</td>
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#### 2. Major Courses

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<th>Course Name</th>
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<tr>
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<td>IES202</td>
<td>Technical Electives</td>
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<tr>
<td>IES300</td>
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<td>IES301</td>
<td>Operations Management</td>
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<tr>
<td>IES302</td>
<td>Quality Systems</td>
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<tr>
<td>IES303</td>
<td>Economic and Finance</td>
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<td>IES313</td>
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### Details of the Curriculum

#### 1. General Basic Courses

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#### Total Credit Requirement

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Total Credit Requirement: 150 Credits
# IE Curriculum : 150 Credits

## First Year

### Semester I
- **MAS116** Mathematics I 3(3-0-6)
- **SCS126** Chemistry for Engineers 3(3-0-6)
- **SCS138** Applied Physics I 3(3-0-6)
- **SCS176** Chemistry Laboratory 1(0-3-0)
- **SCS183** Physics Laboratory I 1(0-3-0)
- **TU100** Civic Education 3(3-0-6)
- **TU103** Life and Sustainability 3(3-0-6)
- **TU104** Critical Thinking Reading and Writing 3(3-0-6)

Sub-Total 20(18-6-36)

### Semester II
- **GTS133** Environmental Studies 3(3-0-6)
- **ITS100** Introduction to Computers and Programming 3(2-3-4)
- **MAS117** Mathematics II 3(3-0-6)
- **SCS139** Applied Physics II 3(3-0-6)
- **SCS184** Physics Laboratory II 1(0-3-0)
- **TU105** Communication Skills in English 3(3-0-6)
- **TU106** Creativity and Communication 3(3-0-6)

Sub-Total 19(17-6-34)

## Second Year

### Semester I
- **EES203** Basic Electrical Engineering 3(3-0-6)
- **IES201** Industrial Engineering Mathematics 3(3-0-6)
- **IES301** Manufacturing Tools and Operations 3(2-3-4)
- **MAS210** Mathematics III 3(3-0-6)
- **MES231** Engineering Mechanics 3(3-0-6)
- **MES300** Engineering Drawing 3(3-0-6)
- **MES341** Fluids Dynamics 3(3-0-6)

Sub-Total 21(19-6-38)

### Semester II
- **GTS202** English Language Structures 3(3-0-6)
- **IES302** Engineering Statistics 3(3-0-6)
- **IES341** Engineering Economy 3(3-0-6)
- **MES302** Introduction to Computer Aided Design 2(1-3-2)
- **MES311** Thermodynamics 3(3-0-6)
- **MES371** Material Science for Engineers 3(3-0-6)

Sub-Total 21(19-6-38)

## Third Year

### Semester I
- **GTS302** Technical Writing 2(2-1-3)
- **IES312** Methods Analysis and Work Measurement Laboratory 3(3-0-6)
- **IES315** Methods Analysis and Work Measurement Laboratory 1(0-3-0)
- **IES321** Operations Research I 3(3-0-6)
- **IES331** Quality Control 3(3-0-6)
- **IES361** Manufacturing Process Design 3(3-0-6)
- **IES391** Applied Statistical Methods 3(3-0-6)
- **TU102** Social Life Skills 3(3-0-6)

Sub-Total 21(20-4-39)

### Semester II
- **IES313** Industrial Plant Design 3(3-0-6)
- **IES323** Production Planning and Control 3(3-0-6)
- **IES362** Manufacturing Engineering Lab. I 1(0-3-0)
- **IES376** Logistics and Supply Chain Management 3(3-0-6)
- **MES390** Basic Mechanical Engineering Laboratory 1(0-3-0)
- **TU101** Thailand, ASEAN, and the World 3(3-0-6)

## Fourth Year

### Semester I
- **IES304** Industrial Engineering Training 1(0-40-0)

Sub-Total 1(0-40-0)

### Option I: Industrial Engineering
- **IES392** Systems Simulation 3(3-0-6)

Sub-Total 3(3-0-6)

### Option II: Manufacturing Engineering
- **IES308** Basic Electromechanical Energy Conversion 3(3-0-6)

Sub-Total 3(3-0-6)

### Summer
- Select either Senior Project Track, Foreign Exchange Track, or Extended Training Track.

1. **Senior Project Track and Foreign Exchange Track**
   - **IES304** Industrial Engineering Training 1(0-40-0)

Sub-Total 1(0-40-0)

2. **Extended Training Track**
   - XXXxxx Free Elective 3(x-x-x)
   - XXXxxx Free Elective 3(x-x-x)

Sub-Total 6(x-x-x)

### Option I: Industrial Engineering
- **IES342** Industrial Cost Analysis and Control 3(3-0-6)

Sub-Total 3(3-0-6)

### Option II: Manufacturing Engineering
- **IES307** Basic Electromechanical Energy Conversion Laboratory 1(0-3-0)

Sub-Total 16(15-3-30)

### Semester II
- **IES401** Industrial Engineering Project II 5(0-15-0)

Sub-Total 11(x-x-x)

## Fourth Year

### Semester I
- **IES402** Special Studies in IE I 3(3-0-6)
- **IES405** Special Studies in IE III 2(2-0-4)

Sub-Total 11(x-x-x)

### Foreign Exchange Track
- **IES402** Special Studies in IE I 3(3-0-6)
- **IES405** Special Studies in IE III 2(2-0-4)

Sub-Total 11(x-x-x)

### Extended Training Track
- **IES404** Extended Industrial Training 6(0-40-0)

Sub-Total 6(0-40-0)
# Information Technology (IT)

## Curriculum Outline

The Information Technology curriculum is designed to prepare students for rapidly changing technology. Students are exposed to a wide range of subjects covering all aspects of information technology and its applications. Emphasis is put on the convergence of computer and telecommunications technologies, and their applications to management science.

The compulsory core courses are designed to help students to:

1. Understand fundamental concepts of electronics and information technology that lead to high performance digital processing.
2. Know the essence of techniques that are needed for the development of information technology applications for telecommunication, industry and business, and
3. Gain confidence for management of information technology in the current business world.

After gaining enough background through the compulsory core courses, the students are allowed to tailor their courses according to their personal interest. Twelve credits of compulsory elective courses, which are required for graduation, can be selected from one of these:

1. Information Technology Management
2. Advanced Applications in Information Technology
3. Information Technology

## Structure and Components

### 1. General Basic Courses 30 Credits

1.1 Part I 21 Credits
   - 1.1.1 Social Sciences (2 courses) 6 Credits
   - 1.1.2 Humanities 3 Credits
   - 1.1.3 Science and Mathematics or Computing 3 Credits
   - 1.1.4 Languages 9 Credits
   - 1.2 Part II 9 Credits

### 2. Core Courses 114 Credits

2.1 Compulsory Courses 93 Credits
   - 2.1.1 Science and Mathematics (6 courses) 18 Credits
     - GTS116
     - GTS117
     - GTS121
     - GTS122
     - GTS210
     - CSS322
   - 2.1.2 Non-IT Courses (11 courses) 34 Credits
     - CSS221
     - CSS222
     - CSS225
     - CSS324
     - CSS325
     - EES370
     - EES371
     - GTS231
     - GTS302
     - IES302
     - MTS252
     - MTS258
   - 2.1.3 IT Courses (17 courses) 41 Credits
     - ITS102
     - ITS103
     - ITS201
     - ITS221
     - ITS227
     - ITS229
     - ITS323
     - ITS327
     - ITS329
     - ITS335
     - ITS341
     - ITS342
     - ITS344
     - ITS352
     - ITS353
     - ITS400

2.2 Compulsory Elective Courses 18 Credits

2.2.1 Track-related courses: 6 Credits
   - Select one of the following 3 tracks:
     1) For students who wish to join the Senior Project Track
        - ITS300
        - ITS403
     2) For students who wish to join the Foreign Exchange Track
        - ITS300
        - ITS495
        - ITS497
     3) For students who wish to join the Extended Training Track
        - ITS499

2.2.2 Specialized courses: 12 Credits

- Select one of the following 3 options:
  1) Option I: Information Technology Management (4 courses)
     - ITS423
     - ITS425
     - ITS443
     - ITS442
  2) Option II: Advanced Applications in Information Technology (4 courses)
     - ITS432
     - ITS433
     - ITS434
     - ITSx
  3) Option III: Information Technology
     - Select 4 credits (12 credits) from the following courses:
       - ITS423
       - ITS425
       - ITS442
       - ITS443
       - ITS42
       - ITS433
       - ITS434
       - ITSx

### 2.3 Technical Elective Courses 3 Credits

- Select 3 credits from the list of courses offered by SIIT, except basic courses.

### 3. Free Elective Courses 6 Credits

- Students may choose any free elective courses (not less than 6 credits in total) offered by SIIT or TU, including general basic courses, except:
  1. General basic courses in Science and Mathematics.
  2. General basic TU courses.
  3. Courses with contents similar to those of other courses in the curriculum already taken by the students.

Total Credit Requirement 150 Credits

---

## Details of the Curriculum

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<thead>
<tr>
<th>1. General Basic Courses</th>
<th>30 Credits</th>
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<tbody>
<tr>
<td>1.1 Part I</td>
<td>21 Credits</td>
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<tr>
<td>1.1.1 Social Sciences</td>
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<td>1.2 Part II</td>
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<thead>
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<tr>
<td>2.1 Compulsory Courses</td>
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<tr>
<td>2.1.1 Science and Math.</td>
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<td>2.1.2 Non-IT Courses</td>
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<thead>
<tr>
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</tr>
<tr>
<td>2.2.2 Specialized</td>
<td>12 Credits</td>
</tr>
</tbody>
</table>

| 2.3 Technical Elective| 3 Credits |

| 3. Free Elective       | 6 Credits |

Total Credit Requirement 150 Credits
### IT Curriculum : 150 Credits

#### First Year

**Semester I**
- TU102 Social Life Skills 3(3-0-6)
- TU104 Critical Thinking, Reading, and Writing 3(3-0-6)
- GTS116 Mathematics for Technologist I 3(3-0-6)
- GTS121 General Science I 3(3-0-6)
- GTS133 Environmental Studies 3(3-0-6)
- ITS100 Introduction to Computers and Programming 3(2-3-4)
- MTS252 Materials Science 3(3-0-6)

*Sub-Total 21(20-3-40)*

**Semester II**
- TU100 Civic Engagement 3(3-0-6)
- TU103 Life and Sustainability 3(3-0-6)
- TU105 Communication Skills in English 3(3-0-6)
- TU106 Creativity and Communication 3(3-0-6)
- GTS117 Mathematics for Technologist II 3(3-0-6)
- GTS122 General Science II 3(3-0-6)
- ITS102 Object-oriented Programming 3(3-0-6)
- ITS103 Object-oriented Programming Laboratory 1(0-3-0)

*Sub-Total 22(21-3-42)*

#### Second Year

**Semester I**
- CSS224 Computer Architectures 3(3-0-6)
- EE5371 Digital Circuits 3(3-0-6)
- GTS210 Mathematics for Technologist III 3(3-0-6)
- GTS231 Law and Technology 3(3-0-6)
- ITS201 Discrete Mathematics 3(3-0-6)
- ITS221 Data Structures and Algorithms 3(3-0-6)
- ITS231 Data Structures and Algorithms Laboratory 1(0-3-0)

*Sub-Total 19(18-3-36)*

**Semester II**
- CSS221 Computer Graphics and Applications 3(2-3-4)
- CSS225 Operating System 3(3-0-6)
- EE5370 Digital Circuit Laboratory 1(0-3-0)
- GTS202 English Language Structures 3(3-0-6)
- IT5302 Engineering Statistics 3(3-0-6)
- ITS227 Algorithm Design 3(3-0-6)
- ITS229 Human Computer Interface Design 3(3-0-6)

*Sub-Total 19(17-6-34)*

#### Third Year

**Semester I**
- CSS322 Scientific Computing 3(3-0-6)
- CSS325 Database Systems 3(3-0-6)
- CSS326 Database Programming Laboratory 1(0-3-0)
- ITS323 Introduction to Data Communications 3(3-0-6)
- ITS341 Management Information Systems 3(3-0-6)
- ITS342 Computer Animation 3(2-3-4)
- ITS344 Web and Business Application Development 3(3-0-6)

*Sub-Total 19(17-6-34)*

**Semester II**
- GTS302 Technical Writing 2(2-1-3)
- CSS324 Artificial Intelligence 3(3-0-6)
- ITS327 Computer Network Architectures and Protocols 3(3-0-6)
- ITS329 System Analysis and Design 3(3-0-6)
- ITS335 IT Security 3(3-0-6)
- ITS352 Networking Laboratory 1(0-3-0)
- ITS353 Graphic and Game Programming Laboratory 1(0-3-0)

#### Option I: Information Technology Management
- ITS423 Data Warehouses and Data Mining 3(3-0-6)
- ITS425 Business Innovation 3(3-0-6)

*Sub-Total 22(20-7-39)*

#### Option II: Advanced Applications in Information Technology
- ITS432 Mobile Application Programming 3(3-0-6)
- ITS433 Location-based Services and Digital Mapping 3(3-0-6)

*Sub-Total 22(20-7-39)*

#### Option III: Information Technology
- ITSxxx Compulsory Elective 3(x-x-x)

*Sub-Total 6(x-x-x)*

#### Fourth Year

**Semester I**
- MTS258 Economics for Technologists 3(3-0-6)
- ITS400 Project Development 1(0-3-0)
- TU101 Thailand, ASEAN, and the World 3(3-0-6)
- XX5xxx Technical Elective 3(x-x-x)

*Sub-Total 16(x-x-x)*

**Semester II**
- IT542 Entrepreneurship for IT Business Development 3(3-0-6)
- IT543 Business Process Model and Management 3(3-0-6)

*Sub-Total 16(x-x-x)*

#### Option I: Information Technology Management
- ITS442 Entrepreneurship for IT Business Development 3(3-0-6)
- ITS443 Business Process Model and Management 3(3-0-6)

*Sub-Total 16(x-x-x)*

#### Option II: Advanced Applications in Information Technology
- IT544 Web services and Service Architecture 3(3-0-6)
- IT5xx Compulsory Elective 3(x-x-x)

*(Select 3 credits from the list of IT courses offered by SIIT, except basic courses)*

*Sub-Total 16(x-x-x)*

#### Option III: Information Technology
- IT5xx Compulsory Elective 3(x-x-x)

*(Select 3 credits from the list of IT courses offered by SIIT, except basic courses)*

*Sub-Total 16(x-x-x)*

#### Semester II

1) **Senior Project Track**
- ITS403 Information Technology Project 5(0-15-0)
- XXXxxx Free Elective 3(x-x-x)
- XXXxxx Free Elective 3(x-x-x)

*Sub-Total 11(x-x-x)*

2) **Foreign Exchange Track**
- ITS495 Special Studies in Information Technology I 3(3-0-6)
- ITS497 Special Studies in Information Technology III 3(2-0-4)
- XXXxxx Free Elective 3(x-x-x)
- XXXxxx Free Elective 3(x-x-x)

*Sub-Total 11(x-x-x)*

3) **Extended Training Track**
- ITS499 Extended Information Technology Training 6(0-40-0)

*Sub-Total 6(0-40-0)*

**Summer**
- Select either Senior Project Track, Foreign Exchange Track, or Extended Training Track.

1. **Senior Project Track** and **Foreign Exchange Track**
- XXXxxx Free Elective 3(x-x-x)
- XXXxxx Free Elective 3(x-x-x)

*Sub-Total 6(x-x-x)*

2. **Extended Training Track**
- XXXxxx Free Elective 3(x-x-x)

*Sub-Total 6(x-x-x)*
Management Technology (MT)

Curriculum Outline

The Management Technology (MT) Program covers general basic courses and three common foundations required for management technology, namely, fundamentals of technology, information technology, and general management. After completing the second year of study, students choose to be specialized in one of the academic options offered by the MT Program. (The list of academic options to be offered to students is left to the discretion of SIIT.)

Examples of academic options are as follows:

Option 1: Business Analytics/Management Information Systems (MIS)
Option 2: Supply Chain Management (SCM)

After completing their third year of study, students choose a study track based on their capability. These study tracks include: (1) Senior Project Track, (2) Foreign Exchange Track, and (3) Extended Management Training Track. For more details on the academic options and study tracks, consult the MT Program Coordinator.

Structure and Components

1. General Basic Courses  30 Credits
   1. Part I  21 Credits
      1.1 Social Sciences (2 courses)  6 Credits
         TU100  TU101
      1.2 Humanities (1 course)  3 Credits
         TU102
      1.3 Science and Mathematics (1 course)  3 Credits
         TU103
      1.4 Languages (3 courses)  9 Credits
         TU104  TU105  TU106
   1.2 Part II (3 courses)  9 Credits
      GTS133  GTS202  ITS100

2. Core Courses  114 Credits
   2.1 Compulsory Courses  77 Credits
      2.1.1 Science and Mathematics (6 courses)  18 Credits
         GTS111  GTS112  GTS121
         GTS122  GTS212  GTS213
      2.1.2 Fundamental of Technology (6 courses)  17 Credits
         GTS303  MTS231  MTS235
         MTS254  MTS370  MTS394
      2.1.3 Information Technology (5 courses)  15 Credits
         MTS280  MTS381  MTS382
         MTS383  MTS487
      2.1.4 General Management (9 courses)  27 Credits
         MTS213  MTS214  MTS258
         MTS312  MTS313  MTS314
         MTS315  MTS412  MTS415
   2.2 Compulsory Elective Courses  37 Credits
      2.2.1 Special Study  6 Credits
         1) Senior Project Track (2 courses)
            MTS301  MTS404
         2) Foreign Exchange Track (3 courses)
            MTS301  MTS491  MTS495
         3) Extended Training Track (1 course)
            MTS302
   2.2.2 Option Courses  31 Credits
      1) Option I: Business Analytics/Management Information Systems (11 courses)
         MTS386  MTS387  MTS388  MTS389
         MTS403  MTS455  MTS483  MTS484
         MTS488  MTSxxx  MTSxxx
         (Select 6 credits from the list of MT Technical Elective course)
      2) Option II: Supply Chain Management (11 courses)
         MTS232  MTS233  MTS331  MTS335
         MTS337  MTS339  MTS340  MTS351
         MTS403  MTS481  MTSxxx  MTSxxx
         (Select 3 credits from the list of MT Technical Elective course)
      3) MT Technical Elective courses
         MTS316  MTS317  MTS318  MTS319
         MTS320  MTS338  MTS339  MTS342
         MTS343  MTS371  MTS395  MTS396
         MTS397  MTS451  MTS455  MTS486
         MTS489

3. Free Elective Courses  6 Credits
   Students may choose any free elective courses (not less than 6 credits in total) offered by SIIT or TU, including general basic courses, except:
   1. General basic courses in Science and Mathematics.
   2. General basic TU courses.
   3. Courses with contents similar to those of other courses in the curriculum already taken by the students.

Total Credit Requirement  150 Credits
### MT Curriculum: 150 Credits

#### First Year

<table>
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<th>Course Code</th>
<th>Course Title</th>
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<td>ITS100</td>
<td>Introduction to Computers and Programming</td>
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<td>TU102</td>
<td>Social Life Skills</td>
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<td>TU104</td>
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#### Second Year

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<td>GTS212</td>
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<td>MTS231</td>
<td>Statistical Methods for Managers</td>
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<td>MTS254</td>
<td>Introduction to Management Science</td>
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<td>MTS258</td>
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#### Third Year

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<td>MTS381</td>
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<td><strong>Option I: Business Analytics/Management Information Systems (MIS)</strong></td>
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#### Fourth Year

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### Summer

- Senior Project Track and Foreign Exchange Track
- Extended Training Track

#### Fourth Year

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<th>Course Title</th>
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<td>MTS339</td>
<td>Strategic Sourcing and Supply Management</td>
<td>3(3-0-6)</td>
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<td></td>
<td>MTS340</td>
<td>Introduction to Inventory Management</td>
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<td><strong>Sub-Total</strong></td>
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#### Option II: Supply Chain Management (SCM)

- MTS491 Special Study in Management Technology I 3(3-0-6)
- MTS495 Special Study in Management Technology III 2(2-0-4)
- **Sub-Total** 8(x-x-x)

### Additional Tracks

- 1. Senior Project Track and Foreign Exchange Track
- 2. Extended Training Track
- 3. Extended Training Track
Mechanical Engineering (ME)

Curriculum Outline

Mechanical engineering is concerned with the mechanisms of energy conversion and their utilization in all fields of industry, as well as in improving the quality of life for everyone. The mechanical engineering discipline has always been central to engineering. Mechanical engineers are involved in a wide range of technological activities which include: production, building-facilities, chemical processing, power generation, material science, mining and mineral extraction, transportation, aerospace engineering, and so on. For these reasons, all industries require the services of mechanical engineers.

The aim of the Mechanical Engineering Program at SIIT is to provide an effective education to prospective engineers, giving them the ability to plan, administer, and manage the latest technologies. Two main areas of study are emphasized in this program; these are: (1) general mechanical engineering, and (2) energy management.

Engineering science is taught mainly in the first and second years. Specialized mechanical engineering courses are offered to the third and fourth year students. Additionally, fundamentals of electrical engineering and industrial practice are included in the undergraduate program in mechanical engineering.

In order to serve industry competently, students have to be exposed to real equipment and processes. Two laboratory courses are required. An extended laboratory course is offered as an elective subject to senior projects, and guided by members of the teaching staff. As engineering students should obtain some experience of industry in order to learn the ways of industrial life and work, an industrial training course is offered for mechanical engineering students.

In addition, ME students can choose among three optional tracks (Senior Project Track, Foreign Exchange Track, and Extended Training Track).

- **Senior Project Track** is designed for ME students who wish to conduct a project under the supervision of ME faculty members.
- **Foreign Exchange Track** is designed for students who wish to participate in a student exchange program with foreign partner universities.
- **Extended Training Track** is designed for students who wish to conduct a co-operative training program in industry.

Structure and Components

1. **General Basic Courses** 30 Credits
   1.1 Part I 21 Credits
      1.1.1 Social Sciences (2 courses) 6 Credits
      1.1.2 Humanities 3 Credits
      1.1.3 Science and Mathematics 3 Credits
      1.1.4 Languages 9 Credits
   1.2 Part II 9 Credits

2. **Major Courses** 113 Credits
   2.1 Basic Courses 40 Credits
   2.2 Specialized Courses 73 Credits

3. **Free Elective Courses** 6 Credits

Total Credit Requirement 149 Credits

Details of the Curriculum

1. **General Basic Courses** 30 Credits
   1.1 Part I
      1.1.1 Social Sciences (2 courses) 6 Credits
      TU100 TU101
      1.1.2 Humanities (1 course) 3 Credits
      TU102
      1.1.3 Science and Mathematics (1 course) 3 Credits
      TU103
      1.1.4 Languages (3 courses) 9 Credits
      TU104 TU105 TU106
   1.2 Part II 9 Credits
      GTS133 GTS202 ITS100

2. **Major Courses** 113 Credits
   2.1 Basic Courses 40 Credits
      2.1.1 Basic Mathematics and Science Courses (10 courses) 24 Credits
      MAS116 MAS117 MAS210 MAS215
      SCS126 SCS138 SCS139 SCS176
      SCS183 SCS184
      2.1.2 Basic Engineering Courses (7 courses) 16 Credits
      EES203 EES204 EES306 EES307
      GTS302 IES301 IES361
   2.2 Specialized Courses 73 Credits
      2.2.1 Compulsory Engineering Courses 55 Credits
      2.2.1.1 Mechanical Design (11 courses) 28 Credits
      MES300 MES302 MES331 MES333
      MES350 MES352 MES371 MES391
      MES392 MES403 MES462
      2.2.1.2 Thermal Science and Fluid Mechanics (7 courses) 21 Credits
      MES311 MES321 MES341 MES342
      MES383 MES422 MES484
      2.2.1.3 Dynamic Systems and Control (2 courses) 6 Credits
      MES351 MES382
      2.2.2 Elective Engineering Courses 18 Credits
      2.2.2.1 Students choose one of three optional tracks:
         1. For Students who wish to join the Senior Project Track (2 courses) 12 Credits
            MES303 MES407
         2. For Students who wish to join the Foreign Exchange Track (3 courses) 6 Credits
            MES303 MES405 MES409
         3. For Students who wish to join the Extended Training Track (1 course) 12 Credits
            MES408
      2.2.2.2 Students choose one of two optional studies:
         2.2.2.2.1 Option I: General Mechanical Engineering (4 courses) 6 Credits
            IES341 IES371 MES313 MES381
         2.2.2.2.2 Option II: Energy Management (4 courses) 6 Credits
            MES312 MES444 MES473 MES474
   3. **Free Elective Courses** 6 Credits
      Students may choose any free elective courses (not less than 6 credits in total) offered by SIIT or TU, including general basic courses, except:
      1. General basic courses in Science and Mathematics.
      2. General basic TU courses.
      3. Courses with contents similar to those of other courses in the curriculum already taken by the students.

Total Credit Requirement 149 Credits
# ME Curriculum: 149 Credits

## First Year

### Semester I
- **MAS116** Mathematics I 3(3-0-6)
- **SCS126** Chemistry for Engineers 3(3-0-6)
- **SCS138** Applied Physics I 3(3-0-6)
- **SCS176** Chemistry Laboratory 1(0-3-0)
- **SCS183** Physics Laboratory I 1(0-3-0)
- **TU100** Civic Education 3(3-0-6)
- **TU103** Life and Sustainability 3(3-0-6)
- **TU104** Critical Thinking, Reading, and Writing 3(3-0-6)

**Sub-Total** 20(18-6-36)

### Semester II
- **GTS133** Environmental Studies 3(3-0-6)
- **ITS100** Introduction to Computers and Programming 3(2-3-4)
- **MAS117** Mathematics II 3(3-0-6)
- **SCS139** Applied Physics II 3(3-0-6)
- **SCS184** Physics Laboratory II 1(0-3-0)
- **TU105** Communication Skills in English 3(3-0-6)
- **TU106** Creativity and Communication 3(3-0-6)

**Sub-Total** 19(17-6-34)

## Second Year

### Semester I
- **EES203** Basic Electrical Engineering 3(3-0-6)
- **IES301** Manufacturing Tools and Operations 3(2-3-4)
- **MAS210** Mathematics III 3(3-0-6)
- **MAS215** Differential Equations 3(3-0-6)
- **MES300** Engineering Drawing 3(2-3-4)
- **MES311** Thermodynamics 3(3-0-6)
- **MES350** Engineering Statics 3(3-0-6)

**Sub-Total** 21(19-3-38)

### Semester II
- **EES204** Basic Electrical Engineering Laboratory 1(0-3-0)
- **EES306** Basic Electrical Machines and Power System 3(3-0-6)
- **GTS202** English Language Structures 3(3-0-6)
- **MES302** Introduction to Computer Aided Design 2(1-3-2)
- **MES331** Solid Mechanics I 3(3-0-6)
- **MES341** Fluid Dynamics 3(3-0-6)
- **MES351** Engineering Dynamics 3(3-0-6)
- **TU102** Social Life Skills 3(3-0-6)

**Sub-Total** 21(19-6-38)

## Third Year

### Semester I
- **EES307** Basic Electromechanical Energy Conversion Laboratory 1(0-3-0)
- **GTS302** Technical Writing 2(2-1-3)
- **MES342** Refrigeration and Air Conditioning 3(3-0-6)
- **MES352** Mechanics of Machinery 3(3-0-6)
- **MES371** Material Science for Engineers 3(3-0-6)
- **MES391** Mechanical Engineering Laboratory I 2(1-2-3)

**Option I: General Mechanical Engineering**
- **IES341** Engineering Economy 3(3-0-6)
- **MES381** Measurement and Instrumentation 3(3-0-6)

**Sub-Total** 20(18-7-35)

**Option II: Energy Management**
- **MES444** Alternative and Renewable Energy Resources 3(3-0-6)
- **MES474** Thermal Energy Management 3(3-0-6)

**Sub-Total** 20(18-7-35)

### Semester II
- **IES361** Manufacturing Process Design 3(3-0-6)
- **MES321** Heat Transfer 3(3-0-6)
- **MES333** Design of Machine Elements 3(3-0-6)
- **MES382** Vibration and Noise Control 3(3-0-6)
- **MES383** Hydraulic and Pneumatic Control 3(3-0-6)
- **MES392** Mechanical Engineering Laboratory II 2(1-3-2)

**Option I: General Mechanical Engineering**
- **MES313** Internal Combustion Engines 3(3-0-6)

**Sub-Total** 20(19-3-38)

**Option II: Energy Management**
- **MES312** Combustion and Emission Control 3(3-0-6)

**Sub-Total** 20(19-3-38)

## Summer
- Select either Senior Project Track, Foreign Exchange Track, or Extended Training Track.

1. **Senior Project Track and Foreign Exchange Track**
   - **MES303** Mechanical Engineering Training 1(0-40-0)

**Sub-Total** 1(0-40-0)

2. **Extended Training Track**
   - XXXxxx Free Elective 3(x-x-x)
   - XXXxxx Free Elective 3(x-x-x)

**Sub-Total** 6(x-x-x)

## Fourth Year

### Semester I
- **MES403** Mechanical Engineering Project I 1(0-2-1)
- **MES422** Thermal System Design 3(3-0-6)
- **MES462** Turbomachinery 3(3-0-6)
- **TU101** Thailand, ASEAN, and the World 3(3-0-6)

**Option I: General Mechanical Engineering**
- **IES371** Engineering Management 3(3-0-6)

**Sub-Total** 16(15-2-31)

**Option II: Energy Management**
- **MES473** Energy Economics 3(3-0-6)

**Sub-Total** 16(15-2-31)

### Semester II
1) **Senior Project Track**
   - **MES407** Mechanical Engineering Project II 5(0-15-0)
   - XXXxxx Free Elective 3(x-x-x)
   - XXXxxx Free Elective 3(x-x-x)

**Sub-Total** 11(x-x-x)

2) **Foreign Exchange Track**
   - **MES405** Special Study in Mechanical Engineering I 3(3-0-6)
   - **MES409** Special Study in Mechanical Engineering III 2(2-0-4)
   - XXXxxx Free Elective 3(x-x-x)
   - XXXxxx Free Elective 3(x-x-x)

**Sub-Total** 11(x-x-x)

3) **Extended Training Track**
   - **MES408** Extended Mechanical Engineering Training 6(0-40-0)

**Sub-Total** 6(0-40-0)
Course Descriptions

**Numerical Code**

For the engineering and technology courses, the following numerical codes are used:

- The first digit indicates the level of difficulty.
- The second digit indicates the course groups.

For common courses, the above codes do not apply.

The numbers after each course (e.g., 3(3-0-6)) represent the credits, lecture hours, laboratory/practice hours, and self-study hours, respectively.

**Prerequisite / Corequisite Requirements**

It is the responsibility of the student to meet all prerequisite and corequisite requirements. Students may not be allowed to take a course if its prerequisites have not been satisfactorily passed. A corequisite course must be taken concurrently or must have been previously passed.

**CES201 Engineering Materials** 3(3-0-6)

Prerequisite: None
Study of relationships between structures, properties, production processes and applications of main groups of engineering materials i.e. metals, polymers, ceramics, and composites. Mechanical properties and materials degradation. Macroscopic mechanical behavior of engineering materials with emphasis on specific materials used in civil engineering, e.g. steel, soil, concrete, and wood.

**CES202 Introduction to Building Facilities** 3(3-0-6)

Prerequisite: None

**CES215 Applied Mathematics in Civil Engineering** 3(3-0-6)

Prerequisite: Have earned credits of MAS117 or consent of Head of School

**CES302 Engineering Hydrology** 3(3-0-6)

Prerequisite: None

**CES303 Civil Engineering Training** 1(0-40-0)

Prerequisite: Junior standing or consent of Head of School
Students are provided with on-the-job training at selected governmental organizations, state enterprises, or private companies. The purpose of the course is to provide the students, opportunities to experience civil engineering work, other than what learned in class. The training period must not be less than 240 hours. Student must submit a report at the end of the training period. A satisfactory (S) or unsatisfactory (U) grade will be given, based on a student’s performance, quality of the report, and supervisor’s comments.

**CES311 Theory of Structures** 3(3-0-6)

Prerequisite: Have earned credits of CES371 or consent of Head of School

**CES312 Structural Analysis** 3(3-0-6)

Prerequisite: Have earned credits of CES311 or consent of Head of School
Analysis of statically indeterminate structures by the method of consistent deformation, methods of slope and deflection, moment distribution, influence lines of indeterminate structures. Approximate analysis. Introduction to matrix structural analysis and plastic analysis.

**CES315 Computational Methods in Civil Engineering** 3(3-0-6)

Prerequisite: Have earned credits of MAS215 or CES215 or consent of Head of School

**CES321 Timber and Steel Design** 4(3-3-6)

Prerequisite: Have earned credits of CES311 or consent of Head of School

CES322 Reinforced Concrete Design 4(3-3-6)
Prerequisite: Have earned credits of CES351 or consent of Head of School

CES323 Advanced Structural Concrete Design 3(3-0-6)
Prerequisite: Have earned credits of CES322 or consent of Head of School

CES331 Soil Mechanics 3(3-0-6)
Prerequisite: Have earned credits of CES371 or consent of Head of School
Soil formation, index properties and classification of soil, compaction, permeability of soil and seepage problems, principle of effective stresses within a soil mass. Stress distribution, compressibility of soil, shear strength of soil, earth pressure theory, slope stability, and bearing capacity. Behavior of soil under mechanical stress and deformation interacting with flow of water.

CES332 Foundation Engineering 3(3-0-6)
Prerequisite: Have earned credit of CES331 or consent of Head of School
Subsurface investigation, bearing capacity of foundation, spread and pile foundation design, settlement analysis, earth pressure problems and retaining structures and sheet pile wall. Elementary soil improvement, compaction, vibro-flotation, sand drains, and chemical stabilization. Introduction to mat and caisson foundation design. Introduction to open cut and braced cut. Design practice.

CES333 Soil Mechanics Laboratory 1(0-3-0)
Corequisite: Taking CES331 in the same semester or consent of Head of School

CES334 Earthquake Engineering 3(3-0-6)
Prerequisite: None
Source mechanisms, stress waves, and site response of earthquake shaking; effect on the built environment and how to mitigate it. Soil liquefaction phenomena; nature of earthquake actions on structures; Seismic analysis of slopes and retaining walls.

CES341 Transportation Engineering and Planning 3(3-0-6)
Prerequisite: None
Characteristics and equilibrium of transportation demand and supply. Planning, design and evaluation of transportation systems, transportation models; water transportation; pipeline transportation; road transportation; railway transportation; air transportation. Economic and financial assessment of transport projects.

CES343 Highway Engineering 3(3-0-6)
Prerequisite: Have earned credits of CES361 or consent of Head of School

CES344 Logistics System Engineering 3(3-0-6)
Prerequisite: None

CES351 Concrete Technology 3(2-3-4)
Prerequisite: None
CES352 Material Testing 1(0-3-0)
Prerequisite: Have earned credits of CES351 or consent of Head of School
Tests on steel bars and steel members: tensile test, torsion test, bending test. Tests on other civil engineering materials such as polymer-based materials, grouting materials, wood, highway materials. Non-destructive tests and instruments: Rebound hammer, ultrasonic pulse velocity, half-cell potential, etc. Simulation of stress-strain relationship of concrete.

CES353 Construction Engineering and Management 3(3-0-6)
Prerequisite: None

CES354 Maintenance of Structures 3(3-0-6)
Prerequisite: Have earned credits of CES351 or consent of Head of School

CES356 Surveying 3(2-3-4)
Prerequisite: None

CES362 Field Surveying Camp 1(0-80-0)
Prerequisite: Have earned credits of CES361 or consent of Head of School
Practice of surveying planning, reconnaissance survey, topographic survey, topographic mapping, long range leveling, surveying reports and documentation. Total field surveying practice period is 80 hours.

CES370 Mechanics of Materials 3(3-0-6)
(For non-civil engineering students)
Prerequisite: Have earned credits of SCS138 or consent of Head of School

CES371 Mechanics of Solids I 3(3-0-6)
Prerequisite: Have earned credits of MES350 or consent of Head of School

CES372 Mechanics of Solids II 3(3-0-6)
Prerequisite: Have earned credits of CES371 or consent of Head of School

CES381 Hydraulics 3(3-0-6)
Prerequisite: Have earned credits of SCS138 or consent of Head of School

CES382 Hydraulics Laboratory 1(0-3-0)
Corequisite: Taking CES381 in the same semester or consent of Head of School

CES391 Special Topics in Civil Engineering I 3(3-0-6)
Prerequisite: None
New topics or areas of study not offered in other civil engineering courses. Topics may vary from semester to semester, but are different from CES392.

CES392 Special Topics in Civil Engineering II 3(3-0-6)
Prerequisite: None
New topics or areas of study not offered in other civil engineering courses. Topics may vary from semester to semester, but are different from CES391.

CES403 Seminar 1(0-3-0)
Prerequisite: Senior standing or consent of Head of School
A group seminar on one or more topics of interest in the field of civil engineering, as approved by the seminar advisor.

CES405 Special Studies in Civil Engineering I 3(3-0-6)
Prerequisite: Consent of Advisor and Head of School
An in-depth study of a topic in the field of civil engineering that is different from CES406.

**CES406 Special Studies in Civil Engineering II** 3(3-0-6)
Prerequisite: Consent of Advisor and Head of School
An in-depth study of a topic in the field of civil engineering that is different from CES405.

**CES407 Civil Engineering Project** 5(0-15-0)
Prerequisite: Have earned credits of CES403
An in-depth study on a topic of interest in the field of civil engineering, as approved by the project advisor.

**CES408 Extended Civil Engineering Training** 6(0-40-0)
Prerequisite: Senior standing or consent of Head of School
Extensive on-the-job training of at least 16 weeks (640 hours) at a selected organization that provides civil engineering services—an individual comprehensive research or practical project related to the training must be intensively conducted under close supervision of faculty members and supervisors assigned by the training organization. At the end of the training, the student must submit a report of the project and also gives a presentation.

**CES409 Special Studies in Civil Engineering III** 2(2-0-4)
Prerequisite: Consent of Advisor or Head of School
An in-depth study of a topic in the field of civil engineering that is different from CES405 and CES406.

**CES414 Finite Element Methods in Engineering** 3(3-0-6)
Prerequisite: None

**CES424 Bridge Engineering** 3(3-0-6)
Prerequisite: Have earned credits of CES322 or consent of Head of School
Planning of bridge projects. Design, analysis and construction of various types of bridges including reinforced and prestressed concrete bridges, steel bridges, composite bridges, and cable-supported bridges.

**CES426 Durability and Deteriorations of Construction Materials** 3(3-0-6)
Prerequisite: Have earned credits of CES351 or consent of Head of School

**CES444 Hydraulic Engineering** 3(3-0-6)
Prerequisite: Have earned credits of CES381 or consent of Head of School

**CES446 Port and Airport Engineering** 3(3-0-6)
Prerequisite: Have earned credits of CES341 or CES450 or consent of Head of School
Planning and design of seaports and harbors. Planning of container terminal and cargo handling systems. Airport master planning. Air traffic control. Design of airport facilities.

**CES450 Urban Engineering** 3(3-0-6)
Prerequisite: None

**CES494 Coastal Engineering** 3(3-0-6)
Prerequisite: Have earned credits of CES381 or consent of Head of School

**CHS211 Organic Chemistry** 3(3-0-6)
Prerequisite: Have earned credits of SCS126 or consent of Head of School
A study of all aspects of fundamental organic chemistry, including nomenclature, chemical and physical properties, reactions and syntheses of major classes of organic compounds.

**CHS212 Physical Chemistry** 3(3-0-6)
Prerequisite: Have earned credits of SCS126 or SCS139 or consent of Head of School
The nature of physical chemistry: gases; chemical thermodynamics; the law of chemical thermodynamics;
free energy, phase rule, chemical equilibrium; solutions of non-electrolytes and electrolytes; electrochemistry. Introduction to quantum chemistry. Simple quantum systems such as particle in a box, harmonic oscillator, hydrogen atom. Molecular Symmetry.

**CHS213 Applied Mathematics in Chemical Engineering** 3(3-0-6)
Prerequisite: Have earned credits of MAS117 or consent of Head of School


**CHS241 Material and Energy Balance** 3(3-0-6)
Prerequisite: Have earned credits of SCS126 or consent of Head of School

Introduction to chemical engineering calculation; Stoichiometry and material balance calculation, recycling, bypassing, and purging, use of chemical and phase equilibrium data, energy balance. Introduction of chemical engineering units.

**CHS242 Thermodynamics I** 3(3-0-6)
Prerequisite: None
First law of thermodynamics; second law of thermodynamics and Carnot cycle; energy; entropy; basic heat transfer and energy conversion. Concept of Entropy. Power and refrigeration cycles, equipment including gas turbine and internal combustion engines.

**CHS251 Fluid Dynamics** 3(3-0-6)
Prerequisite: Have earned credits of CHS241 or consent of Head of School

Physical properties of fluids, fluid static and applications, characteristics of fluid flow and momentum transfer including applications, and design of unit operations for solid-fluid separations.

**CHS261 Chemical Engineering Laboratory I** 1(0-3-0)
Corequisite: Taking CHS251 in the same semester or consent of Head of School

Laboratory practice and experimental studies on topics covered in fluid dynamics and heat transfer.

**CHS301 Chemical Engineering Training** 1(0-40-0)
Prerequisite: Junior standing or consent of Head of School

Students are provided with on-the-job training at selected modem industrial or service facilities. The purposes of the course are to allow the students opportunities to observe how industrial engineers function, to learn how to collaborate with co-workers, and to develop self-responsibility. The training period must not be less than 240 hours. Students must submit a report at the end of the training period. Satisfactory (S) or unsatisfactory (U) grade will be given based on student’s performance, quality of the report, and supervisor’s comments.

**CHS302 Seminar** 1(0-2-1)
Prerequisite: None

Students are required to present reports on current developments of chemical engineering technology to their classmates and faculty members. The reports may lead to the senior projects later on. The reports have to be submitted for grading.

**CHS315 Environmental Chemical Engineering** 3(3-0-6)
Prerequisite: Have earned credits of SCS126 or consent of Head of School

Impacts of environmental pollution, environmental quality standards, sources and characteristics of industrial wastes and treatment methods, hazardous wastes and disposal methods.

**CHS316 Statistics for Chemical Engineering** 3(3-0-6)
Prerequisite: Have earned credits of MAS117 or consent of Head of School

Probability theory; random variables; statistical inference; analysis of variance; regression and correlation; using statistical methods as a tool in problem solving.

**CHS317 Safety in Chemical Operations** 3(3-0-6)
Prerequisite: Have earned credits of CHS241 or consent of Head of School

Principles of safety and loss prevention control, hazard identification and handling including risk assessment, principles of safety management, legislation and safety laws.

**CHS327 Bio-Chemical Technology** 3(3-0-6)
Prerequisite: Have earned credits of SCS126 or consent of Head of School

Molecular biology of cells and biotechnology including microbiology, microbial biotechnology, enzyme catalysis, technology and bio-chemical processes and applications.

**CHS328 Pharmaceutical Industry and Technology** 3(3-0-6)
Prerequisite: Have earned credits of SCS126 or consent of Head of School

Survey of basic principles of biochemistry and molecular biology, with emphasis on broad understanding of chemical events in pharmaceutical products in terms of metabolism and structure-function relationships of biologically molecules. Introduction to the pharmaceutical production systems including separation and purification processes.
CHS331 Chemical Reaction Kinetics and Reactor Design 3(3-0-6)
Prerequisite: Have earned credits of CHS241 or consent of Head of School
Application of thermodynamic and kinetic fundamentals to the analysis and design of chemical reactors, type of reactors: single reactors single reactor and multiple reactor systems; isothermal and non-isothermal operation: homogeneous reactors and introduction to heterogeneous reactors.

CHS343 Thermodynamics II 3(3-0-6)
Prerequisite: Have earned credits of CHS242 or consent of Head of School
Thermodynamics of multi-component systems and applications for phase equilibrium and chemical reaction equilibrium.

CHS352 Heat Transfer 3(3-0-6)
Prerequisite: Have earned credits of CHS251 or consent of Head of School
Basic principles and mechanisms for heat transfer, conceptual design for heat transfer equipment.

CHS353 Mass Transfer 3(3-0-6)
Prerequisite: Have earned credits of CHS352 or consent of Head of School
Basic principles and mechanisms for mass transfer, conceptual design of mass transfer and simultaneous heat-mass transfer equipment.

CHS355 Chemical Engineering Process Design 3(3-0-6)
Prerequisite: Have earned credits of CHS241 or consent of Head of School
Problem-based course: Applications of chemical engineering fundamentals to the design of a multi-unit process. Emphasis on use of process simulators.

CHS362 Chemical Engineering Laboratory II 1(0-3-0)
Corequisite: Taking CHS352 in the same semester or consent of Head of School
Laboratory practice and experimental studies on topics covered in momentum and heat transfer.

CHS363 Chemical Engineering Laboratory III 1(0-3-0)
Corequisite: Taking CHS353 in the same semester or consent of Head of School
Laboratory practice and experimental studies on topics covered in simultaneous heat and mass transfer.

CHS364 Experimental Design and Methods for Chemical Engineering 3(3-0-6)
Prerequisite: Have earned credits of CHS316 or consent of Head of School
Scientific and technological concepts, ethics and good practice in research, searching the literature, regression, applications of statistical analyses, research design principles, factorial design, non regular design, design with complex aliasing, interpretation of analyses.

CHS371 Petroleum and Petrochemical Technology 3(3-0-6)
Prerequisite: Have earned credits of CHS211 or consent of Head of School
Introduction to petroleum and petrochemical products, natural gas and its use. Study chemical and physical properties of some important petrochemical products. Applications of chemical engineering fundamentals to the design of processes in the petrochemical industry, including refinery and production plants.

CHS374 Polymer Science and Engineering 3(3-0-6)
Prerequisite: Have earned credits of CHS211 or consent of Head of School

CHS375 Analytical and Instrumental Chemistry 3(3-0-6)
Prerequisite: Have earned credits of SCS126 or consent of Head of School
Theory and practice of chemical quantitative analyses. Conventional and modern instrumental, chemical, and physical analyses including: statistical treatment of data, gravimetric and volumetric analyses, chemical equilibria, acid-base chemistry, electrochemistry, complex formation reaction, chromatographic analyses. Theory and applications of analytical instruments used in chemical engineering and technology.

CHS425 General Food Science 3(3-0-6)
Prerequisite: None
A study of the physical, chemical, and microbiological aspects of food, the function of and changes in components during preparation and processing of food.

CHS456 Transport Phenomena 3(3-0-6)
Prerequisite: None
 Constitutive equations for momentum, energy and mass transfer. Development of microscopic and macroscopic momentum, energy and mass transfer equations for homogeneous and heterogeneous systems. Analogy and dimensionless analysis. Problems and applications in chemical engineering.

CHS457 Chemical Engineering Plant Design 3(3-0-6)
Prerequisite: Have earned credits of CHS355 or consent of Head of School
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Thammasat University

Problem-based course: Conceptual design of a chemical plant, general design considerations and selection, process design project of a chemical plant.

CHS461 Process Dynamics and Control 3(3-0-6)
Prerequisite: Have earned credits of CHS241 or consent of Head of School
Mathematical modeling of chemical engineering systems, solution techniques and dynamics of these systems, introduction to automatic control, feedback control concept, stability analysis, frequency response and control system designs, introduction to measurement and control instrument characteristics.

CHS463 Energy Technology and Management 3(3-0-6)
Prerequisite: Have earned credits of CHS241 or consent of Head of School
Electric power generation and distribution, heat exchangers, pinch analysis, fuels and combustion, heat engines and steam boiler, principles of energy management in industry, energy auditing, cleaner technology, and tools and methods to enhance the efficiency of industrial energy systems.

CHS481 Special Topics in Chemical Engineering I 3(3-0-6)
Prerequisite: None
New topics or areas of study not offered in other chemical engineering courses. Topics may vary from semester to semester. Topics covered are different from CHS482 and CHS483.

CHS482 Special Topics in Chemical Engineering II 3(3-0-6)
Prerequisite: None
New topics or areas of study not offered in other chemical engineering courses. Topics may vary from semester to semester. Topics covered are different from CHS481 and CHS483.

CHS483 Special Topics in Chemical Engineering III 3(3-0-6)
Prerequisite: None
New topics or areas of study not offered in other chemical engineering courses. Topics may vary from semester to semester. Topics covered are different from CHS481 and CHS482.

CHS484 Chemical Engineering Project I 1(0-3-0)
Prerequisite: Senior standing or consent of Head of School
The first course in the senior project course series. A student team is given a problem, for which they must determine appropriate approaches and actions to obtain feasible solutions. This involves establishment of initial contacts, project proposal development, preliminary data collection, data analysis, verification of the results, and practical implementation. A presentation of the progress and submission of a status report are due at the end of the semester.

CHS485 Chemical Engineering Project II 4(0-12-0)
Prerequisite: Have earned credits of CHS484 or consent of Head of School
A continuation of CHS484. A team of students will work on group projects assigned to them. The projects can be intensively conducted in industry or within the institute. After a project is completed, students are responsible for submitting their final report and giving a presentation.

CHS486 Special Studies in Chemical Engineering I 3(3-0-6)
Prerequisite: Consent of Advisor and Head of School
An in-depth study of a topic in the field of chemical engineering.

CHS487 Special Studies in Chemical Engineering II 3(3-0-6)
Prerequisite: Consent of Advisor and Head of School
An in-depth study of a topic in the field of chemical engineering. The covered topic is different from CHS486.

CHS488 Special Studies in Chemical Engineering III 2(2-0-4)
Prerequisite: Consent of Advisor and Head of School
An in-depth study of a topic in the field of chemical engineering. The covered topic is different from CHS486 and CHS487.

CHS489 Extended Chemical Engineering Training 6(0-40-0)
Prerequisite: Senior standing
Students are provided with on-the-job training at selected modern industrial or service facilities for an extended period of at least 16 weeks (640 hours). The purposes of the course are to allow the students opportunities to observe how industrial engineers function, to learn how to collaborate with co-workers, and to develop self-responsibility. Students must submit a report at the end of the training period.

CSS221 Computer Graphics and Applications 3(2-3-4)
Prerequisite: None
Representation and manipulation of graphic data. Representation and transformations of two-dimensional space, three-dimensional space. Illumination and shading modes. Visualizing and analyzing numerical data associated with scientific, business, and/or entertainment applications. Methods of creating, storing, manipulating, presenting, and animating two and three dimensional graphical objects. Elements of image processing. Programming computer graphics with OpenGL or similar library.

CSS224 Computer Architectures 3(3-0-6)
Prerequisite: Have earned credits of EES371 or taking EES371 in the same semester or consent of Head of School

CSS225 Operating System 3(3-0-6)
Prerequisite: Have earned credits of ITS100 or consent of Head of School

CSS300 Computer Engineering Training 1(0-40-0)
Prerequisite: Junior standing or consent of Head of School
Practical training in private sectors or governmental departments in the field of Computer Engineering, not less than 240 hours during summer vacation of the third year. Students must submit a report to his/her supervisor who will decide for the final grade of either satisfactory (S) or unsatisfactory (U).

CSS321 Theory of Computation 3(3-0-6)
Prerequisite: None
Automata, computability, and complexity, emphasizing computability and computational complexity theory. Regular and context-free languages. Decidable and undecidable problems, reducibility, completeness theory, recursive function theory. Finite automata and regular languages. Push-down automata and context-free languages. Turing machines and decidable (recursive) languages.

CSS322 Scientific Computing 3(3-0-6)
Prerequisite: Have earned credits of GTS210 or consent of Head of School
An introduction to elementary numerical analysis and scientific computation. Topics include conditioning, stability, interpolation, quadrature, linear and nonlinear equation solving, least-squares fitting, eigenvalue and eigenvector computation, optimization, and ordinary differential equations.

CSS323 Software Engineering 3(3-0-6)
Prerequisite: None
Methodologies and strategies for developing medium and large scale software. Topics include software management, problem analysis, cost estimation, system design techniques, system testing and performance evaluation, and system maintenance.

CSS324 Artificial Intelligence 3(3-0-6)
Prerequisite: Have earned credits of ITS100 or consent of Head of School
Overview of current research and applications of artificial intelligence. Introduction to the languages of artificial intelligence, such as Prolog or LISP. Search techniques.


CSS325 Database Systems 3(3-0-6)
Prerequisite: None
Database systems architectures; relational data models; query languages; database security, integrity, and concurrency.

CSS326 Database Programming Laboratory 1(0-3-0)
Prerequisite: Have earned credits of ITS231 or consent of Head of School

CSS331 Fundamentals of Data Communications 3(3-0-6)
Prerequisite: None
An overview of techniques used in data communications and switched communication networks. Topics include: protocol architectures; data transmission and transmission media; signal encoding techniques; data link control protocols; multiplexing, multiple access and spread spectrum; switching networks.

CSS332 Microcontrollers and Applications 3(2-3-4)
Prerequisite: Have earned credits of EES371 or consent of Head of School

CSS334 Computer Networks and Internetworking 3(3-0-6)
Prerequisite: None
An overview of networking and internetworking technologies. Topics include the Open Systems Interconnect (OSI) reference model, Internet Protocol suite, standards, design concepts of protocols, routing algorithms, and applications of networks.

CSS400 Project Development 1(0-3-0)
Prerequisite: Senior standing or consent of Head of School
Practical projects or problems in Computer Engineering for individual students or groups of students under supervision of faculty members. Students are required to submit and present a project proposal to their project committee, appointed by the school.
CSS403 Computer Engineering Project 5(0-15-0)
Prerequisite: Senior standing or consent of Head of School
Practical projects or problems in Computer Engineering for individual students or group of students under supervision of faculty members. Students are required to submit and present a project report to their project committee, appointed by the school.

CSS431 Machine Learning and Pattern Recognition 3(3-0-6)
Prerequisite: None
Introduction to machine learning and statistical decision theory, adaptive classifiers, and supervised and unsupervised learning. Different types of machine learning and pattern recognition systems are introduced, including transducers, feature extraction, and decision units. Techniques for optical character recognition, speech processing, and remote sensing.

CSS432 Natural Language Processing and Information Retrieval 3(3-0-6)
Prerequisite: None

CSS433 Computer Vision 3(3-0-6)
Prerequisite: None

CSS434 Knowledge Representation and Reasoning 3(3-0-6)
Prerequisite: Have earned credits of ITS201 or consent of Head of school
This course shows how knowledge can be represented symbolically, and how it can be manipulated in an automated way by reasoning algorithms. The topics include logic-based knowledge representation, first-order logic, description logic, inference mechanisms, and their applications in ontologies and the Semantic Web.

CSS451 Cloud Computing 3(3-0-6)
Prerequisite: None

CSS452 Internet of Things 3(3-0-6)
Prerequisite: None
Internet of Things (IoT) and Web of Things (WoT), layering and REST, making things smart, IoT business aspects, IoT business issues and models, IoT communication protocols, persuasive technologies, big IoT data, semantics and semantic technologies, and implications for society.

CSS453 Cyber Crimes and Digital Forensics 3(3-0-6)
Prerequisite: None

CSS454 Network Security 3(3-0-6)
Prerequisite: None

CSS481 Special Topics in Computer Engineering Fundamentals I 3(3-0-6)
Prerequisite: Consent of Head of School
Topics of current interest in Computer Engineering Fundamentals.

CSS482 Special Topics in Computer Engineering Fundamentals II 3(3-0-6)
Prerequisite: Consent of Head of School
Topics of current interest in Computer Engineering Fundamentals.

CSS483 Special Topics in Computer Engineering Fundamentals III 3(3-0-6)
Prerequisite: Consent of Head of School
Topics of current interest in Computer Engineering Fundamentals.
CSS484 Special Topics in Computer Engineering Applications I 3(3-0-6)
Prerequisite: Consent of Head of School
Topics of current interest in Computer Engineering Applications.

CSS485 Special Topics in Computer Engineering Applications II 3(3-0-6)
Prerequisite: Consent of Head of School
Topics of current interest in Computer Engineering Applications.

CSS486 Special Topics in Computer Engineering Applications III 3(3-0-6)
Prerequisite: Consent of Head of School
Topics of current interest in Computer Engineering Applications.

CSS495 Special Studies in Computer Engineering I 3(3-0-6)
Prerequisite: None
Special study on current topics related to Computer Engineering.

CSS496 Special Studies in Computer Engineering II 3(3-0-6)
Prerequisite: None
Special study on current topics related to Computer Engineering.

CSS497 Special Studies in Computer Engineering III 2(2-0-4)
Prerequisite: None
Special study on current topics related to Computer Engineering.

CSS499 Extended Computer Engineering Training 6(0-40-0)
Prerequisite: Senior standing or consent of Head of School
Extensive on-the-job training of at least 16 weeks (640 hours) at a selected organization that provides Computer Engineering services. An individual comprehensive research or practical project must be intensively conducted under close supervision of faculty members and supervisors assigned by the training organization. At the end of the training, the student must submit a report of the project and also give a presentation.

EES203 Basic Electrical Engineering 3(3-0-6)
(For non-major students)
Prerequisite: None
Basic DC and AC circuit analysis; voltage; current and power; transformers; introduction to electrical machinery; generators, motors and their uses; concepts of three phase systems; methods of power transmission; introduction to some basic electrical instruments.

EES204 Basic Electrical Engineering Laboratory 1(0-3-0)
Prerequisite: Have earned credits of or taking EES203 in the same semester or consent of Head of School
Laboratory practice and experimental studies on topics covered in EES203.

EES210 Basic Electrical Engineering Laboratory 1(0-3-0)
Prerequisite: Have earned credits of EES216 or consent of Head of School
Laboratory practice and experimental studies on topics covered in EES216.

EES211 Electrical Measurement and Instrumentation 3(3-0-6)
Prerequisite: Have earned credits of (EES203 or EES216) or consent of Head of School

EES212 Electromagnetics 3(3-0-6)
Prerequisite: Have earned credits of (MAS117 and SCS139) or consent of Head of School
 Electrostatic fields; conductors and dielectrics; capacitance; convection and conduction currents; resistance, magnetostatic fields; magnetic materials; inductance, time-varying electromagnetic fields; Maxwell’s equations.

EES216 Circuit Analysis 3(3-0-6)
Prerequisite: None
Circuit elements; node and mesh analysis; circuit theorems; resistance, inductance, and capacitance; first and second order circuits; phasor diagram; AC power circuits; three-phase systems.

EES221 Computational Tools in Electrical Engineering 3(2-2-5)
Prerequisite: Have earned credits of MAS117 or consent of Head of school
Ordinary differential equations (ODE), series solution,
systems of ODEs, linear algebra, eigen problem, solutions via computational software and numerical solutions, functions of matrices, difference equations, EE computational software for circuit analysis and simulation.

**EES281 Signals and Systems** 3(3-0-6)
Prerequisite: Have earned credits of (EES221 or MAS215) or consent of Head of School
Continuous-time and discrete-time signals and systems. Linear systems and their properties. Fourier analysis of continuous-time and discrete-time signals and systems. Sampling and Convolution, reconstruction of signals. Laplace transform and its applications to continuous-time system analysis. Z-transform and its applications to discrete-time system analysis.

**EES298 Electrical Engineering Project Design I** 1(0-3-0)
Prerequisite: Sophomore standing or consent of Head of school
Basic project design: Conceive, Design, Implementation and Operation (CDIO), problem-based learning, focusing on Conceive and Design processes, multi-disciplinary and self-driven initiatives, idea generation and teamwork skill training.

**EES300 Electrical Engineering Training** 1(0-40-0)
Prerequisite: Junior standing or consent of Head of School
Practical training in the private sector or governmental departments in related fields of electrical engineering for not less than 240 hours during summer vacation of the third year. Students must submit a report at the end of the training period. A satisfactory (S) grade or an unsatisfactory (U) grade will be given, based on the student’s performance, quality of the report, and supervisor’s comments.

**EES306 Basic Electrical Machines and Power Systems** 3(3-0-6)
Prerequisite: Have earned credits of (EES203 or EES216) or consent of Head of School
Basic concepts in power system analysis, such as phasors, complex power, power factor improvement, three-phase circuits. Voltage, current, and power calculations in single phase and three phase systems. Introduction to Magnetic Circuits and Transformers. Basic concepts of DC and AC Rotating Machines. Induction motor and synchronous generator: principles, characteristic, operations and applications.

**EES307 Basic Electromechanical Energy Conversion Laboratory** 1(0-3-0)
Prerequisite: Have earned credits of (EES306 or EES308) or consent of Head of School
Laboratory practice and experimental studies on topics covered in EES306 or EES308

**EES308 Basic Electromechanical Energy Conversion** 3(3-0-6)
Prerequisite: Have earned credits of (EES203 or EES216) or consent of Head of School

**EES315 Probability and Random Processes** 3(3-0-6)
Prerequisite: Have earned credits of MAS117 or consent of Head of School
Random experiments, events, probability, discrete and continuous random variables, probability density function, cumulative distribution function, functions of random variables, expectations; central limit theorem, law of large numbers, central limit theorem; introduction to random processes, random noise, Gaussian random process, autocorrelation and power spectral density.

**EES330 Electronic Circuits Laboratory** 1(0-3-0)
Prerequisite: Have earned credits of EES332 or consent of Head of School
Laboratory practice and experimental studies on topics covered in EES331 and EES332.

**EES331 Electronic Circuits I** 3(3-0-6)
Prerequisite: Have earned credits of EES216 or consent of Head of School
Semiconductors and pn junction diodes. Diode circuits and power supply modules. Bipolar junction transistors (BJTs), and field-effect transistors (MOSFETs, NMOS, PMOS, CMOS, JFETs), DC and AC analysis of single-stage and multi-stage amplifiers based on transistors. Frequency response of amplifiers. Operational amplifiers.

**EES332 Electronic Circuits II** 3(3-0-6)
Prerequisite: Have earned credits of EES331 or consent of Head of School

**EES340 Electrical Machines Laboratory** 1(0-3-0)
Prerequisite: Have earned credits of EES341 or consent of Head of School
Laboratory practice and experimental studies on topics covered in EES341.
EES341 Electrical Machines 3(3-0-6)
Prerequisite: Have earned credits of (EES203 or EES216) or consent of Head of school
Magnetic circuits; principles of electromechanical energy conversion; energy and co-energy in magnetic circuits; single phase and three phase transformers; principles of rotating machines; DC machines; AC machines construction; synchronous machines; single phase and three phase induction machines; protection of machines.

EES342 Electrical Power System 3(3-0-6)
Prerequisite: Have earned credits of (EES203 or EES216) or consent of Head of school
Electrical power system structure; AC power circuits; per unit system; generator characteristics and models; power transformer characteristics and models; transmission line parameters and models; cable parameters and models; fundamental of load flow; fundamentals of fault calculation.

EES351 Principles of Communications 3(3-0-6)
Prerequisite: Have earned credits of or taking (EES315 or EES302) in the same semester and have earned credits of EES281 or consent of Head of school.
Communication models, wire/cable and wireless/radio; Introduction to signal and system; spectrum of signal and applications of Fourier series and transform; analog modulation, AM, DSB, SSB, FM, NB/WBFM, PM; noise in analog communication; binary baseband modulation; Nyquist’s sampling theory and quantization; pulse analog modulation, POM, DM; multiplexing techniques; introduction to transmission lines, radio wave propagation, microwave components and communication, satellite communications, optical communication.

EES363 Mechatronic Instrumentation 3(3-0-6)
Prerequisite: Have earned credits of (EES203 or EES216) and MES211 or consent of Head of School
Analysis, characteristics and applications of instruments used in engineering mechatronics including transducers, sensors, actuators, etc. Measurement principles. Integrated sensors actuators. Programmable Logic Control (PLC) Data Acquisition System.

EES370 Digital Circuits Laboratory 1(0-3-0)
Prerequisite: Have earned credits of or taking EES371 in the same semester or consent of Head of School
Laboratory practice and experimental studies on topics covered in EES371.

EES371 Digital Circuits 3(3-0-6)
Prerequisite: None

EES380 Feedback Control Laboratory 1(0-3-0)
Prerequisite: Have earned credits of EES381 or consent of Head of School
Laboratory practice and experimental studies on topics covered in EES381.

EES381 Feedback Control Systems 3(3-0-6)
Prerequisite: Have earned credits of (EES203 or EES216) or consent of Head of School
Mathematical models of systems; transfer function; system models on time domain and frequency domain; dynamic models and dynamic responses of systems; first and second order systems; open-loop and closed-loop control; feedback control and sensitivity, types of feedback control; concepts and conditions of system stability, methods of stability testing.

EES382 Microprocessors and Embedded Systems 3(3-0-6)
Prerequisite: Have earned credits of EES371 or consent of Head of School
Microprocessor architecture; instruction sets and assembly language programming; concepts of timing and clocks; task-modeling and real-time operating system; state-machine and concurrent processes; encoding and flow control; formal verification; signal digitization and conditioning; memory and I/O interfacing.

EES398 Electrical Engineering Project Design II 1(0-3-0)
Prerequisite: Junior standing or consent of Head of school
Project design concept: Conceive, Design, Implementation and Operation (CDIO), project-based learning focusing on Design and Implementation processes, creative solution and efficiency concern, effective communication and technical presentation skill training.

EES431 Analog Integrated Circuits 3(3-0-6)
Prerequisite: Have earned credits of EES332 or consent of Head of School

EES432 Digital Integrated Circuits 3(3-0-6)
Prerequisite: Have earned credits of EES332 or consent of Head of School
Design principles of digital integrated circuits. NMOS inverters,

**EES433 Introduction to VLSI Design** 3(3-0-6)
Prerequisite: Have earned credits of (EES371 and EES332) or consent of Head of School
Introduction to design and fabrication of very large scale integrated systems using NMOS and CMOS technologies. CAD tools and computer-aided design. Use of state-of-the-art design methodologies and tools. Testing and design for testability. Modularity, parallelism, local communications, fault tolerance.

**EES435 Physical Electronics** 3(3-0-6)
Prerequisite: Have earned credits of EES331 or consent of Head of School

**EES436 Chaotic Circuits and Systems** 3(3-0-6)
Prerequisite: Have earned credits of EES332 or consent of Head of School

**EES441 Electrical System Design** 3(3-0-6)
Prerequisite: Have earned credits of (EES203 or EES216) or consent of Head of school
Basic design concepts; codes and standards; power distribution schemes; electrical wires and cables; raceways; electrical equipment and apparatus; load calculation; power factor improvement and capacitor bank circuit design; lighting and appliances circuit design; motor circuit design; load, feeder, and main schedule; emergency power systems; short circuit calculation; grounding systems for electrical installation.

**EES442 Power Electronics** 3(3-0-6)
Prerequisite: Have earned credits of EES331 or consent of Head of school
Characteristics of power electronics devices; principles of power converters - AC to DC converter, DC to DC converter, AC to AC converter, DC to AC converter.

**EES443 High Voltage Engineering** 3(3-0-6)
Prerequisite: Have earned credits of (EES203 or EES216) or consent of Head of school
Uses of high voltage and overvoltage in power systems; generation of high voltage for testing; high voltage measurement techniques; electric field stress and insulation techniques, breakdown of gas; liquid and solid dielectrics; high voltage testing techniques; lightning and protection; insulation coordination.

**EES444 Power System Protection** 3(3-0-6)
Prerequisite: Have earned credits of EES341 or consent of Head of school
Fundamental of protection practices; instrument transformer and transducers; protection devices and protection systems; overcurrent and earth fault protection; differential protection; transmission line protection by distance relaying; transmission line protection by pilot relaying; motor protection; transformer protection; generator protection; bus zone protection; introduction to digital protection devices.

**EES445 Renewable Energy** 3(3-0-6)
Prerequisite: None
Introduction to energy systems and renewable energy resources; potential of renewable resources; difference of conventional and renewable energy technologies; renewable technologies, such as solar, wind, biomass, geothermal, biogas, municipal solid waste, wave energy, and fuel cell; energy storages; laws, regulations, and policies of renewable energy; economics aspects.

**EES446 Energy Conservation and Management** 3(3-0-6)
Prerequisite: None
Fundamentals of energy efficiency; principles of energy efficiency in building and industry; load management; laws and regulations of energy conservation; energy management and analysis in buildings and industry; technical aspects to use energy efficiently in lighting systems, heating and ventilating and air-conditioning (HVAC) systems, industrial motors; co-generation; energy conservation and economic analysis.

**EES447 Power Plants and Substations** 3(3-0-6)
Prerequisite: Have earned credits of EES341 or consent of Head of school
Load curve; diesel power plants; steam power plants; gas turbine power plants; combined cycle power plants; hydro power plants; nuclear power plants; renewable energy sources; types of substations; substation equipment; substation layout;
substation automation, lightning protection for substations; grounding systems.

EES448 Electrical Safety 3(3-0-6)
Prerequisite: None
Electrical Hazards and safety measures; causes of electrical accidents and injuries; electric shock; step and touch potentials; electrostatic discharge (EDS); electrical arc flash and protection; electrical isolation; practical grounding, bonding, and shielding; electrical safety testing; circuit protection devices; electrical safety guidance for low-voltage and high-voltage systems; electrical safety in the workplaces.

EES450 Signal Processing and Communication 1(0-3-0)
Laboratory
Prerequisite: Have earned credits of (EES351 and EES472) or consent of Head of School
Sampling and reconstruction of signals, digital filter design and hardware implementation, real-time filtering, AM-FM modulation/demodulation, basic digital communication techniques, spectrum analysis, power measurement, DSP system simulation.

EES451 Data Communications and Networks 3(3-0-6)
Prerequisite: None
Introduction to data communications and networks; layered network architecture; point-to-point protocols and links; delay models in data networks; medium-access control protocols; flow control; error control; local area networks; switching networks; routing in data networks; network security; cloud networks, architecture and systems; standards.

EES452 Digital Communication Systems 3(3-0-6)
Prerequisite: Have earned credits of EES351 or consent of Head of School
Review of probability and random processes; signal space; minimum Nyquist bandwidth; signal detection; AWGN, digital modulation techniques, sigma-delta, performance analysis; synchronization; equalization; introduction of information theory; source coding; channel coding; multichannel and multicarrier systems; spread spectrum techniques; multipath fading channels.

EES453 Satellite Communication Systems 3(3-0-6)
Prerequisite: Have earned credits of EES351 or consent of Head of School

EES454 Communication Networks and Transmission Lines 3(3-0-6)
Prerequisite: Have earned credits of EES351 or consent of Head of School
Wire and wireless communication; wire communication network; Y, Z, F, G, H matrix; relation; connection and basic circuits, network transformation, transmission quantities, signal transmission circuit techniques, wave filters, attenuator, impedance matching, transmission line theory, equation, solution for low, medium, high frequencies, primary and secondary constant; incident and reflected waves, standing wave ratio, line characteristics for open, short, terminated load, lossless, and lossy lines; reflections in time domain, bounce diagrams, near-end and far-end crosstalk, differential signaling, composite line, types of cable, and unshielded twisted pair, coaxial cable; current cable standards.

EES455 Mobile Communications 3(3-0-6)
Prerequisite: Have earned credits of EES351 or consent of Head of School
Wireless communication system; theory, principle of mobile communication system; characteristic and impact of radio propagation; modulation techniques; speech coding; diversity channel coding; multiplexing technique; interconnection components for mobile communication system; standards of current mobile communication, 3G, 4G, 5G, and beyond; cellular systems: multiple access and interference management, capacity of wireless channels, multiuser capacity; MIMO system.

EES456 Optical Communications 3(3-0-6)
Prerequisite: Have earned credits of EES212 or consent of Head of School
Cylindrical dielectric waveguides and propagating conditions; structure and types of optical fiber; optical fiber parameters; optical fiber production; optical cable types; optical transmitters; optical receivers; signal degradations, attenuation and dispersion in fiber link; optical repeaters and amplifiers; link budget calculation; multiplexing in optical link system; introduction to FTTX.

EES457 Broadband Communication 3(3-0-6)
Prerequisite: Have earned credits of EES351 or consent of head of school
Principles of broadband communication networks for switching telephone system, VoIP telephone, WAN infrastructure; ATM, VPN, FDDI, DSL, and current techniques; Internet, intranet; SDH, traffic engineering and QoS; FITH, WLANS, PON DWDM network; theory of power line communications (PLC) for narrowband, broadband communications, standards of PLC-based Networking.
EES458 Communication Electronics 3(3-0-6)
Prerequisite: Have earned credits of EES332 and EES351 or consent of Head of School
RF and power amplifiers, oscillators, phase-locked loops, filters, carrier modulators and demodulators, analog-to-digital and digital-to-analog converters, examples of commercially available integrated circuits for communication systems.

EES461 Microwave Principles 3(3-0-6)
Prerequisite: Have earned credits of EES212 or consent of Head of School
Review of Maxwell’s equations, plane waves; microwave transmission lines and waveguides; microwave network analysis; impedance and equivalent voltage and current; s- matrix; signal flow graphs, impedance matching and tuning, microwave resonators; power dividers and directional couplers; microwave filters; point-to-point microwave link; radar systems; microwave propagation; basics of microwave measurement; applications.

EES462 Antennas 3(3-0-6)
Prerequisite: Have earned credits of EES212 or consent of Head of School
Basic definitions and theory; isotropic point source; power and field patterns; directivity and gain; efficiency, polarization; input impedance and bandwidth; Friis transmission equation, radiation from current elements; ground effects; radiation properties of wire antenna; array antenna; Yagi-Uda antennas and log-periodic antennas; aperture antenna; microstrip antenna; modern antennas for current applications; antenna characteristics measurement.

EES465 Biomedical Instrumentation 3(3-0-6)
Prerequisite: Have earned credits of EES211 or consent of Head of School

EES472 Digital Signal Processing 3(3-0-6)
Prerequisite: Have earned credits of EES281 or consent of Head of School
Continuous-time and discrete-time signals, spectral analysis; decimation and interpolation; sampling rate conversion; DFT; probabilistic methods in DSP; design of FIR, IIR digital filters, multirate systems and filter Banks; Discrete Wavelet Transform; introduction to some DSP applications such as image processing, speech and audio processing, array processing and further current applications.

EES475 Digital Image Processing 3(3-0-6)
Prerequisite: Have earned credits of EES281 or consent of Head of School

EES477 Signal Processing for Communication Systems 3(3-0-6)
Prerequisite: Have earned credits of EES472 or consent of Head of School
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.

EES478 Introduction to Computer Vision and Pattern Recognition 3(3-0-6)
Prerequisite: None (EES475 Digital Image Processing is recommended)

EES481 Introduction to Robotics 3(3-0-6)
Prerequisite: Have earned credits of EES381 or consent of Head of School
Operation principles, analysis, and design of robots. Mechanical manipulators: kinematics, dynamics, trajectory planning, and control. Robotic vision and visual feedback. Robot programming languages. Control algorithm design. Current topics of interest from the literature.

EES482 Introduction to Mechatronics 3(3-0-6)
Prerequisite: None
Introduction to integration of mechanical, electrical, and computer systems for information processing and control of machines and devices. Basic electronics, signal processing, micro-controller and microprocessor, sensors and actuators. Control architecture in mechatronic systems. Overview of electro-mechanical design and embedded systems in topics of current interest in mechatronics.

EES483 Linear System Theory 3(3-0-6)
Prerequisite: Have earned credits of EES381 or consent of Head of School
EES485 Dynamic Systems and Control 3(3-0-6)
Prerequisite: Have earned credits of MES351 or consent of Head of School
Mathematical modeling of mechanical, electrical, pneumatic, hydraulic and combined physical systems using a unified approach such as the Bond graph technique. Introduction state-variables, system response, stability using laplace transform technique. System characteristics; controllability and observability. Open and closed loop responses of control systems. Solution to state equation by direct analysis and digital computer methods.

EES491 Electrical Engineering Seminar I 1(0-3-0)
Prerequisite: Senior standing or consent of Head of School
Presentation and discussion of recent advances and research in electrical engineering by guest lecturers, faculty, and students. Topics may vary from semester to semester. S/U grading.

EES492 Electrical Engineering Seminar II 1(0-3-0)
Prerequisite: Senior standing or consent of Head of School
Presentation and discussion of recent advances and research in electrical engineering by guest lecturers, faculty, and students. Topics may vary from semester to semester. S/U grading.

EES493 Special Topics in Electrical Engineering I 3(3-0-6)
Prerequisite: None
New topics or areas of study not offered in other electrical engineering courses. Topics may vary from semester to semester.

EES494 Special Topics in Electrical Engineering II 3(3-0-6)
Prerequisite: None
New topics or areas of study not offered in other electrical engineering courses. Topics may vary from semester to semester. The covered topic is different from EES493.

EES495 Special Studies in Electrical Engineering II 3(3-0-6)
Prerequisite: None
Current development and/or fundamental knowledge in electrical engineering technologies.

EES496 Special Studies in Electrical Engineering I 3(3-0-6)
Prerequisite: None
Current development and/or fundamental knowledge in electrical engineering technologies.

EES497 Special Studies in Electrical Engineering III 2(2-0-4)
Prerequisite: None
Current development and/or fundamental knowledge in electrical engineering technologies.

EES498 Electrical Engineering Project 5(0-15-0)
Prerequisite: Senior standing or consent of Head of School
Practical projects or problems in electrical engineering for individual students or groups of students under supervision of faculty members. Students are required to submit complete project reports and present the project results to their project committee appointed by the program.

EES499 Extended Electrical Engineering Training 6(0-40-0)
Prerequisite: Senior standing or consent of Head of School
Full-time research or practical training under close supervision of faculty members and assigned supervisors from the Electrical Engineering-related company for at least 16 weeks (640 hours). Evaluation based on the project achievement, project report and final oral presentation.

GTS111 Probability for Technologists 3(3-0-6)
Prerequisite: None

GTS112 Principles of Linear Algebra 3(3-0-6)
Prerequisite: None

GTS116 Mathematics for Technologists I 3(3-0-6)
Prerequisite: None
Introductory calculus: a course on the differential and integral calculus of functions of one variable. Topics include limits and continuity of functions, origin and definition of the derivative; exponential, and logarithmic forms; origin and definition of anti-derivative; integral calculus; indefinite integrals. Taylor’s Theorem for a function of two variables; introduction to differential equations.
GTS117 Mathematics for Technologists II 3(3-0-6)
Prerequisite: Have earned credits of GTS116 or consent of Head of School
Introduction to vectors, curves, and surfaces in space; partial differentiation; directional derivatives and the gradient vector; integration, techniques of integration, and logarithmic functions. Three-dimensional analytic geometry. Differential and integral calculus of functions of two or three variables: partial derivatives, multiple integrals, Lagrange multipliers, and Green’s Theorem.

GTS121 General Science I 3(3-0-6)
Prerequisite: None
Elements of mechanics: concepts of vectors, forces, motion, energy and conservation laws. Elements of electromagnetism, electric field and potential, magnetic field, Faraday’s law of induction, electromagnetic wave and applications, introduction to circuit analysis.

GTS122 General Science II 3(3-0-6)
Prerequisite: None
An introduction to chemistry: states of matter, chemical reactions, organic chemistry and their applications. Introduction to biology, interplay between structure and function at the molecular, cellular, and organismal level of organization, study of major systems in human body.

GTS133 Environmental Studies 3(3-0-6)
Prerequisite: None

GTS202 English Language Structures 3(3-0-6)
Prerequisite: None
The course aims to further develop students’ English proficiency. The course emphasizes academic writing from basic sentences and paragraphs to more complex structures. The English structures covered in this course will aid students in preparing for standardized English examinations.

GTS210 Mathematics for Technologists III 3(3-0-6)
Prerequisite: Have earned credits of GTS117 or consent of Head of School
Vectors in the plane and space, systems of linear equations, vectors, vector spaces, linear transformations, inner products, eigenvalues and eigenvectors. Introduction to matrices and determinants and complex numbers.

GTS212 Calculus for Technologists I 3(3-0-6)
Prerequisite: None

GTS213 Calculus for Technologists II 3(3-0-6)
Prerequisite: Have earned credits of GTS212 or consent of Head of School

GTS231 Law and Technology 3(3-0-6)
Prerequisite: None
A study of the relation between laws and technology: exploration of issues in both private and public laws pertaining to the application of technology. Implication of technology on law development internationally. Legal issues involving e-commerce, e-contracting, intellectual property, privacy, torts, consumer protection, product liability, professional negligence, professional liability, environmental and natural resources, legal principles on common commercial transaction and business organizations.

GTS302 Technical Writing 2(2-1-3)
Prerequisite: None
Students learn and practice writing and presentation of technical reports, which include reports of laboratory experiments, in-depth technical reports, overview articles of technical topics for the general public, as well as executive summaries.

GTS303 Communications in Business 2(2-1-3)
Prerequisite: Have earned credits of TU105 or consent of Head of School
This course prepares students to communicate effectively in various types of business situations. Students learn how to write professional letters and emails with an emphasis on tone, format, and formality. Students also make a resume and cover letter, and give a business style presentation. By expressing ideas in a thoughtful and professional manner, students gain important skills that are necessary for success in the business world. Ideas in a thoughtful and professional manner, students gain important skills that are necessary for success in the business world.
GTS401  Intensive English Proficiency  6(6-0-12)  
Prerequisite:  
1. Student has completed all course work according to respective curriculum.  
2. Student has taken at least 5 times an acceptable English proficiency test (TOEFL, TU-GET, IELTS, TOEIC, or Institutional TOEFL).  
3. Student should have a minimum score of 400 for paper-based TOEFL, or equivalent score when using other tests.  
Students who pass this course will have similar English skills to those students who satisfy the English Proficiency requirement. The course content is based primarily on the Institutional TOEFL (ITP) exam; however, materials may be drawn from other tests (e.g., IELTS or TOEIC). Strategies for answering the different types of exam questions are discussed and practiced in class. Special emphasis is placed on helping students improve their individual weaknesses in the listening, reading, or structure sections of the exam. An S (satisfactory) or U (unsatisfactory) grade is given.

IES201  Industrial Engineering Mathematics  3(3-0-6)  
Prerequisite: Have earned credits of MAS117 or consent of Head of School  
This course presents elementary differential equations and numerical methods for industrial engineers. Emphases are placed on first-order ordinary differential equations, linear ordinary differential equations of higher order, power series representation and gamma functions, Laplace and inverse transform methods, mathematical modeling, computers, and error analysis; fundamentals of unconstrained and constrained optimizations, such as golden-section search, quadratic interpolation, gradient methods, and linear programming; least-squares regression; interpolation. Some heuristic algorithms such as Simulated Annealing, Particle Swarm Optimization, etc., are also introduced. The implementation of these techniques using mathematical software packages, e.g., MATLAB and/or LINGO, for industrial engineering applications is also covered.

IES301  Manufacturing Tools and Operations  3(2-3-4)  
Prerequisite: None  
This course emphasizes fundamentals of engineering and measurement, particularly the correct and safe use of machine tools. Students are provided with hands-on experience in fitting, welding, foundry, and fabrication.

IES302  Engineering Statistics  3(3-0-6)  
Prerequisite: Have earned credits of (MAS117 or GTS117) or consent of Head of School  
This course discusses fundamentals of probability, discrete and continuous probability distributions, conditional probability, moment generating functions, discrete and continuous random variables, sampling distributions, hypothesis testing of means, variances, and proportions. Regression analysis is also introduced.

IES303  Engineering Management and Cost Analysis  3(3-0-6)  
(For Non-Industrial Engineering Students)  
Prerequisite: None  
The course presents a broad and fundamental view of management systems (in both its classical and modern aspects), including structures and functions of interrelated departments. Philosophy and quantitative aspects of inventory management, quality assurance, project management, etc. are emphasized. Students are also introduced to basic concepts and applications of an economic evaluation of engineering projects. Topics covered include interest formulas, time value of money, economic decision making involving several alternatives, etc. This course is not intended for industrial engineering students.

IES304  Industrial Engineering Training  1(0-40-0)  
Prerequisite: Junior standing  
Students are provided with on-the-job training at selected modern industrial or service facilities. The purpose of the course is to allow the students opportunities to observe how industrial engineers function, to learn how to collaborate with co-workers, and to develop self-responsibility. The training period must not be less than 240 hours. Students must submit a report at the end of the training period. A Satisfactory (S) or Unsatisfactory (U) grade will be given based on student’s performance, quality of the report, and supervisor’s comments.

IES305  Industrial Engineering Project I  1(0-3-0)  
Prerequisite: Senior standing or consent of Head of School  
The first course in the senior project course series. A student team is given a real world problem which they must determine appropriate approaches and actions to obtain feasible solutions. This involves establishment of initial contacts, project proposal development, preliminary data collection, data analysis, verification of the results, and practical implementation. A presentation of the progress and submission of a status report are due at the end of the semester.

IES312  Methods Analysis and Work Measurement  3(3-0-6)  
Prerequisite: None  
This course emphasizes the measurement and evaluation of work methods and how improvement can be introduced. Topics include visual and micromotion study techniques, motion economy, time study, and work sampling. The development and use of standard time data and computerized techniques are covered.
IES313  Industrial Plant Design  3(3-0-6)  
Prerequisite: None  
Modern methods applied to facility layout and location design are discussed. Logistics of motion of people and materials, flow analysis, plant layout, and material handling techniques are covered. Students will study the mathematical approaches and computer packages applicable for solving facility layout and location problems.

IES315  Methods Analysis and Work  1(0-3-0)  
Measurement Laboratory  
Corequisite: Taking IES312 in the same semester or consent of Head of School  
This laboratory course demonstrates a practical use of modern apparatus available for motion and time study applications. Process charts and a time study board are utilized to, not only analyze manufacturing and service operations, but also to improve productivity.

IES321  Operations Research I  3(3-0-6)  
Prerequisite: Have earned credits of (MAS210 and IES302) or consent of Head of School  
Basic operations research models, algorithms, and their applications are discussed in this course. Topics covered are linear programming and its extensions; transportation models; game theory; network flow analysis; queuing theory; and simulation modeling.

IES323  Production Planning and Control  3(3-0-6)  
Prerequisite: None  
A study of the components and functions of integrated production, planning, and control systems. Consideration is given to material, equipment, and manpower requirements for optimizing continuous and intermittent manufacturing operations. Topics discussed include demand forecasting, hierarchical production planning, capacity planning, line balancing, operation sequencing, and scheduling, etc.

IES324  Production Sequencing and Scheduling  3(3-0-6)  
Prerequisite: Have earned credits of IES323 or consent of Head of School  
This course discusses techniques of sequencing and scheduling for job shops, flow lines, and other general manufacturing and production systems. Both deterministic and stochastic models are introduced.

IES331  Quality Control  3(3-0-6)  
Prerequisite: Have earned credits of IES302 or consent of Head of School  
Methods used to achieve higher product quality, to prevent defects, to locate chronic sources of trouble, to measure process capability, and to use inspection data to regulate manufacturing processes, are emphasized. Preparation of statistical control charts and selection of suitable sampling plans are discussed. Total quality control, quality control circles, and ISO 9000 standards are also studied.

IES332  Factory Automation and Control  3(3-0-6)  
Methods  
Prerequisite: None  
This course discusses the design, automation, and integration of supporting subsystems in the overall manufacturing environment. These subsystems include flexible manufacturing system (FMS) cells, robotic cells, automated warehousing (AS/RS), automated material handling systems (conveyor, AGV, etc), and automated inspection systems. Their functional characteristics and computerized controls are covered. Additionally, the course discusses linear and proportion-integral-differential (PID) control systems, system reliability analysis, open and closed loop control systems, system response, etc.

IES333  Industrial Robotics and Applications  3(3-0-6)  
Prerequisite: Have earned credits of ITS100 or consent of Head of School  
Intended to provide students with knowledge of robotics in manufacturing systems. The field of robotics is studied with emphasis on the role of programmable robots in manufacturing. Students obtain hands-on experience with hardware and software available for various industrial robot systems.

IES334  Industrial Instrument and Controlling Systems  3(3-0-6)  
Prerequisite: Have earned credits of SCS139 or consent of Head of School  
This course is a problem-based course on metrology. This course involves the principles and applications of precision or fine measuring equipment, e.g., optical, laser, and electro-magnetic devices. Standards and accuracy of measurement are also discussed.

IES335  Metrology  3(3-0-6)  
Prerequisite: Have earned credits of SCS139 or consent of Head of School  
This course covers principles and applications of instruments, particularly measuring and controlling instruments, employed in various kinds of industrial processes and manufacturing. Measuring instruments are typically used for electrical measurement, distance measurement, color detection, pressure measurement, level measurement, and temperature measurement. Additionally, this course includes mechanical and electrical controlling device, such as Programmable Logic Control (PLC). The driving system is also mentioned. Finally, the design of measuring and controlling systems is discussed to integrate all industrial instruments mentioned in the course together.
IES341  Engineering Economy  3(3-0-6)
Prerequisite: None
Introduction to the principles of engineering economics for utilization and evaluation of capital investments. This course covers time value of money, net present value, rate of return, depreciation, and selection of the best economic investment alternative. Decisions involving multiple choice replacement, uncertainty, risk, and estimating income tax consequences are also discussed.

IES342  Industrial Cost Analysis and Control  3(3-0-6)
Prerequisite: None
The course provides an understanding of the tools and techniques applicable for cost analysis and control. Topics discussed include financial analysis of the accounting system, standard costs, variance analysis, cost-volume-profit relationships, cost estimation, and utilization of accounting data for control of operations.

IES343  Safety Engineering  3(3-0-6)
Prerequisite: None
The principles and practices of safety engineering in product and facilities design are discussed. Among the topics treated are loss prevention principles, safe practices and hazard control, safety standards and codes, inspection procedures, governmental regulations, and safety statistics. The Occupational Safety and Health Act (OSHAct) and Thai legislation will be examined and compared. Engineering ethics, moral principles, and social responsibility are also covered.

IES345  Project Feasibility Study  3(3-0-6)
Prerequisite: Have earned credits of IES341 or consent of Head of School
This course is a problem-based course on a project feasibility study. Fundamental concepts of a project feasibility study is discussed in detail. The course emphasizes essential qualitative and quantitative aspects of the feasibility study, such as marketing evaluation, proposal development (preparation and presentation), economic analysis, project planning and scheduling, etc.

IES351  Maintenance Engineering  3(3-0-6)
Prerequisite: None
This course focuses on the key components of maintenance engineering, which can be classified into these following topics: Introduction and objective of maintenance management; Responsibility of maintenance; Management and structure of the maintenance function; Total Productive Maintenance (TPM); Types of Maintenance activities (Preventive/Corrective/Predictive/Schedule); Maintenance measurement (Mathematical models); Software maintenance, both in industrial organization and service industries; Definition of key terminologies: Reliability, System reliability, Failure rate, Mean time between failure, Mean time to failure, Mean time to repair, Availability, Downtime loss, Improving system reliability, Equipment and machinery life cycle, Failure rate, Exponential probability distribution and mathematical analysis; Designing for maintainability; Human error in maintenance; Application of Fault Tree Analysis (FTA).

IES353  Pollution Control and Waste Treatment  3(3-0-6)
Prerequisite: None
Discussion of the physical, chemical, and biological processes which influence the extent of air, water, and land pollution; methods for monitoring, controlling, and preventing pollution; methods of waste treatment; chemical wastes and hazardous wastes.

IES361  Manufacturing Process Design  3(3-0-6)
Prerequisite: Have earned credits of IES301 or consent of Head of School
Introduction to the theory and practice of manufacturing processes. Study covers various types of casting, and metal forming processes and technologies. This course emphasizes process selection and design of cost effective manufacturing processes. Linkages between process design, and production planning, and control are considered.

IES362  Manufacturing Engineering  1(0-3-0)
Laboratory I
Prerequisite: Junior standing
This course provides hands-on exercises on CAD/CAM, CNC machine programming and control (lathe and milling), and robot programming and control.

IES363  Manufacturing Engineering  2(1-3-2)
Laboratory II
Prerequisite: Senior standing
The laboratory course provides practical integration between measuring and controlling instrument used in a manufacturing environment. Physical property measuring such as pressure, temperature, and level is focused on. Mechanical and electrical control devices, such as Programmable Logic Control (PLC), are emphasized.

IES364  Manufacturing Processes and Technologies  3(3-0-6)
Prerequisite: Have earned credits of IES361 or consent of Head of School
This course covers non-traditional manufacturing processes and technologies for metal parts, and those for plastic and composite-material parts. Manufacturing processes for electronic devices, and printed circuit boards are studied.
IES365  Jig, Fixture, and Mold Design  3(3-0-6)
Prerequisite: Have earned credits of (IES301 and MES302) or consent of Head of School
This course covers fundamentals of jig, fixture, and mold design. The topics include types, classifications, functions, and applications of jig, fixture, and mold, and also design economics. Computer aided design (CAD) concept is introduced to develop jig, fixture, and mold. Hands-on exercises of CAD are provided.

IES371  Engineering Management  3(3-0-6)
Prerequisite: None
This course is specifically designed for industrial engineering students to appreciate the applications of industrial engineering techniques in managing both manufacturing and service systems. Students learn the fundamentals of engineering economics and gain an understanding of the management process. Major topics covered include concepts and theories of modern management, capital investment justification methods, project organization and management, legal, quality, and staffing issues.

IES372  Materials Management and Inventory Control  3(3-0-6)
Prerequisite: Have earned credits of IES323 or consent of Head of School
This course emphasizes the philosophy of materials management and quantitative techniques used in controlling inventories in an organization. Classifications of inventory from different perspectives are presented. Both deterministic and probabilistic inventory models are discussed. Modern materials management systems, e.g., MRP-II and JIT, are also studied.

IES374  Management Information Systems  3(3-0-6)
Prerequisite: Have earned credits of ITS100 or consent of Head of School
Structure and design of computer-based information systems are discussed. Topics included are computer hardware and software, database models, database management systems, system analysis, design, and implementation.

IES376  Logistics and Supply Chain Management  3(3-0-6)
Prerequisite: None
This course is specifically designed for students to understand the principles of logistics and supply chain management. Major topics include logistic planning, cooperation and management in the supply chain, transportation, material purchasing and inventory control, packaging, integration between production planning and distribution among partners in the chain, and information systems. The present and future roles of logistics in the supply chain management are also discussed.

IES377  Distribution Network Models: Warehouse, Inventory, and Transportation  3(3-0-6)
Prerequisite: None
This course covers guidelines for design and management of distribution networks, and describes roles of warehouses, distribution centers, inventory, and transportation in multi-echelon supply chains. The course emphasizes optimization models for warehouse location, size, and market allocation. Other relevant topics include warehouse design and layout, types of distribution networks, inventory management models, simulation models for studying and evaluating of inventory models, analysis of transportation systems, transportation modes, and vehicle routing problems. Case studies of model implementation are also provided.

IES391  Applied Statistical Methods  3(3-0-6)
Prerequisite: Have earned credits of IES302 or consent of Head of School
This course emphasizes statistical analysis techniques and their applications. Topics discussed include a review of hypothesis testing, goodness-of-fit tests, regression analysis, and analysis of variance. Special attention is given to their applications in engineering fields.

IES392  Systems Simulation  3(3-0-6)
Prerequisite: Have earned credits of IES302 or consent of Head of School
This course is a problem-based course on systems simulation. This course introduces the application of discrete time simulation modeling for the analysis of complex manufacturing and service systems, using case examples in warehousing, material handling, banking, etc. Applications of continuous time and combined discrete-continuous simulation modeling will also illustrated. Students will gain first-hand practice on how to use state-of-the-art simulation software through a series of laboratory exercises or a realistic semester project.

IES394  Artificial Intelligence in Industrial Engineering  3(3-0-6)
Prerequisite: None
To provide insight into concepts and techniques of intelligent systems. Topics covered include search methodologies, knowledge representation, components of knowledge-based systems, design of knowledge bases, and inferencing. Applications of knowledge-based systems in design of products, processes, and systems, as well as machine diagnostics, production planning and scheduling will also be introduced.

IES395  Special Topics in Industrial Engineering I  3(3-0-6)
Prerequisite: None
This course is designed for topics related to industrial engineering, but not presently offered as either a required or technical elective.
IES396  Special Topics in Industrial Engineering II
Prerequisite: None
This course is designed for topics related to industrial engineering, but not presently offered as either a required or technical elective. Topics covered are different from IES395.

IES401  Industrial Engineering Project II  5(0-15-0)
Prerequisite: Have earned credits of IES305 or consent of Head of School
A continuation of IES305. An individual student or a team of students will work on the individual or group projects assigned to them. The projects can be intensively conducted in industry or within the institute. After a project is completed, students are responsible for submitting their final report and giving a presentation.

IES402  Special Study in Industrial Engineering I
Prerequisite: Consent of Head of School
This course is intended for students who wish to participate in the exchange program. It covers new topics or areas of study related to industrial engineering, but not presently offered as either a required or technical elective. Topics covered are different from IES403.

IES403  Special Study in Industrial Engineering II
Prerequisite: Consent of Head of School
This course is intended for students who wish to participate in an exchange program. It covers new topics or areas of study related to industrial engineering but not presently offered as either a required or technical elective. Topics covered are different from IES402.

IES404  Extended Industrial Training  6(0-40-0)
(For Extended Industrial Training Track)
Prerequisite: Senior standing or consent of Head of School
Students are provided with extensive on-the-job training at selected modern industrial facilities. The purpose of the course is to allow the students opportunities, to work and intensively conduct an individual research or practical project for at least 16 weeks (640 hours) under the close supervision of faculty members and main supervisors assigned by the training company. After the project is completed, students are responsible for submitting their final reports and giving a presentation.

IES405  Special Studies in Industrial Engineering III
Prerequisite: Consent of Head of School
This course is intended for students who wish to participate in the exchange program. It covers new topics or areas of study related to industrial engineering, but not presently offered as either a required or technical elective. Topics covered are different from IES402 and IES403.

ITS100  Introduction to Computers and Programming
Prerequisite: None
Computer system components and organization. Hardware and software interaction. Introduction to data processing and databases. Algorithms and programming languages. Programming in high-level languages. Program design and development. Practical laboratories are essential parts of the course, designed to develop students’ programming skills and understanding of computer systems. These skills are important foundations for other technical courses.

ITS101  Programming and Algorithms
Prerequisite: Have earned credits of ITS100 or consent of Head of School

ITS102  Object Oriented Programming
Prerequisite: Have earned credits of ITS100 or consent of Head of School
Concepts of object oriented programming and introduction to software engineering principles. Topics include data structure fundamentals: abstraction; encapsulation; inheritance; polymorphism; overloading; pointer and reference variables; recursion and various important algorithms. Modeling and applications with classes, member functions, constructors and destructors, public, private and protected access, static and non-static members, virtual functions, and standard I/O.

ITS103  Object-oriented Programming Laboratory
Prerequisite: Have earned credits of ITS100 or consent of Head of School
Hands-on practice and experiments of topics in object-oriented programming.

ITS201  Discrete Mathematics
Prerequisite: None

ITS221  Data Structures and Algorithms
Prerequisite: Have earned credits of ITS102 or consent of Head of School
Concepts of data structures; data structures and programming; basic data structures: stacks, queues, linked lists, trees, graphs, etc.; recursion; hash tables; sorting and searching algorithms.
ITS224  Numerical Computation  3(3-0-6)
Prerequisite: Have earned credits of ITS100 or consent of Head of School

ITS227  Algorithm Design  3(3-0-6)
Prerequisite: Have earned credits of ITS221 or consent of Head of School
Definitions of algorithm, analysis of algorithm, divide and conquer, dynamic programming, graph algorithms, greedy algorithms, state space searches, NP-completeness and intractability. Hands-on practice on algorithm design and implementation.

ITS229  Human Computer Interface Design  3(3-0-6)
Prerequisite: Have earned credits of ITS100 or consent of Head of School

ITS231  Data Structures and Algorithms  1(0-3-0) Laboratory
Prerequisite: Have earned credits of ITS221 or Corequisite: Taking ITS221 or consent of Head of School
Hands-on practice and experiments on topics on data structures and algorithms

ITS300  Information Technology Training  1(0-40-0)
Prerequisite: Junior standing or consent of Head of School
Practical training in the private sector or governmental departments in the field of Information Technology. Not less than 240 hours during the summer vacation of the third year. Students must submit a report to his/her supervisor who will decide for the final grade of either satisfactory (S) or unsatisfactory (U).

ITS323  Introduction to Data Communications  3(3-0-6)
Prerequisite: None
An overview of basic knowledge related to the process of data exchange between computers. Topics include analog and digital data transmission systems, various network topologies, client-server models, and structure/mechanism of the 5-layer simplified OSI model: application, transport, network, data-link, and physical layers.

ITS327  Computer Network Architectures and Protocols  3(3-0-6)
Prerequisite: None
Network models; OSI layers; transmission media; local area networks; design concepts of protocols; routing algorithms; applications of networks.

ITS329  System Analysis and Design  3(3-0-6)
Prerequisite: Have earned credits of ITS100 or consent of Head of School
Software models and software modeling methodologies. Basic abstraction mechanisms in software modeling. Modeling techniques, processes, and languages. Software development process. Object-oriented system analysis and design. Hands-on practice on software development process and system analysis and design.

ITS335  IT Security  3(3-0-6)
Prerequisite: None

ITS341  Management Information Systems  3(3-0-6)
Prerequisite: Have earned credits of ITS100 or consent of Head of School
Structure and design of computer-based information systems. Topics included are computer hardware and software, database models, database management systems, system analysis, design and implementation.

ITS342  Computer Animation  3(2-3-4)
Prerequisite: Have earned credits of CSS221 or consent of Head of School
Introduction to techniques for computer animation such as keyframing, procedural methods, motion capture, and simulation. Overview and implementation of story-boarding, scene composition, lighting and sound track generation. 2D & 3D images and animation software.

ITS344  Web and Business Application Development  3(3-0-6)
Prerequisite: Have earned credits of ITS100 or consent of Head of School
Introduction to integrated web-based system, concepts of web programming in business application development,
programming with an emphasis on business applications. Transaction processing systems and management support systems. Principles of web-based application design; including programming structures, data structures, program testing, debugging, implementation of programs with graphical user interfaces, and event driven code.

**ITS352 Networking Laboratory** 1(0-3-0)
Prerequisite: Have earned credits of ITS231 or consent of Head of School
Hands-on practice with the administration of computer networks and the development of computer network applications. Topics include: configuring network interfaces, designing and building switched and routed networks, monitoring network activities, and programming client/server applications.

**ITS353 Graphic and Game Programming Laboratory** 1(0-3-0)
Prerequisite: Have earned credits of ITS231 or consent of Head of School
Hands-on practice and experiments of topics on graphic design and modeling. Applications of graphics to game programming. Game programming. Graphic design tools. Design of user interface for game applications. Design of game applications.

**ITS400 Project Development** 1(0-3-0)
Prerequisite: Senior standing or consent of Head of School
Practical projects or problems in information technology for individual students or groups of students under supervision of faculty members. Students are required to submit and present the project proposal to their project committee appointed by the school.

**ITS403 Information Technology Project** 5(0-15-0)
Prerequisite: Senior standing or consent of Head of School
Practical projects or problems in information technology for individual student or group of students under supervision of faculty members. Students are required to submit and present a project report to their project committee, appointed by the school.

**ITS412 Tele-services and Services Architecture** 3(3-0-6)
Prerequisite: Have earned credits of ITS327 or consent of Head of School
In modern telecommunications, service providers experience market expansion and changes in service provisioning technologies. This course presents students with an architectural foundation, which is based on the convergence of computer, telecommunication, and digital content technologies. Topics include Intelligent Networks, Common Object Request Broker Architecture (CORBA), and common service architectures available in several telecommunication standards.

**ITS413 Internet Technologies and Applications** 3(3-0-6)
Prerequisite: Have earned credits of ITS327 or consent of Head of School
An overview of Internet technologies and applications. Topics to be covered include TCP/IP first generation (IPv4), TCP/IP new generation (IPv6), integration with ATMs, new infrastructures (e.g., Internet 2, gigapops, IP over SONET, and IP over WDM), IP telephony, video over IP, and multimedia applications over IP.

**ITS423 Data Warehouses and Data Mining** 3(3-0-6)
Prerequisite: Have earned credits of CSS325 or consent of Head of School
The course will introduce data warehousing and data mining, to study their principles, algorithms, implementations, and applications. Topics include data warehousing technology: data cube methods, data warehouse construction and maintenance; data mining techniques: characterization, association, classification, clustering, and similarity-based mining.

**ITS424 Electronic Commerce** 3(3-0-6)
Prerequisite: None
The course will introduce students to the underlying economic aspects of the electronic marketplace in order to provide them with an understanding of its foundations for the development of new business models. Topics included are electronic commerce and the Internet, characteristics of digital products and processes, product information, market efficiency, copyright protection, and electronic payment systems.

**ITS 425 Business Innovation** 3(3-0-6)
Prerequisite: None
This course provides an overview and discussion of design thinking principles and service science concepts for developing better products, services, processes, strategies, spaces, architecture, and experiences for customers-centric organization. Design thinking helps organization to develop practical and innovative solutions for their problems. Design thinking and service science are essential knowledge for transforming traditional business to human-focused, prototype-driven, and service-oriented business. This course will help students to develop a solid understanding of the fundamental concepts of design thinking, service science, and service Dominant Logic (SDL) and how to apply these multi-disciplinary knowledge to service-oriented business innovation.

**ITS432 Mobile Application Programming** 3(3-0-6)
Prerequisite: Have earned credits of ITS100 or consent of Head of School
Problem-based learning; principles of mobile application development; programming languages, for mobile devices, such as JAVA, .NET, C/C++, Object-C; syntax and library usage; hands-on practice on a suitable software development kit (SDK); current and future trends of mobile applications.
ITS433  Location-based Services and Digital Mapping  3(3-0-6)
Prerequisite: None
This course describes a comprehensive picture of the Location-based Services (LBS) world and covers key technologies, key markets, vertical industries, applications, solutions, value chains, and key stakeholders. This course provides an introduction to digital mapping and location technologies, satellite based location methods (GNSS), mapping, and navigation.

ITS434  Web Services and Service Architecture  3(3-0-6)
Prerequisite: Have earned credits of ITS327 or ITS329 or consent of Head of School
This course aims at presenting students with an architectural foundation of software as Web services, basing on the convergence of computer, communication, and digital content. Topics include notations, models and specifications for designing service-based distributed software systems. Students acquire a clear understanding of the major types of established service design elements and technologies, such as REST services, SOAP services.

ITS441  Accounting Information Systems  3(3-0-6)
Prerequisite: Have earned credits of ITS100 or consent of Head of School
An introduction to information systems for accounting and finance, including their roles, in identifying, recording, and classifying financial transactions; characteristics of various types of accounts; accounting principles and concepts for measuring financial transactions; preparation of financial statements. Financial analysis and the basic principles of financial management in the allocation and acquisition of funds.

ITS442  Entrepreneurship for IT Business Development  3(3-0-6)
Prerequisite: None
Technology viability assessment, legal issues associated with forming a new company, competitive positioning, market analysis and market opportunity assessment, product life-cycle planning, marketing strategy, organization management, intellectual property management, patenting, technopreneurship, business plan, venture capital, entrepreneurial ethics.

ITS443  Business Process Model and Management  3(3-0-6)
Prerequisite: None
This course provides an overview and discussion of the principles, concepts and techniques required to transform business from a traditional, functional organization to a process-centric organization.
The course introduces a systematic approach and methodology for planning, monitoring, measuring and managing organizational business process performance and for redesigning and improving specific processes. The students will understand the value and benefits of business process management, the principles of business process management and how to apply them. Business Process Model and Notation (BPMN) will be used as a standard language for process analysis and design, process reengineering, process improvement and process automation. Examples and exercises of process model and process management in this course include financial, accounting, human resource management, CRM processes, etc.

ITS481  Topics in Hardware and Communications I  3(3-0-6)
Prerequisite: Consent of Head of School
Topics of current interest in Hardware and Communications.

ITS482  Topics in Hardware and Communications II  3(3-0-6)
Prerequisite: Consent of Head of School
Topics of current interest in Hardware and Communications.

ITS483  Topics in Hardware and Communications III  3(3-0-6)
Prerequisite: Consent of Head of School
Topics of current interest in Hardware and Communications.

ITS484  Topics in Software Technology I  3(3-0-6)
Prerequisite: Consent of Head of School
Topics of current interest in Software Technology.

ITS485  Topics in Software Technology II  3(3-0-6)
Prerequisite: Consent of Head of School
Topics of current interest in Software Technology.

ITS486  Topics in Software Technology III  3(3-0-6)
Prerequisite: Consent of Head of School
Topics of current interest in Software Technology.

ITS487  Topics in Computer Information Systems I  3(3-0-6)
Prerequisite: Consent of Head of School
Topics of current interest in Computer Information Systems.

ITS488  Topics in Computer Information Systems II  3(3-0-6)
Prerequisite: Consent of Head of School
Topics of current interest in Computer Information Systems.

ITS489  Topics in Computer Information Systems III  3(3-0-6)
Prerequisite: Consent of Head of School
Topics of current interest in Computer Information Systems.

ITS495  Special Studies in Information Technology I  3(3-0-6)
ITS496 Special Studies in Information Technology II
3(3-0-6)
Prerequisite: None
Special study on current topics related to Information and Communication Technology.

ITS497 Special Studies in Information Technology III
2(2-0-4)
Prerequisite: None
Special studies on current topics related to Information and Communication Technology.

ITS499 Extended Information Technology Training
6(0-40-0)
Prerequisite: Senior standing or consent of Head of School
Extensive on-the-job training of at least 16 weeks (640 hours) at a selected organization that provides information technology services. An individual comprehensive research or practical project must be conducted under close supervision of faculty members and supervisors assigned by the training organization. At the end of the training, the student must submit a report of the project and also give a presentation.

MAS116 Mathematics I
3(3-0-6)
Prerequisite: None
Mathematical induction; functions; limits; continuity; differential calculus: derivatives of functions, higher order derivatives, extrema, applications of derivatives, indeterminate forms; integral calculus: integrals of functions, techniques of integration, numerical integration, improper integrals; introduction to differential equations and their applications; sequence and series: Taylor’s expansion, infinite sums.

MAS117 Mathematics II
3(3-0-6)
Prerequisite: Have earned credits of MAS116 or consent of Head of School
Analytic geometry in calculus; polar and curvilinear coordinates; three-dimensional space: vectors, lines, planes, and surfaces in three-dimensional space; function of several variables; calculus of real-valued functions of several variables and its applications: partial derivatives, extremes of functions, functions of higher derivatives, Lagrange multipliers; topics in vector calculus: line and surface integrals, Green’s theorem.

MAS210 Mathematics III
3(3-0-6)
Prerequisite: Have earned credits of MAS117 or consent of Head of School
Linear algebra: vector spaces, linear transformation, matrices, determinants, systems of linear equations, Gaussian elimination, eigenvalue problems, eigenvalues and eigenvectors, diagonalization, complex matrices; introduction to complex analysis: complex numbers, analytic functions, complex integration, conformal mapping; calculus of variations; introduction to tensor analysis: Cartesian tensors and their algebra.

MAS215 Differential Equations
3(3-0-6)
Prerequisite: Have earned credits of MAS117 or consent of Head of School
Ordinary differential equations of the first order; linear ordinary differential equations of higher order: matrix notation, homogeneous solutions, method of variation of parameters; general ordinary differential equations: series solutions, Bessel functions, Laplace transformation; Fourier analysis: Fourier series, integrals and transforms; partial differential equations: method of separating variables, applications of Laplace and Fourier transforms; applications to initial-value and boundary: value problems.

MES211 Thermofluids
3(3-0-6)
Prerequisite: Have earned credits of (SCS138 or GTS121) or consent of Head of School
Fundamental concepts in thermodynamics. The first and second law of thermodynamics. Basic concepts and basic properties of fluids. Fundamentals of fluid statics. Fundamentals of fluid dynamics. Characteristics of fluids such as laminar and turbulent flows.

MES231 Engineering Mechanics
3(3-0-6)
(For non-mechanical engineering students)
Prerequisite: Have earned credits of SCS138 or consent of Head of School
Force systems; resultants; equilibrium; trusses; frames and machines; internal force diagrams; mass and geometric properties of objects; fluid statics; kinematics and kinetics of particles and rigid bodies; Newton’s second law of motion; work and energy, impulse and momentum.

MES300 Engineering Drawing
3(2-3-4)
Prerequisite: None
Introduction to basic principle of engineering drawing, including lettering, applied geometry, orthogonal drawing and sketching, sectional views and conventions, detail drawing, assembly drawing, dimensioning, three dimensioning, basic descriptive geometry dealing with points, lines & planes and their relationships in space and basic developed views. Introduction to Computer Graphics.

MES302 Introduction to Computer Aided Design
2(1-3-2)
Prerequisite: Have earned credits of MES300 or consent of Head of School
Use of industrial Computer Aided Design software for detail design and drafting in various engineering fields such as in
mes 303 mechanical engineering training 1(0-40-0)
prerequisite: junior standing or consent of head of school
students are required to obtain practical training in the field of
mechanical engineering at selected private sectors or
governmental departments for not less than 240 hours during
summer vacation of the third year. the objective is to allow
students to have opportunities to experience actual working
conditions other than what is learned in the classrooms and
laboratories. students must submit a report at the end of the
training period. a satisfactory (s) or unsatisfactory (u) grade
will be given based on student’s performance, quality of the
report and supervisor’s comments.

mes 311 thermodynamics 3(3-0-6)
prerequisite: none
first law of thermodynamics; second law of thermodynamics
and the carnot cycle; energy; entropy; basic heat transfer and
energy conversion.

mes 312 combustion and emission control 3(3-0-6)
prerequisite: have earned credits of mes 311 or equivalent or
consent of head of school
properties of fossil fuels. production of synthetic fuels from
biomass, coal, oil shales, and tar sands. stoichiometry,
combustion processes and emission control in boilers and
furnaces, internal combustion engines and gas turbines,
turbulent flame, laminar flame.

mes 313 internal combustion engines 3(3-0-6)
prerequisite: have earned credits of mes 311 or consent of
head of school
internal combustion engine fundamentals, spark-ignition and
compression-ignition engines, fuels and combustion, ignition
systems, ideal fuel air cycle, supercharging and scavenging
performance and testing, lubrication.

mes 321 heat transfer 3(3-0-6)
prerequisite: have earned credits of (mes 211 or mes 311) or
consent of head of school
steady-state conduction. natural convection. forced
convection. thermal radiation. unsteady-state conduction.
combined heat transfer problems. condensation and boiling
heat transfer. heat exchangers.

mes 331 solid mechanics i 3(3-0-6)
prerequisite: have earned credits of scs 138 or consent of
head of school
concepts of internal force and stress, and deformation and
strain. analysis of stress and strain, mohr’s circles for stress
and strain, stress-strain relationship. stress and strain in
thin-walled pressure vessels. thermal stresses. energy method.
torsion of circular shaft, thin-walled tubes, and close-coiled
helical spring. shear force, bending moment and bending
stress in beams. deflection of beams.

mes 332 solid mechanics ii 3(3-0-6)
prerequisite: have earned credits of mes 331 or consent of
head of school
generalized concepts of strain and hooke’s law. thick-walled
cylinders and shrink fits. rotating discs. open-coiled helical
springs and impact loads. axisymmetric bending of circular
plates. buckling of columns. use of mohr’s circles for
transformation of stress and strain, yield and fracture criteria.
virtual work and energy methods.

mes 333 design of machine elements 3(3-0-6)
prerequisite: have earned credits of mes 331 or consent of
head of school
theories of failure for static and dynamic loading. design of
mechanical components such as rotating shafts, bearings,
welding, screw, springs, and power transmission devices.
introduction to the use of computers as a tool in problem
solving of mechanical design, design project.

mes 341 fluid dynamics 3(3-0-6)
prerequisite: have earned credits of scs 138 or consent of
head of school
motion of fluid particles and stream lines. momentum
equations and applications. energy equations and applications.
laminar and turbulent internal flows. flow of fluid around a
body. boundary layers. similarity and dimensional analysis.
theories and designs of centrifugal and axial-flow pumps,
fans, water turbines and cavitation. flows in open channels.
compressible flow.

mes 342 refrigeration and air conditioning 3(3-0-6)
prerequisite: have earned credits of mes 331 and (mes 211 or
mes 341) or consent of head of school
refrigeration cycles and properties of refrigerants. evaporative
cooling and cooling towers. refrigeration load estimation.
design of refrigeration systems. equipment selection and
design. psychometric properties and processes of air.
criteria for thermal comfort. cooling load estimation. design of
air-conditioning systems. equipment selection and design.

mes 350 engineering statics 3(3-0-6)
prerequisite: have earned credits of scs 138 or consent of
head of school
method of solving engineering problem using fundamental
principles of mechanics, resultant and resolution of forces
and couples, equilibrium of particles, rigid bodies and various
structures, concept of friction, centroid, mass center and center
of gravity, moment of inertia of area and mass, virtual work.
MES351 Engineering Dynamics  3(3-0-6)
Corequisite: Taking SCS138 in the same semester or consent of Head of School
Dynamics of particles: velocity, acceleration, force, momentum, laws of motion, work, power, energy, impulse, impact of elastic bodies, projectiles, circular motion. Dynamics of rigid bodies: moment of inertia and radius of gyration of various rigid bodies, rigid-body motion, force and acceleration, work and energy, impulse and momentum.

MES352 Mechanics of Machinery  3(3-0-6)
Prerequisite: Have earned credits of MES351 or consent of Head of School
Kinematics and dynamics of machines; displacement velocity, acceleration, and force analysis of linkage, cams and gear systems. Balancing of rotating and reciprocating machine parts; gyroscopic effects, critical speeds; energy variation in machinery. Mechanism design.

MES371 Material Science for Engineers  3(3-0-6)
Prerequisite: None
The course discusses properties and structure of materials, including metals, alloys, ceramics, polymers, wood, concrete, composites, and solid-state materials. Study of microstructures in relationship with mechanical properties of materials and phase equilibrium diagrams. Effects of production processes on microstructure of materials, degradation and failure analysis.

MES381 Measurements and Instrumentation  3(3-0-6)
Prerequisite: Have earned credits of MES311 or consent of Head of School

MES382 Vibration and Noise Control  3(3-0-6)
Prerequisite: Have earned credits of MES351 or consent of Head of School
Vibration: linear system equations, free and forced responses, systems with two degrees of freedom. Behaviour of sound waves. Sources of environment noise and vibration and their impacts. Instrumental and practical measurement. General physiological and subjective responses to noise and vibration. Regulations, criteria, methods, and techniques to reduce and control environmental noise and vibration.

MES383 Hydraulic and Pneumatic Control  3(3-0-6)
Prerequisite: Have earned credits of MES341 or consent of Head of School
Static and dynamic modeling of hydraulic and pneumatic components and systems. Energy and power transfer and impedance matching concepts. Dynamic performance and stability of open and closed-loop servodrives. Introduction to hydraulic and pneumatic control system design.

MES390 Basic Mechanical Engineering Laboratory  1(0-3-0)
(For non-mechanical engineering students)
A service course for students with major outside mechanical engineering. Experimental practices cover fluid mechanics, heat transfer, thermodynamics, combustion and emissions, mechanisms, physical and mechanical properties of materials. Technical notes on the experimental tests have to be submitted for grading.

MES391 Mechanical Engineering Laboratory I  2(1-3-2)
Prerequisite: Have earned credits of MES311 or consent of Head of School
Students are required to conduct tests and experiments on physical and mechanical properties of materials, mechanisms, fluid mechanics, thermodynamics and heat transfer, combustion and internal combustion engines. Reports or technical notes on the tests and experiments have to be submitted for grading.

MES392 Mechanical Engineering Laboratory II  2(1-3-2)
Prerequisite: Have earned credits of MES311 or consent of Head of School
Students are required to conduct tests and experiments on physical and mechanical properties of materials, mechanisms, fluid mechanics, thermodynamics and heat transfer, combustion and internal combustion engines. Reports or technical notes on the tests and experiments have to be submitted for grading.

MES403 Mechanical Engineering Project I  1(0-2-1)
Prerequisite: Senior standing or consent of Head of School
Students are required to present seminars on current development of mechanical engineering to their classmates and faculty members. The seminars may lead to senior projects later on. The reports of the seminars have to be submitted for grading.

MES405 Special Studies in Mechanical Engineering I  3(3-0-6)
(For Foreign Exchange Track)
Prerequisite: Consent of Head of School
This course is intended for students wish to participate in the exchange program. It is designed for topics related to mechanical engineering, but not presently offered as either a required or technical elective. The covered topic is different from MES406.
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Thammasat University

MES406 Special Studies in Mechanical Engineering II 3(3-0-6) (For Foreign Exchange Track)
Prerequisite: Consent of Head of School
This course is intended for students who wish to participate in the exchange track. It is designed for topics related to mechanical engineering, but not presently offered as either a required or technical elective. The covered topic is different from MES405.

MES407 Mechanical Engineering Project II 5(0-15-0) (For Senior Project Track)
Prerequisite: Senior standing or consent of Head of School
A final course involving individual or group projects including design, analysis and implementation of mechanical systems selected from various interesting areas within mechanical engineering. Students are required to propose their projects during the first semester of their senior year. After a project is completed, students are responsible for submitting their final report and giving a presentation.

MES408 Extended Mechanical Engineering Training 6(0-40-0) (For Extended Training Track)
Prerequisite: Senior standing or consent of Head of School
Students are provided with extensive on-the-job training at selected modern mechanical engineering facilities. The purpose of the course is to allow the students opportunities, to work and intensively conduct an individual research or practical project for at least 16 weeks (640 hours) under the close supervision of faculty members and main supervisors assigned by the training company. After the project is completed, students are responsible for submitting their final report and giving a presentation.

MES409 Special Studies in Mechanical Engineering III 2(2-0-4) (For Foreign Exchange Track)
Prerequisite: None
This course is intended for students who wish to participate in the exchange track. It is designed for topics related to mechanical engineering, but not presently offered as either a required or technical elective. The covered topic is different from MES405 and MES406.

MES413 Advanced Thermodynamics 3(3-0-6)
Prerequisite: Have earned credits of (MES211 or MES311) or consent of Head of School

MES422 Thermal System Design 3(3-0-6)
Prerequisite: Have earned credits of (MES321 and MES341) or consent of Head of School
Design procedures. Comparison between a workable system and optimum system. Equation fitting for equipment and processes characterization. Modeling of equipment and processes based on physical laws. Simulation of thermal systems. Selected optimization techniques such as Lagrange multiplier, search methods, linear programming, etc.

MES434 Mechanical System Design 3(3-0-6)
Prerequisite: Have earned credits of MES333 or consent of Head of School
Mechanical engineering system design involving practical problems in various industries. Students, working in groups, will investigate the design methodology and processes from concepts through final design including detailed analysis of all mechanical components of the system, by which knowledge of all engineering disciplines is required. Projects are proposed from various areas of study within mechanical engineering. Students submit a final report and present their projects at the end of semester.

MES444 Alternative and Renewable Energy Resources 3(3-0-6)
Prerequisite: None
Global and regional resources, conversion technologies and economics of renewable energy such as hydropower, biomass energy, solar energy, wind energy, and geothermal energy.

MES462 Turbomachinery 3(3-0-6)
Prerequisite: Have earned credits of (MES311 and MES341) or consent of Head of School
Review of thermodynamics of compressible flow. Principles, designs and applications of centrifugal and axial flow machines, i.e. centrifugal turbines and compressors, axial flow turbines and compressors, impulse and reaction steam turbines and Laval nozzles. Steam and gas turbine plants: theories, applications, performance characteristics of practical cycles. Erosion problems in steam and gas turbine components.

MES471 Electrical Energy Management 3(3-0-6)
Prerequisite: Senior or junior standing or consent of Head of School
MES473 Energy Economics 3(3-0-6)
Prerequisite: None

MES474 Thermal Energy Management 3(3-0-6)
Prerequisite: Senior or junior standing or consent of Head of School
Efficient uses of thermal equipment and systems such as boilers and steam equipment, evaporators and condensers, pre-heaters and economisers, dryers and drying systems, etc.

MES481 Power Plant Engineering 3(3-0-6)
Prerequisite: None
Energy conversion principles and availability concepts: fuels, and combustion analysis, and component study of gas turbines and internal combustion engine power plants, combined cycle and cogeneration, hydro power plant, nuclear power plant, control and instrumentation, power plant economics, and environmental impacts.

MES482 Power Generation and Environment 3(3-0-6)
Prerequisite: None
Thermal power plants: steam turbines, gas turbines, and cogeneration, hydropower plants, nuclear safety and waste treatment; atmospheric, land and water environment for power plants, introduction to environment impact assessment for power plants.

MES483 Dynamic Systems and Control 3(3-0-6)
Prerequisite: Have earned credits of MES351 or Consent of Head of School
Mathematical modeling of mechanical, electrical, pneumatic, hydraulic, and combined physical systems using a unified approach, such as the Bond graph technique. Introduction to state-variables, system response, stability using Laplace transforms technique. System characteristics: controllability and observability. Open and closed loop responses of control systems. Solution to state equation by direct analysis and digital computer methods.

MES484 Automatic Control 3(3-0-6)
Prerequisite: None
Automatic control principles, analysis and modeling of linear control elements, stability of feedback systems, design and compensation of control systems.

MES485 Mechatronics 3(3-0-6)
Prerequisite: None
Basic electronics, connectivity between computer and electromechanical systems, hydraulic systems, pneumatic systems, analysis and design of those systems.

MES493 Extended Mechanical Engineering 3(1-6-2) Laboratories
Prerequisite: Have earned credits of (MES391 and MES392) or consent of Head of School
Students are required to conduct extended tests and experiments on thermo-fluid systems, such as fluid machinery systems, gas turbines, refrigeration and air conditioning systems, etc. Component modeling and system simulation are expected in the reports submitted for grading.

MES494 Special Topics in Mechanical Engineering I 3(3-0-6)
Prerequisite: None
New topics or areas of study not offered in other mechanical engineering courses. Topics may vary from semester to semester and will not be the same as the one offered in Special Topic II, MES495.

MES495 Special Topics in Mechanical Engineering II 3(3-0-6)
Prerequisite: None
New topics or areas of study not offered in other mechanical engineering courses. Topics may vary from semester to semester and will not be the same as the one offered in Special Topic I, MES494.

MTS213 Principles of Business and Management 3(3-0-6)
Prerequisite: None

MTS214 Business Law 3(3-0-6)
Prerequisite: None
A basic understanding of legal issues that corporations face during their existence. Legal systems and basic legal principles affecting various forms of business. Review of contracts; sales, hiring, purchasing, agency, mortgages, leasing, creditors’ rights, and bankruptcy, etc. The applications of law to financial instruments. Laws on
management of business organizations. A broad array of law-sensitive issues: intellectual property, patent, labor, duties of directors and officers, business disputes, and bankruptcy and reorganization.

MTS231 Statistical Methods for Managers 3(3-0-6)
Prerequisite: Have earned credits of (GTS111 or MAS117) or consent of Head of School
Fundamentals of statistics: discrete random variables and probability distribution functions, continuous random variables and probability distributions, point estimation, interval estimation, tests of hypotheses, analysis of variance, and regression analysis. Examples and applications in class, selected for managers.

MTS232 Production and Operations Management 3(3-0-6)
Prerequisite: None
Functions in modern manufacturing and service organizations: operation strategy, decision analysis, operating system design, facility design, project management, supply-chain management, forecasting, capacity and aggregate planning, inventory management, scheduling, and quality management.

MTS233 Introduction to Supply Chain Management 3(3-0-6)
Prerequisite: None
Principles of domestic and international supply chain systems: introduction to logistics, transportation, production planning, inventory control, purchasing and procurement, packaging, supply chain integration, and information technology for supply chain management.

MTS235 Statistics for Data Science and Empirical Study 3(2-2-5)
Prerequisite: Have earned credits MTS231 and MTS254 or consent of Head of School

MTS252 Materials Science 3(3-0-6)
Prerequisite: None

MTS254 Introduction to Management Science 3(3-0-6)
Prerequisite: Have earned credits of GTS111 or consent of Head of School
Applications of quantitative methods: linear programming modeling, graphical method for linear programming and sensitivity analysis, assignment problems, network models, integer linear programming, goal programming, analytic hierarchy process, decision analysis, project management, simulation, and forecasting models.

MTS256 Fundamentals of Thermofluids 3(3-0-6)
Prerequisite: Have earned credits of GTS121 or consent of Head of School
Basic principles of Thermofluid Science, mass-energy equation, conservation of mass and energy, energy transfer by heat, work and mass, thermodynamic properties, properties of pure substances. First and Second Law for closed and open systems, flow in pressure conduit, entropy, fluid properties, fluid statics, momentum equation, and mechanisms of heat transfer.

MTS257 Fundamentals of Electrical and Electronics Engineering 3(3-0-6)
Prerequisite: None
An overview of Electrical and Electronics Engineering: electrical signals, basic circuit theory, DC and AC analysis, Kirchoff’s law, Thévenin theorem, three-phase circuits, basic electronic devices and circuits, fundamentals of operational amplifiers, fundamentals of power systems, Schematic diagram, one-line diagram, DC and AC motor and generator modeling, transformer modeling, loss and efficiency of DC/AC machinery, and household/industry wiring.

MTS258 Economics for Technologists 3(3-0-6)
Prerequisite: None

MTS280 Introduction of Algorithms and Object Oriented Programming 3(2-2-5)
Prerequisite: Have earned credits of ITS100 or consent of Head of School
Basic principles of algorithms and object oriented programming for technologists. High-level programming languages. Types of data. Control flows. Iteration of functions and procedures. Program

MTS301 Management Technology Training 1(0-40-0)
Prerequisite: Junior Standing or consent of Head of School
Students are provided with on-the-job training at selected industrial or service organizations. The purposes of this course are to allow the students opportunities to learn through hands-on experience how various modern technologies can be applied to manage facilities and systems. Moreover, students learn how to collaborate with colleagues, coordinate project activities, and develop self-responsibility. The training period must not less than 240 hours. Students must submit a written report at the end of the training period. Satisfactory (S) or unsatisfactory (U) grade will be given based on the student’s performance, the quality of the report, and the supervisor’s comments.

MTS302 Extended Management Technology Training 6(0-40-0)
Prerequisite: Senior standing or consent of Head of School
This extended management technology training provides students with intensive on-the-job training at selected industrial or service organizations. The training period must not be less than 16 weeks (640 hours). This intensive training enables students to work with company personnel to solve real problems, not simulated ones. Students gain hands-on experience on how various modern technologies are applied to manage facilities and systems. Moreover, they learn how to collaborate with colleagues, coordinate project activities, and develop self-responsibility. In addition to a designated supervisor at the company, a faculty member is assigned to co-supervise a student’s training program. An approved industrial project is expected to be carried out by the student. At the end of the training period, the student must give an oral presentation of his/her work and submit a written report to the assigned project to the company and the engineering management Program.

MTS309 Engineering Management Training 1(0-40-0)
Prerequisite: Junior Standing or consent of Head of School
Students are provided with on-the-job training at selected industrial or service organizations. The purposes of this course are to allow the students opportunities to learn through hands-on experience how various modern technologies can be applied to manage facilities and systems. Moreover, students learn how to collaborate with colleagues, coordinate project activities, and develop self-responsibility. The training period must not less than 240 hours. Students must submit a written report at the end of the training period. Satisfactory (S) or unsatisfactory (U) grade will be given based on a student’s performance, the quality of the report, and the supervisor’s comments.

MTS312 Principles of Marketing 3(3-0-6)
Prerequisite: None
Definition and roles of marketing, modern marketing concepts; marketing system, consumer behavior, marketing mix, tools for marketing management and responsibility, ethics of marketers.

MTS313 Organizational Behavior 3(3-0-6)
Prerequisite: Have earned credits of MTS213 or consent of Head of School
A study of the human behavior in a variety of organizations: organizational culture, socialization, individual differences, motivation, leadership, performance improvement, groups and teams, decision making, conflict and negotiation, communications, power and politics, managing change.

MTS314 International Trade and Business 3(3-0-6)
Prerequisite: Have earned credits of MTS213 or consent of Head of School
An introduction to international and globalization of business; global trade; global trade theories; global business environment (cultural, political, social, etc.); international competitiveness, international operations, international marketing, international financial management, global strategic planning, strategy adaptations (marketing, human resources, etc.).
MTS315 Fundamentals of Financial and Managerial Accounting  3(3-0-6)
Prerequisite: None
An introduction to both financial and managerial accounting. Analysis and evaluation of accounting information as part of the managerial processes of planning, decision-making, and control. A basic overview of financial accounting: basic accounting concepts and principles, and structure of financial statements. A basic overview of managerial accounting: development and use of accounting information for internal decisions, cost behavior and analysis, product and service costing, and relevant costs for internal decision-making.

MTS316 Innovation and Entrepreneurship  3(3-0-6)
Prerequisite: Have earned credits of MTS213 or consent of Head of School
Study of problem solving in organizations by using innovation. Creativity and innovation skills. Thinking tools. Creative organizations, teams, individuals, and communities. An introduction to the big picture of entrepreneurship. Techniques of analysis of starting up a business and managing the risk. Decision analysis and economic analysis of failure consequences. How to create, design, find, assess, and shape opportunities to define and manage the risk.

MTS317 Financial Technologies  3(3-0-6)
Prerequisites: None
Overview of financial technologies. Changes in how to borrow, save, invest, and other financial operations. Analysis of competition under the changes and new strategies adopted. Digital platform economics. Network effects. Economies of scale. Areas of payments. Alternative credit. Virtual currencies. Related technologies used in the implementation of financial technology, such as Bitcoin and Blockchain.

MTS318 Operations Strategy  3(3-0-6)
Prerequisites: Have earned credits of MTS213 or consent of Head of School
Management of operations at manufacturing and service firms. The structure of their global supply chains, internal processes, and sourcing strategy in response to the uncertainties and risks they face in these turbulent times. Evolving patterns of operation strategies adopted by firms for producing products, sourcing, manufacturing, distributing products, delivering services, and managing products. Programs for enhancing quality, productivity and flexibility. Formulation and execution of such strategies for a collection of firms in the context of the current dynamics of global competition.

MTS319 Lean Manufacturing and Supply Chain Management  3(3-0-6)
Prerequisites: Have earned credits of MTS213 or consent of Head of School
Lean concepts applied within a company and throughout a supply chain. Lean basics. Waste reduction. House of Toyota framework. Toyota production systems. Lean philosophy in various areas: sales and operations planning, forecasting, customer relationships, leveling, dependent demand materials, capacity management, shop floor control, lean inventory management, lot sizing, warehousing and logistics, quality control, purchasing, supplier management, dealer and demand fulfillment, supply chain management.

MTS320 Digital Marketing  3(3-0-6)
Prerequisite: Have earned credits of MTS312 or consent of Head of School
Usage of a customer database to analyze customer information, to help create strategies for marketing. Application of marketing schemes aimed at consumers, using digital channels from general advertising to closing a sale. Introduction of direct, database, and digital marketing. Using direct and database marketing to analyze market situation. Setting objectives and strategies within direct and database marketing. Creating segmentation using database, direct, and database marketing. Implementation and control. Introduction to digital marketing technology: Internet, Social media, Customer databases. Information systems such as CRM and Demand Generation Systems.

MTS331 Economic Decision Analysis  3(3-0-6)
Prerequisite: None
Fundamental concepts and tools for economic decision-making for business projects: money–time relationships and equivalence, cash flow analysis, minimum attractive rate of return (MARR) of an investment, methods for investment appraisal, present worth analysis (PW), annual worth analysis (AW), internal and external rate of return analysis (IRR and ERR), benefit-cost ratio (B/C), effects of inflation, depreciation techniques, impacts of depreciation and tax on decision analysis, sensitivity analysis and risk analysis for investment alternatives.

MTS332 Quality Management  3(3-0-6)
Prerequisite: Have earned credits of MTS231 or consent of Head of School
Quality control and management in both manufacturing and service environments; strategic importance of quality, quality and productivity relationships; statistical process statistical control methods; techniques for design of experiments, problem solving tools for quality assurance, and total quality management.

MTS333 Production and Inventory Management  3(3-0-6)
Prerequisite: Have earned credits of (GTS212 or MAS116) or consent of Head of School
Relationship between inventory and production; qualitative and quantitative approaches for production and inventory
management of both dependent and independent demands: economic order quantity (EOQ), economic lot sizing (Eqsco, just in time (JIT), materials requirement planning (MRP), manufacturing resources planning (MRP II), enterprise resources planning (ERP), production planning, and capacity planning.

**MTS335 Enterprise Planning and Control Systems**  
**Prerequisite:** None  
The design, analysis, and implementation of enterprise-wide resource planning and control systems; demand forecasting, aggregate planning, decision support models for production planning, master scheduling, shop floor control; application of information technologies, such as ERP and MRP II, to operations planning and control.

**MTS336 Operations Scheduling**  
**Prerequisite:** None  
This course emphasizes models for 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 manufacturing environments.

**MTS337 Transportation, Warehouse and Logistics Management**  
**Prerequisite:** None  
Theories, tools, techniques, and technologies to manage transportation, warehouse, and logistics systems. Introduction to logistics management. Supply chain drivers. Roles of logistics in supply chain. Transportation modes: motor, railroad, air, water, and intermodal modes. Inventory models with transportation choices. Global transportation. Designing of distribution networks. Information technology in transportation. Logistic strategies and other advanced topics in logistics and supply chain management. Fundamentals of warehouse management, such as warehousing, warehouse technology, and best practice of modern warehouse operations.

**MTS338 Warehouse Operations Management**  
**Prerequisite:** None  
Fundamental operations in warehouse management, including roles of warehousing and warehouse technology, such as bar codes, radio frequency identification (RFID) for inventory control system, modern warehouse operations, classifying products, materials handling equipment and systems, racking and shelving, aisle width decision, information technology for warehouse operations, health and safety issues.

**MTS339 Strategic Sourcing and Supply Management**  
**Prerequisite:** None  
Cooperative efforts across internal functions and external business partners to eliminate inefficiencies in the supply chain. Purchasing aspects: purchasing process, policy, supply chain integration, and purchasing in organizations. Sourcing topics: concepts and principles of strategic sourcing, internal analysis, strategic approach in procuring different inputs, supplier strategy, fact-based negotiation, required infrastructure of supply management, supplier evaluation, selection and development, contract management, outsourcing issues and global sourcing.

**MTS340 Introduction to Inventory Management**  
**Prerequisite:** None  
Introduction to inventory management, types of inventory, inventory problem classifications; inventory cost; independent demand systems; deterministic and probabilistic models; single order quantities, dependent demand systems, material requirement planning (MRP), just-in-time (JIT), inventory valuation.

**MTS342 Time Series Analysis and Forecasting**  
**Prerequisites:** Have earned credits of MTS231 or consent of Head of School  

**MTS343 Decision Analysis**  
**Prerequisites:** Have earned credits of MTS231 or consent of Head of School  

**MTS351 Management Systems Optimization**  
**Prerequisite:** Have earned credits of (GTS112 or MAS210), MTS231 and MTS254 or consent of Head of School  

**MTS352 Ergonomics and Work Design**  
**Prerequisite:** None  
Essential concepts in operation analysis: simplification of work procedures, work measurement, integrated systems of humans,
and machines (Equipment), and work environment (H-M-E) systems, factors influencing workers’ physical well-being, issues in workplace ergonomics and safety.

**MTS370 Applied Business Analytics and Optimization for Decision Making**  
**3(2-2-5)**  
Prerequisite: Have earned credits of MTS231 and MTS254 or consent of Head of School  
Basic theories and models used in optimization, decision making, data analytics, machine learning, forecasting, and simulation. Hands-on experience using selected software or spreadsheet tools: Basic to advanced spread-sheet skills, basic formulas in spreadsheets, vlookup, pivot table, simple VBA, Solver, time-series and panel data forecasting tools, decision trees, Monte Carlo simulation, business intelligence software such as Power Query/BI/Pivot and/or other machine learning tools.

**MTS371 Data Visualization**  
**3(3-0-6)**  
Prerequisite: Have earned credits of MTS280 or consent of Head of school  

**MTS381 Business Information Systems**  
**3(3-0-6)**  
Prerequisite: Have earned credits of ITS100 or consent of Head of School  
Relationships between information systems and organization: information systems in global business, strategic uses of information systems; information systems in business functions, IT infrastructure, telecommunications and networks. Information systems security, electronic commerce, data and knowledge management, decision support systems, and systems development.

**MTS382 Database Systems and Applications**  
**3(3-0-6)**  
Prerequisite: Have earned credits of MTS280 or consent of Head of School  
Logical data models, relational database systems, structured query language (SQL), conceptual modeling; database design, Web-connected databases, transaction management, data warehousing, data mining, and database application.

**MTS383 E-Business**  
**3(3-0-6)**  
Prerequisite: Have earned credits of ITS100 or consent of Head of School  
This course offers the learning that is needed to develop electronic business. Topics include: developing a strategy; business-to-consumer (B2C) and business-to-business (B2B) marketing; pricing; customer relationship management (CRM); supply chain management; bar codes and radio frequency identification (RFID) for inventory management system; planning, developing, and maintaining websites and supporting information systems; business processes; online payments and international, legal, privacy, and security issues. A unique feature is an ongoing project within the course that provides an opportunity to develop e-commerce implementation plans.

**MTS386 Distributed and Collaborative Computing**  
**3(3-0-6)**  
Prerequisite: None  
Distributed computing concepts. Social networks and their applications. Tools for collaborative computing, such as Google Documents, Google Site, and Blogger. Introduction to Web application development. Introduction to Web Services and Service-Oriented Architecture. Introduction to Cloud Computing.

**MTS387 Business Data Communications and Networking**  
**3(3-0-6)**  
Prerequisite: Have earned credits of MTS386 or consent of Head of School  

**MTS388 Business Information Systems Analysis**  
**3(3-0-6)**  
Prerequisite: Have earned credits of ITS100 or consent of Head of School  
Systems development life cycle, project planning, investigation, requirements definition, system specifications, alternative selection. Tools and techniques of object-oriented development and structured development.

**MTS389 Application Programming for Technologists**  
**3(3-0-6)**  
Prerequisite: Have earned credits of ITS100 or consent of Head of School  
Introduction to business programming, programming processes, programming environments, object-oriented and event-oriented models, and database programming.

**MTS391 Special Topics in Management Technology**  
**3(3-0-6)**  
Prerequisite: None  
This course is designed for topics related to Management Technology, but not presently offered as either a required or technical elective.
MTS392 Current Topics in Management Technology I 3(3-0-6)
Prerequisite: None
This course is designed for current topics related to Management Technology, but not presently offered as either required or elective courses.

MTS393 Current Topics in Management Technology II 3(3-0-6)
Prerequisite: None
This course is designed for current topics related to Management Technology, but not presently offered as either required or elective courses. Topics covered are different from MTS392.

MTS394 Introduction to Research Methodology in Management Technology 3(3-0-6)
Prerequisite: Have earned credits of MTS231 or consent of Head of School
An introduction to research methodology: basic terminology, ethical considerations in research, problem definition, literature review, research proposal, collecting primary data, sampling and fieldwork, tools and techniques for analyzing research data, communicating research findings.

MTS395 Current Topics in Management Technology III 3(3-0-6)
Prerequisite: None
Current topics related to Management Technology, but not presently offered as either required or elective courses. Topics are different from MTS392 or MTS393.

MTS396 Current Topics in Management Technology IV 3(3-0-6)
Prerequisite: None
Current topics related to Management Technology, but not presently offered as either required or elective courses. Topics covered are different from MTS392, MTS393, or MTS395.

MTS397 Current Topics in Management Technology V 3(3-0-6)
Prerequisite: None
Current topics related to Management Technology, but not presently offered as either required or elective courses. Topics covered are different from MTS392, MTS393, MTS395, or MTS396.

MTS403 Management Technology Seminar 1(0-3-0)
Prerequisite: Senior standing or consent of Head of School
Each student group is assigned a real-world or research-like problem as its seminar topic. Under supervision and guidance of a faculty member, the group must conduct a thorough literature review and collect published articles relevant to the assigned topic. They must develop a project proposal which consists of the project scope, objectives, feasible approach, project activities, Gantt chart, and expected results and their contributions. The group must submit the proposal to the project advisor and give a public seminar on the assigned topic at the end of the semester.

MTS404 Management Technology Project 5(0-15-0)
Prerequisite: Have earned credits of MTS403 or consent of Head of School
A continuation of MTS403. An individual student or a team of students work on the senior project. The projects can be intensively conducted in industry or within the institute. After a project is completed, students are responsible for submitting their final report and giving a presentation.

MTS412 Business Finance 3(3-0-6)
Prerequisite: Have earned credits of MTS315 or consent of Head of School
Basic principles in financial management: roles, functions, and objectives of financial management, various types of business organizations, financial statement analysis, time value of money, management of cash flow, risk and return, and sources of financing.

MTS413 Human Resources Management 3(3-0-6)
Prerequisite: Have earned credits of MTS213 or consent of Head of School
A study of concepts and practices of human resource management: roles and responsibilities of human resource manager, staff acquisition; recruitment, selection, orientation, training and development. Staff management; performance management, rewards and compensation, benefits, counseling, employment legislation, safety and health issues, labor retentions, release of staff, and multinational human resources.

MTS415 Strategic Management 3(3-0-6)
Prerequisite: Have earned credits of MTS213 or consent of Head of School
The role of top management in integrating an organization's internal functional activities and external environmental forces. Economic, technological, ethical, political, and social factors that affect an organization and the consideration in setting goals and strategies. The relationships of organizations to their environments. The hierarchy of organizational objectives. Structured and informal approaches to strategic planning. The integration of business functions. Organizational structure, Policy implementation and evaluation. Assessing the competitive dynamics of firms.

MTS431 Facility Location and Layout Planning 3(3-0-6)
Prerequisite: Have earn credits of (MTS232 and MTS351) or consent of Head of School
A study of production facilities, location, planning, design and maintenance, production systems, machine selection, automation, material handling, storage and warehousing, quality, retrofitting, and preventative maintenance.

MTS433 Analysis Techniques for Complex Supply Chain Management Problems 3(3-0-6)
Prerequisite: None
This course deals with real-world complex supply chain management (SCM) problems from both the individual and integrated viewpoints of the SCM components. Well-known heuristic and meta-heuristic techniques, such as greedy heuristics, genetic algorithms (GA), simulated annealing (SA), ant colony optimization (ACO), etc. are introduced. Selected SCM problems are illustrated and their solution approaches are explained.

MTS451 Project Management 3(3-0-6)
Prerequisite: None
Basic principles of project management: initiating, planning, executing, monitoring & controlling, and closing process groups; project management knowledge areas: integration, scope, time, cost, quality, human resources, communications, risk, and procurement.

MTS455 Business Process Management 3(3-0-6)
Prerequisite: None

MTS481 Business Process Simulation 3(3-0-6)
Prerequisite: Have earned credits of MTS231 or consent of Head of School
A study of the application of computer simulation software to business decision making problems, statistics problems, discrete-event simulation approaches, simulated data analysis, simulation variance reduction techniques.

MTS483 Information Systems Implementation 3(3-0-6)
Prerequisite: Have earned credits of MTS388 or consent of Head of School
Logical and physical design of computer-based information systems; tools and techniques that underline the design processes. Design of an enterprise information system with CASE tools. Alternative approaches to systems design with emphasis on object-orientation.

MTS484 Intelligent Systems and Machine Learning for Business 3(3-0-6)
Prerequisite: Have earned credits of ITS100 or consent of Head of School

MTS486 Introduction to Enterprise Resource Planning 3(3-0-6)
Prerequisite: None
Introduction to the integrated business planning and execution systems currently in use by most large and medium-sized organizations. The focus of this course is on fundamentals of enterprise resource planning (ERP) systems, and the importance of integrated information systems in an organization. The implementation process of ERP is discussed. An illustration of a small business firm with the functions of procurement, production, and sales, using commercial ERP software.

MTS487 Business Intelligence and Analytics 3(3-0-6)
Prerequisite: Have earned credits of MTS381 or consent of Head of School

MTS488 Principles of Data Warehousing and Data Mining 3(3-0-6)
Prerequisite: Have earned credits of MTS382 or consent of Head of School

MTS489 Big Data Analytics 3(3-0-6)
Prerequisites: Have earned credits of MTS235 and MTS382 or consent of Head of School
Key IT technologies that you can use to manipulate, store, and analyze big data. Basic tools for statistical analysis, R, Python or
equivalent language, and a few key methods used in Machine Learning. The review of techniques for parallel processing and technologies that allow analysis of data near real time. Big data systems that can accept, store, and analyze large volumes of unstructured data in batch mode and/or real time.

**MTS491 Special Study in Management Technology I**

**Prerequisite:** Consent of Head of School

This course is intended for students who wish to participate in the exchange program. It covers new topics or areas of study related to management technology, but not presently offered in general basic courses, basic courses in science and mathematics, compulsory courses, or compulsory elective courses of the management technology curriculum. Topics covered are different from MTS492.

**MTS492 Special Study in Management Technology II**

**Prerequisite:** Consent of Head of School

This course is intended for students who wish to participate in the exchange program. It covers new topics or areas of study related to management technology, but not presently offered in general basic courses, basic courses in science and mathematics, compulsory courses, or compulsory elective courses of the management technology curriculum. Topics covered are different from MTS491.

**MTS493 Special Study in Engineering Management I**

**Prerequisite:** Consent of Head of School

This course is intended for students who wish to participate in the exchange program. It covers new topics or areas of study related to engineering management, but not presently offered in general basic courses, basic courses in science and mathematics, compulsory courses, or compulsory elective courses of the engineering management curriculum. Topics covered are different from MTS494 and MTS496.

**MTS494 Special Study in Engineering Management II**

**Prerequisite:** Consent of Head of School

This course is intended for students who wish to participate in the exchange program. It covers new topics or areas of study related to engineering management, but not presently offered in general basic courses, basic courses in science and mathematics, compulsory courses, or compulsory elective courses of the engineering management curriculum. Topics covered are different from MTS493 and MTS496.

**MTS495 Special Study in Management Technology III**

**Prerequisite:** Consent of Head of School

This course is intended for students who wish to participate in the exchange program. It covers new topics or areas of study related to management technology, but not presently offered in general basic courses, basic courses in science and mathematics, compulsory courses, or compulsory elective courses of the management technology curriculum. Topics covered are different from MTS491 and MTS492.

**MTS496 Special Study in Engineering Management III**

**Prerequisite:** Consent of Head of School

This course is intended for students who wish to participate in the exchange program. It covers new topics or areas of study related to engineering management, but not presently offered in general basic courses, basic courses in science and mathematics, compulsory courses, or compulsory elective courses of the engineering management curriculum. Topics covered must be different from MTS493 and MTS494.

**SCS126 Chemistry for Engineers**

**Prerequisite:** None

Properties of gases, liquids, solids; properties of solutions; chemical equilibrium; acid and bases; electrochemistry; organic chemistry and polymer; atomic structure and bonding.

**SCS138 Applied Physics I**

**Prerequisite:** None

Mechanics of particles and rigid bodies: statics of particles and rigid bodies, analysis of simple structures, friction, work, momentum, rotation, vibrations, and waves; Mechanics of fluids: properties of fluids, pressure measurement, forces on plane and curved areas, buoyancy and stability of bodies, fluid flow concepts, heat, thermal properties, and modes of heat transfer.

**SCS139 Applied Physics II**

**Prerequisite:** Have earned credits of SCS138 or consent of Head of School

Elements of electromagnetism: electric fields and magnetic fields, dielectrics and capacitors, magnetic induction and Faraday’s law of induction, inductors, electromagnetic theory and applications, AC circuits, fundamental electronics; Optics: reflection, refraction, interference, diffraction, polarization, optical equipment, application of optics and LASER; modern physics.

**SCS140 Pre-Mathematics and Sciences**

This course is designed for students who have insufficient background in mathematics, physics, or chemistry. Its objective is to improve basic knowledge of students to be able to study mathematics, physics, and chemistry, effectively. Differential and Integral calculus, Trigonometric functions, Logarithmic functions, Limits, chain rule, L’Hospital rule; Motion in three
dimensions, Rotational motion, Angular momentum, Equilibrium of rigid bodies, Fluid mechanics, Harmonic oscillation; Thermodynamics, Chemical equilibrium, Atomic structure.

**SCS176 Chemistry Laboratory** 1(0-3-0)
Corequisite: Taking SCS126 in the same semester or consent of Head of School
This laboratory course is designed to, not only provide hands-on experience to students taking SCS126, but also strengthen the understanding of the subjects taught in the course. Through a series of laboratory exercises, students learn how to use selected apparatus essential for chemistry experiments and how to safely handle chemical substances.

**SCS183 Physics Laboratory I** 1(0-3-0)
Corequisite: Taking SCS138 in the same semester or consent of Head of School
A series of physics experiments is designed to demonstrate theories taught in SCS138. Students have opportunities to use state-of-the-art apparatus in a modern laboratory to recapitulate fundamental concepts covered in the SCS138 course.

**SCS184 Physics Laboratory II** 1(0-3-0)
Corequisite: Taking SCS139 in the same semester or consent of Head of School
A series of physics experiments is designed to demonstrate theories taught in SCS139. Students have opportunities to use state-of-the-art apparatus in a modern laboratory to recapitulate fundamental concepts covered in the SCS139 course.

**TU050 English Skill Development** 3(3-0-6)
Prerequisite: None
Practice basic skills for listening, speaking, reading, and writing in English through an integrated method. Students will acquire a basis to continue to study English at a higher level.

**TU100 Civic Engagement** 3(3-0-6)
Prerequisite: None
Instillation of social conscience and awareness of one’s role and duties as a good global citizen. This is done through a variety of methods such as lectures, discussion of various case studies and field study outings. Students are required to organise a campaign to raise awareness or bring about change in an area of their interest.

**TU101 Thailand, ASEAN, and the World** 3(3-0-6)
Prerequisite: None
Study of significant phenomena around the world, in the ASEAN region and in Thailand in terms of their political, economic and sociocultural dimensions. This is done through approaches, theories and principles of social science research via discussion and raising examples of situations or people of interest. The purpose of this is to create a perspective of diversity, to understand the complexity of global interrelationships, to build a global mindset and to be able to challenge old paradigms and open up a new, broader worldview.

**TU102 Social Life Skills** 3(3-0-6)
Prerequisite: None
Holistic health care, addressing the physical, emotional, social, and spiritual needs, which is considered. Important skills for success in leading a happy life in society. Students learn to develop their ability in physical health care to manage stress, build emotional security, understand themselves and adapt to psychological, emotional and social problems. Students also learn to understand the meaning of aesthetics, experiencing and appreciating the relationship between art and humanity in different fields, namely visual arts, music, performing arts and architecture.

**TU103 Life and Sustainability** 3(3-0-6)
Prerequisite: None
This course provides an introduction to the importance of life-cycle systems perspectives in understanding major challenges and solutions to achieving more sustainable societies in this changing world. Students will learn about the relationship between mankind and the environment in the context of energy and resource use, consumption and development, and environmental constraints. Furthermore, an examination of social conflict and change from the life-cycle perspective will be used to develop an understanding of potential solution pathways for sustainable lifestyle modifications.

**TU104 Critical Thinking, Reading, and Writing** 3(3-0-6)
Prerequisite: None
Development of critical thinking through questioning, analytical, synthetic and evaluation skills. Students learn how to read without necessarily accepting all the information presented in the text, but rather consider the content in depth, taking into account the objectives, perspectives, assumptions, bias and supporting evidence, as well as logic or strategies leading to the author’s conclusion. The purpose is to apply these methods to students’ own persuasive writing based on information researched from various sources, using effective presentation techniques.

**TU105 Communication Skills in English** 3(3-0-6)
Prerequisite: None
Development of English listening, speaking, reading and writing skills, focusing on the ability to hold a conversation in exchanging opinions, as well as reading comprehension of academic texts from various disciplines related to students’ field of study.

**TU106 Creativity and Communication** 3(3-0-6)
Prerequisite: None
Creative thought processes, with critical thinking as an important part, as well as communication of these thoughts that lead to suitable results in social, cultural and environmental contexts, at personal, organisational and social levels.
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Property Management Division
Mr. Saengjan Kwang-khwang ext. 4801 Chief of Property Management Division
School Secretaries

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Rangsit Campus

Tel: +66-2-986-9009, +66-2-564-3221–29; Fax: +66-2-986-9112

School of Bio-Chemical Engineering and Technology (BCET)
Ms. Nachcha Rodphotong  ext. 2308
Ms. Suwanna Ppunyadee  ext. 2303

School of Civil Engineering and Technology (CET)
Ms. Kanchisa Jantakaew  ext. 1901
Ms. Pattanun Manachitrungrueng  ext. 1903

School of Manufacturing Systems and Mechanical Engineering (MSME)
Ms. Jutamas Thuankruaval  ext. 2202
Ms. Mayuree Phan-On  ext. 2203
Ms. Pareena Thaibumrungwiwat  ext. 2102

Department of Common and Graduate Studies (CGS)
Ms. Naree Chankeaw  ext. 1802
Ms. Wilaiwan Siri-umpai  ext. 1801
Ms. Mathawee Wiritanont  ext. 1803

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Bangkadi Campus

Tel: +66-2-501-3505–20; Fax: +66-2-501-3524

School of Information, Computer, and Communication Technology (ICT)
Ms. Charinnarat Mongkolthalang  ext. 5018
Ms. Naratsita Tirathanun  ext. 5025
Ms. Nichcha Puikanokhiran  ext. 5019
Ms. Sirinart Sirijorn  ext. 5020
Mr. Witchapon Jomprapan  ext. 5036

School of Management Technology (MT)
Ms. Aroonkarnol Samanchuen  ext. 6013
Ms. Chitra Pimon  ext. 6010
Ms. Pavinee Jongjaitate  ext. 6011
Ms. Usanee Koedlapmeesuk  ext. 6012
Faculty Members

School of Bio-Chemical Engineering and Technology

Dr. Alice Sharp  Nationality: Thai

Education:
Ph.D.  Natural Resource Management, Hiroshima University, Japan
M.S.  Natural Resource Management, Hiroshima University, Japan
M.S.  Environmental Risk Assessment of Tropical Ecosystems, Chiang Mai University, Thailand
B.S.  Biology, Chiang Mai University, Thailand

Academic Awards:
• 2002 Best Teaching Award, Sirindhorn International Institute of Technology
• Japanese Government (Monbukagakusho) Scholarship, 1995-2000
• GTZ (German Technical Cooperation) Scholarship, 1993-1995

Research Areas:
• Community based natural resource management
• Environmental Impact Assessment
• Pollution monitoring
• Solid waste management

Dr. Khanin Nueangnoraj  Nationality: Thai

Education:
Ph.D.  Applied Chemistry, Tohoku University, Japan
M.Eng.  Applied Chemistry, Tohoku University, Japan
B.Eng.  Chemical Engineering, (1st class honors) Kasetsart University, Thailand

Academic Awards:
• TU outstanding Young Researcher 2017.
• Best poster award at the 3rd Symposium on Graphene Oxide, Tokyo (Japan), 2014.
• BCSJ Award Article from Bulletin of the Chemical Society of Japan, 2014.
• Recipient of Sato Yo International Scholarship, 2011-2013.
• Best poster award at the Annual World Conference on Carbon, Shanghai (China), 2011.
• Best poster award at the 37th Japanese Carbon Conference, Himeji (Japan), 2010.

Research Areas:
• Carbon-based materials and their surface functionalization.
• Electrochemical capacitors and related hybrid systems for energy storage
Dr. Luckhana Lawtrakul  Nationality: Thai

Education:
Dr.rer.nat. Theoretical Biochemistry,
University of Vienna, Austria
M.Sc. Physical Chemistry,
Kasetsart University, Thailand
B.Sc. Chemistry,
Kasetsart University, Thailand

Academic Awards:
• 2013 Gold Medal, 41st International Exhibition of Inventions of Geneva
• 2007 Best Teaching Award, Sirindhorn International Institute of Technology
• 2001 Research Award, National Research Council of Thailand (NRCT)
• 1997 Outstanding Thesis Award, Kasetsart University
• 1987-2000 Development and Promotion of Science and Technology Talents Project (DPST) Scholarship

Research Areas:
• Computer-aided molecular modeling and molecular design

Dr. Paiboon Sreearunothai  Nationality: Thai

Education:
Ph.D. Physics,
University of Cambridge, UK
M.Sc. Physics,
University of Cambridge, UK
B.A. Physics,
University of Cambridge, UK

Academic Awards:
• Development and Promotion of Science and Technology Talents Project (DPST) Scholarship, 1996-2006

Research Areas:
• Nanomaterials
• Photo-Active Materials
• Sensors
• Environmental Technology
• Optical and Time-Resolved Instrumentation
Dr. Pakorn Opaprakasit  

**Education:**
- Ph.D. Materials Science and Engineering, The Pennsylvania State University, Pennsylvania, USA
- M.S. Materials Science and Engineering: Polymer Option, The Pennsylvania State, University Pennsylvania, USA
- B.Sc. Chemistry, (1st Class Honors) Chiang Mai University, Thailand

**Academic Awards:**
- NRCT research awards 2015, National Research Council of Thailand (NRCT)
- Research grant award 2009, Thailand Toray Research Foundation
- Young Researcher Award 2008, Thammasat University
- Gold Medal Prize, 1997, Chiang Mai University
- Gold Medal Prize, 1997, The Thab Foundation, Chulalongkorn University
- Development and Promotion of Science and Technology Talents Project (DPST) Scholarship, 1990-2003

**Research Areas:**
- Infrared spectroscopy
- Biocompatible/biodegradable polymers
- Nanomaterials/functional materials
- Materials characterization
- Sensors

**Present Academic and Professional Activities:**
- Executive board – The Materials Research Society (MRS) of Thailand
- Executive board – The Polymer Society of Thailand (PST)
- Executive board – The Science, Mathematics, and Technology Teachers Association of Thailand (SMTAT)
- Head – Center of Excellence in Materials and Plasma Technology (CoE M@P Tech), Thammasat University.

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Dr. Pisanu Toochinda  

**Education:**
- Ph.D. Chemical Engineering, The University of Akron, Ohio, USA
- M.S. Chemical Engineering, The University of Akron, Ohio, USA
- B.Sc. Chemistry, Mahidol University, Thailand

**Academic Awards:**
- 2014 Outstanding teacher Award, Thammasat University
- 2013 Best teaching Award, SIIT
- 2013 Distinguished teacher Award, SIIT
- 2013 Gold Medal, 41st International Exhibition of Inventions of Geneva
- 2008 Best Teaching Award, Sirindhorn International Institute of Technology
- 2004 Best Teaching Award, Sirindhorn International Institute of Technology

**Research Areas:**
- Hydrogen production from alcohol reforming and ammonia decomposition
- Heterogeneous catalysis and reactor design
- Molecular encapsulation/zeolite syntheses
- Preservation of Active compounds from plants by Nanoencapsulation
Dr. Rachnarin Nitisoravut  Nationality: Thai

Education:
Ph.D.  Civil/Environmental Engineering,  
North Carolina State University, NC, USA
M.S.  Biosystem Engineering,  
University of Hawaii at Manoa, HI, USA
B.S.  Chemical Technology/ Chemical Engineering, Chulalongkorn University, Thailand 
Diploma Analytical Chemistry, 
(Honors) Institute of Analytical Chemistry Training, Ministry of Science, Technology and Environment, Thailand

Research Areas:
- Biosystem engineering
- Water and wastewater treatment/management
- Low-carbon technologies

Dr. Sandhya Babel  Nationality: Indian

Education:
D.Tech.Sc. Environmental Technology and Management, Asian Institute of Technology (AIT), Thailand
M.Sc.  Environmental Technology and Management, Asian Institute of Technology (AIT), Thailand
M.Sc.  Biochemistry, University of Indore, India
B.Sc.  Biology/Chemistry,  
(1st Class) University of Indore, India

Academic Awards:
- First position in order of merit award in Master of Science (Biochemistry) Program, University of Indore, India

Research Areas:
- Adsorption
- Bio-hydrogen production
- Phytoremediation
- Solid and hazardous waste management
- Wastewater treatment
Dr. Siwarutt Boonyarattanakalin  Nationality: Thai

Education:
Ph.D. Organic Chemistry,
The Pennsylvania State University, USA
B.S. Chemistry,
(Distinction) Colorado State University, USA

Academic Awards:
• Asian CORE Program (ACP) Lectureship Award for Japan
• Asian CORE Program (ACP) Lectureship Award for Taiwan
• Young Scientist Award by Thammasat University
• Research Grant Award, Thailand Toray Research Foundation
• Best Thesis in Chemistry and Pharmacy, National Research Council of Thailand (NRCT)
• Roche Research Foundation Postdoctoral Fellowship

Research Areas:
• Design, synthesis, and evaluation of biologically active molecules
• Biomass conversions into chemical commodities by chemical and biological methods.
• Design and validation of assays to evaluate biologically active molecules and assays to study cellular processes
• Developments of biological and chemical methods for carbon recycling
• Organic synthesis

Dr. Wanwipa Siriwatwechakul  Nationality: Thai

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

Academic Awards:
• King’s Scholarship, 1993
• Bronze Medal, International Chemistry Olympiad, 1992

Research Areas:
• Polymers and biomaterials
Dr. Amin Eisazadeh Otaghsaraei  
Nationality: Iranian

Education:
Ph.D. Geotechnic, University of Technology, Malaysia  
M.Sc. Geotechnic, Tehran Polytechnic, Iran  
B.Sc. Civil Engineering, Tehran University, Iran

Academic Awards:
• 2012 UTM ICON Award (Best Researcher with IF Publication)  
• 2005 Masters Degree (Hons) (GPA of 16.89/20)  
• 2003 Ranked 119 in Iran’s Civil Eng. Masters Degree Qualification Test  
• 1999 Secondary School Diploma (Hons) (GPA of 19.23/20)

Research Areas:
• Tropical Soil Engineering  
• Soil Stabilization  
• Geochemistry  
• Water Treatment

Present Academic and Professional Activities:  
• Member of Civil Engineering Society of Iran  
  (2010 – present)

Dr. Chariya Kaewsaneha  
Nationality: Thai

Education:
Ph.D. Polymer Science and Technology, Mahidol University, Thailand  
M.Sc. Polymer Science and Technology, Mahidol University, Thailand  
B.Sc. Chemistry, Mahidol University, Thailand

Academic Awards:
• Royal Golden Jubilee Ph.D. Program, The Thailand Research Fund and The French Embassy of Bangkok  
• Distinguished Thesis Award, Faculty of Graduate Studies, Mahidol University  
• Junior Research Fellowship Program, The French Embassy of Bangkok

Research Areas:
• Polymer Colloid  
• Composite Magnetic/Polymer Particles  
• Bionanotechnology

School of Civil Engineering and Technology
Dr. Kriengsak Panuwatwanich  Nationality: Thai

Education:
Ph.D.  Construction Engineering and Management,  
Griffith University, Australia
M.Eng.  Engineering Construction and Management,  
University of New South Wales, Australia
B.Eng.  Civil Engineering,  
Sirindhorn International Institute of Technology, Thammasat University, Thailand

Academic Rank:  Assistant Professor
E-mail:  kriengsak@siit.tu.ac.th

Academic Awards:
• Best Paper Award at the 7th International Conference on Engineering, Project and Production Management, 21st-23rd September 2016, Bialystok, Poland
• Award for Innovation in Learning and Teaching by Griffith School of Engineering, Griffith University, 2014
• Dean’s Highly Commended Award - Learning and Teaching Citations by Griffith Sciences, Griffith University, 2014
• Pro Vice Chancellor’s Learning and Teaching Excellence Award by the Science, Environment, Engineering and Technology Group, Griffith University, 2013
• Griffith University’s Learning and Teaching Citations by the Science, Environment, Engineering and Technology Group, Griffith University, 2013
• Grand Award for Research Excellence (Sustainability Specialist Group Prize) by the International Water Association (IWA), 2010
• Emerald Prize for Best Conference Paper by the Emerald’s Journal of Construction Innovation at the 8th International Postgraduate Research Conference in the Built and Human Environment, 26th-27th June 2008, Prague, Czech Republic

Research Areas:
• Innovation diffusion and management within project and organizational environments
• Building Information Modeling
• Augmented/Mixed Reality application in construction
• Applications of 3D Terrestrial Laser Scanning in construction
• Green building/sustainable construction
• Safety management in construction
• Engineering Education
• Big Data in construction engineering and management

Present Academic and Professional Activities:
• President – Association of Engineering, Project, and Production Management
• Conference Co-Chair - The 8th International Conference on Engineering, Project and Production Management (EPPM2017), 19-21 September 2017, Amman, Jordan
• Editorial Board – The Journal of Engineering, Project, and Production Management
• Scientific Co-Chair – The 7th International Conference on Engineering, Project and Production Management (EPPM2016), 21-23 September 2016, Bialystok, Poland
• Program Committee and International Advisory Board – The 10th International Conference on Project Management (ProMAC2016), 16-19 November 2016, Gold Coast, Australia
• Conference Chair – The 6th International Conference on Engineering, Project and Production Management (EPPM2015), Gold Coast, Australia
Dr. Mongkut Piantanakulchai  Nationality: Thai

Education:
Ph.D.  Transportation,
Tohoku University, Japan
M.Eng.  Transportation,
Asian Institute of Technology (AIT), Thailand
B.Eng.  Civil Engineering,
Chulalongkorn University, Thailand

Academic Awards:
• Researcher Awards from Thammasat University, 2006 and 2015
• Thomas L. Saaty’s Best Paper Award at the Eighth International Symposium on the Analytic Hierarchy Process (ISAHP), 2005
• Japanese Government (Monbukagakusho) Scholarship, 1996-2000
• Barbara and John Hugh Jones Prize (Award for the Most Outstanding Transportation Engineering Student), 1995, Asian Institute of Technology (AIT)

Research Areas:
• Intelligent transportation systems (ITS)
• Multi criteria decision making in transportation planning
• Activity based travel demand modeling
• Computable general equilibrium modelling for transport and energy policy studies
• Evacuation planning
• Traffic simulation

Present Academic and Professional Activities:
• Executive Board Member, Thai Society for Transportation and Traffic Studies
• Regular Member, Eastern Asia Society for Transportation Studies

Dr. Pruettha Nanakorn  Nationality: Thai

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

Academic Awards:
• 2003 Best Teaching Award, Sirindhorn International Institute of Technology
• The Mahesh Varma Prize (Award for the Most Outstanding Structural Engineering and Construction Student), 1991, Asian Institute of Technology (AIT), Thailand
• Gold Medal Prize, 1989, Chulalongkorn University, Thailand

Research Areas:
• Computational mechanics
• Finite element technology
• Structural optimization
• Design automation
Dr. Somnuk Tangtermsirikul  Nationality: Thai

Education:
D.Eng.  Civil Engineering,
The University of Tokyo, Japan
M.Eng.  Civil Engineering,
The University of Tokyo, Japan
B.Eng. Civil Engineering,
(Honors) Chulalongkorn University, Thailand

Academic Awards:
• Excellent Research Award, National Research Council 2016
• National Distinguished Researcher, National Research Council 2013
• Chair Professor of Siam Cement Group, since 2012
• Distinguished Scholar of Science and Technology of Thammasat University, 2008
• Outstanding Technologist Award from the Foundation for the Promotion of Science and Technology under the Patronage of H.M. the King, 2002
• Outstanding Researcher 1999, Thammasat University, Thailand
• Paper Award from JSCE, 1999
• Yoshida Award from JSCE, 1993

Research Areas:
• Modeling of concrete behavior
• Durability evaluation and service life design of concrete structures
• High performance cementitious based materials
• Special concrete
• Use of wastes and recycled materials in cement and concrete
• Repair, maintenance, and assessment of concrete structures

Present Academic and Professional Activities:
• Honorary Member, Japan Concrete Institute
• Advisor, Thailand Concrete Association
• Advisor, Civil Engineering Committee, Engineering Institute of Thailand
• Treasurer, Asian Concrete Federation
• Advisory Board of the Advanced Concrete Technology International Journal
• Editorial Board of Journal of Asian Concrete Federation
• Editorial Board of the ASEAN Engineering Journal
• Chairman of Editorial Board of the Journal of Thailand Concrete Association

Academic Rank:
Professor
E-mail: somnuk@siit.tu.ac.th
Dr. Taweep Chaisomphob  Nationality: Thai

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

Academic Awards:
• Fellow, School of Engineering, The University of Tokyo, Japan, 2007
• The Outstanding Researcher 1998, Thammasat University
• Japanese Government (Monbukagakusho) Scholarship, 1982-1987
• Gold Medal Prize, 1982, Chulalongkorn University, Thailand

Research Areas:
• Steel structures
• Structural mechanics
• Maintenance infrastructure
• Composting technology
• Social impacts on development of infrastructure

Present Academic and Professional Activities:
• President, Thailand Structural Steel Society (TSSS)
• Chairperson, Subcommittee on Hot-rolled Structural Steel, Thailand Industrial Standards Institute (TISI)
• Chairperson, Subcommittee on Cold-formed Structural Steel, Thailand Industrial Standards Institute (TISI)
• Member, Subcommittee on Certifying Civil Engineering Degree and Curriculum, Council of Engineers of Thailand

Dr. Winyu Rattanapitikon  Nationality: Thai

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

Academic Awards:
• 2011 SIIT Distinguished Teacher Award, Sirindhorn International Institute of Technology
• 2011 Best Teaching Award, Sirindhorn International Institute of Technology
• TU Outstanding Teacher in Science and Technology Award 2006, Thammasat University
• 2005 Best Teaching Award, Sirindhorn International Institute of Technology
• 1998 Best Teaching Award, Sirindhorn International Institute of Technology
• Japanese Government (Monbukagakusho) Scholarship, 1992-1995
• The James A. Linen III Memorial Prize (Award for the Most Outstanding Water Resources Development Student), 1991, Asian Institute of Technology (AIT), Thailand

Research Areas:
• Mathematical modeling
• Sediment Transport
• Beach Deformation
Construction and Maintenance Technology
Research Center (CONTEC)

Research Faculty Members

Dr. Ganchai Tanapornraweekit  Nationality: Thai

Education:
Ph.D. Civil and Environmental Engineering,
University of Melbourne, Australia
M.Sc. Engineering,
Sirindhorn International Institute of Technology (SIIT), Thammasat University (TU), Thailand
B.Eng. Civil Engineering,
Chulalongkorn University, Thailand

Academic Awards:
• IPRS & MIRS scholarships from Australian Government and University of Melbourne (2006-2010)
• Highly commended presentation in Postgrad-seminar from University of Melbourne (2009)
• SIIT Full Scholarship (2001-2004)

Research Areas:
• Fiber reinforced concrete for hybrid structures
• Degree of restraint and effects of restrained shrinkage cracks in concrete structures
• Repair and strengthening of concrete structures
• Finite element analysis (FEA) of reinforced concrete structures
• Analysis and design of structures under shock and impact including explosion/blast loads
• Explosion/blast wave propagation

Present Academic and Professional Activities:
• Committee on Concrete Materials, Thai Concrete Association (TCA)
• Advisor to the Committee on Development of Building Structures of Ministry of Defense
Dr. Krittiya Kaewmanee  Nationality: Thai

Education:
Ph.D.  Engineering,
Sirindhorn International Institute of Technology (SIIT), Thammasat University (TU), Thailand
M.Eng.  Civil Engineering,
Kochi University of Technology, Japan
B.Eng.  Civil Engineering,
SIIT, TU, Thailand

Academic Awards:
• An outstanding oral presentation award at the RGJ Seminar Series LX I: Innovation and Sustainable Development in Civil Engineering (September 4, 2008)
• Royal Golden Jubilee Scholarship (PhD Program), The Thailand Research Fund (2007)
• Master’s Degree Scholarship, Kochi University of Technology, JAPAN (1999 – 2001)

Research Areas:
• Design of concrete mix proportions
• Multi-binder concrete
• Use of waste and recycled materials in concrete
• Thermal analysis of mass concrete

Present Academic and Professional Activities:
• Member, Subcommittee on concrete and materials, Engineering Institute of Thailand
• Secretariat, Asian Concrete Federation (ACF)

Dr. Lalita Yongchaitrakul  Nationality: Thai

Education:
Ph.D.  Resources and Eco-materials Engineering, Hokkaido University, Japan
M.Sc.  Engineering, Sirindhorn International Institute of Technology (SIIT), Thammasat University (TU), Thailand
B.Eng.  Chemical Engineering, SIIT, TU, Thailand

Academic Awards:
• Ministry of Education, Culture, Sports, Science and Technology of Japan (MEXT) Scholarship (2013-2016)
• Award winning paper at conference of Sustainable Construction Materials and Technologies (SCMT4), Las Vegas, USA 2016

Research Areas:
• Cement Chemistry
• Chemical and microstructural analysis of hardened concrete
• Durability of concrete
• Alkali-silica reaction of concrete
Dr. Pakawat Sancharoen  Nationality: Thai

Education:
Ph.D.  Civil Engineering,  
The University of Tokyo, Japan
M.Eng.  Civil Engineering,  
The University of Tokyo, Japan
M.Sc.  Environmental Management,  
Chulalongkorn University, Thailand
B.Eng.  Civil Engineering,  
(2nd Class Honors) Chulalongkorn University, Thailand

Academic Awards:
• Outstanding young researcher award, Thammasat University (2012)
• Excellent Presentation Award at Annual Convention of Japan Concrete Institute (2006)
• Excellent Paper Award at Annual Convention of Japan Concrete Institute (2006)
• Excellent Presentation Award at Annual Meeting of Japan Cement Association (2003)
• Ministry of Education, Culture, Sports, Science and Technology of Japan (MEXT) Scholarship (2002-2007)
• 2nd class honors, Department of Civil Engineering, Faculty of Engineering, Chulalongkorn University, Bangkok, Thailand (2001)

Research Areas:
• Waste utilization in concrete
• Corrosion of reinforcing steel in concrete
• Durability of concrete and repairing system
• Repairing and maintenance management of reinforced concrete, pre-stressed concrete and steel structures
• Non-Destructive Testings on structures

Present Academic and Professional Activities:
• Subcommittee member (Maintenance), Thailand Concrete Association

Dr. Parnthep Julnipitawong  Nationality: Thai

Education:
Ph.D.  Civil Engineering, Hamburg University of Technology, Germany
M.Sc.  Engineering,  
Sirindhorn International Institute of Technology (SIIT), Thammasat University (TU), Thailand
B.Eng.  Building Facilities Engineering,  
(2nd Class Honors) SIIT, TU, Thailand

Academic Awards:
• 2nd Class Honors for Bachelor’s degree

Research Areas:
• Water transport in concrete
• Bleeding of concrete
• Moisture measurement techniques in concrete
• Fresh properties of concrete

Present Academic and Professional Activities:
• Subcommittee - Thai Concrete Association (TCA)
Dr. Qudeer Hussain  
Nationality: Pakistani

Education:
Ph.D. Engineering, Sirindhorn, International Institute of Technology (SIIT), Thammasat University (TU), Thailand
M.Eng. Civil Engineering, University of Engineering and Technology , Taxila, Pakistan
B.Eng. Civil Engineering, University of Engineering and Technology, Taxila, Pakistan

Academic Awards:
- Ph.D.’s degree Scholarship, Sirindhorn International Institute of Technology (SIIT), Thammasat University (TU), Thailand.
- 1st Class Honors for Bachelor’s degree

Research Areas:
- Analysis and design of reinforced concrete and steel structures.
- Seismic retrofitting and strengthening of reinforced concrete and steel structures.
- Finite element analysis (FEA) of reinforced concrete structures
- Use of wastes and recycled materials in concrete.
- Environmental hydrology, hydraulics and irrigation engineering.
- Geotechnical Investigations

Dr. Warangkana Saengsoy  
Nationality: Thai

Education:
Ph.D. Resources and Eco-materials Engineering, Hokkaido University, Japan
M.Sc. Engineering, Sirindhorn International Institute of Technology (SIIT), Thammasat University (TU), Thailand
B.Eng. Civil Engineering, (2nd Class Honors) SIIT, TU, Thailand

Academic Awards:
- NRCT Outstanding Research Project Award 2017
- Outstanding Researcher Award for research award recipients from external organizations in 2014, Thammasat University (2014)
- ACF 2014 Best Paper Award (2014)
- Outstanding Young Researcher Award, Thammasat University (2012)
- 2nd Class Honors for Bachelor’s degree (2001)

Research Areas:
- Cement Chemistry
- Hydration reaction and microstructure of cementitious system
- Chemical and microstructural analysis of hardened concrete
- Utilization of pozzolans and eco-materials in concrete
- Durability of concrete

Present Academic and Professional Activities:
- Committee on Concrete Materials, Thai Concrete Association (TCA)
- Technical Subcommittee for drafting Thai Green Label: Portland Cement and Hydraulic Cement, Thailand Environment Institute
- Committee for drafting TIS Standard: Ground Coal Bottom Ash use as an Admixture in Concrete
Dr. Banlue Srisuchinwong  Nationality: Thai

Education:
Ph.D.  Electrical Engineering,
      The University of Manchester, The UK.
M.Sc.  Electrical Engineering,
      The University of Manchester, The UK.
B.Eng.  Electrical Engineering,
        (Honors) King Mongkut’s Institute of Technology Ladkrabang, Thailand.

Academic Awards:
• The TU Distinguished Research Award 2016 in Science and Technology, Thammasat University, 26 December 2016.
• The Gold Paper Award 2016, the IEEE Management and Innovation Technology International Conference (MITicon 2016), October 2016.
• The SIIT Research Award 2011, SIIT, 28 June 2012.
• The ICT Award 2010, (the 3rd-prize award), the Ministry of Information and Communication Technology (MICT), 9 March 2011.
• The British Council Scholarship, the UK, October 1989-1991.
• The Overseas Research Studentship (ORS) Award, CVCP, the UK, October 1988-1989.
• The Philips Scholarship, Philips International Institute of Technological Studies (PII), and Philips Research Laboratories, Eindhoven, the Netherlands, January 1987-February 1988.

Research Areas:
• Microelectronics
• Periodic/chaotic circuits and systems

Present Academic and Professional Activities:
• Associate Member, Thai Academy of Science and Technology Foundation
• Researcher, National Research Council of Thailand (NRCT)
• Member, Academic Committee No. 900, Thai Industrial Standard Institute, Ministry of Industry, 1997-2013
• Treasurer, Electrical Engineering/Electronics, Computer, Telecommunications and Information Technology (ECTI) Association, 2004-2010
• Secretary General, Electrical Engineering/Electronics, Computer, Telecommunications and Information Technology (ECTI) Association, 2002-2003
Dr. Cholwich Nattee  Nationality: Thai

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

Academic Awards:
- Finalist of “Telecom Prototype Award” from the Telecommunications Research and Industrial Development Institute (with K. Zintus-art, S. Saetia, and V. Pongpamich)
- Young Researcher Award 2009, Thammasat University
- Very Good Research Award 2008, Thammasat University
- Japanese Government (Monbukagakusho) Scholarship, 1998-2004

Research Areas:
- Artificial intelligence
- Machine learning
- Knowledge discovery and data mining
- Artificial intelligence applications in distance learning
- Pattern recognition

Dr. Chalie Charoenlarpnopparut  Nationality: Thai

Education:
Ph.D. Electrical Engineering,
   The Pennsylvania State University, University Park, PA, USA
M.S. Electrical Engineering,
   The Pennsylvania State University, University Park, PA, USA
B.Eng. Electrical Engineering,
   (1st Class Honors) Chulalongkorn University, Bangkok, Thailand

Academic Awards:
- 2011 SIIT Research Award 2011
- 2010 Distinguished Teacher Award, SIIT
- 2010 Best Teaching Award, SIIT
- 2008 Outstanding Teacher in Science and Technology Award, Thammasat University
- 2006 Best Teaching Award, SIIT
- 2002 Best Teaching Award, SIIT
- Best Presenter-in-the-track Award, Automatic Control Conference, USA, 1998
- Gold Medal Prize, 1993, Chulalongkorn University

Research Areas:
- Multidimensional systems and signal processing
- Image processing/pattern recognition
- Signal processing for communication
- STEM Education & Learning
- Smart grid Technology: renewable energy and energy storage

Present Academic and Professional Activities:
- Associate Editor, Multidimensional Systems and Signal Processing, an international journal, Springer, USA
- Sigma Xi, The Science Research Society, USA, 2000
- Phi Kappa Phi Honor Society, USA, 1995
// Dr. Ekawit Nantajeewarawat  Nationality: Thai

Education:
D.Eng.  Computer Science,
Asian Institute of Technology (AIT), Thailand
M.Eng.  Computer Science,
Asian Institute of Technology (AIT), Thailand
B.Eng.  Computer Engineering,
Chulalongkorn University, Thailand

Academic Awards:
• Very Good Research Award 2008, Thammasat University
• 2001 Best Teaching Award, SIIT
• Outstanding Dissertation Award 1999, National Research Council of Thailand (NRCT)
• 1997 Best Teaching Award, SIIT

Research Areas:
• Knowledge representation
• Automated reasoning
• Knowledge-based software engineering
• Semantic web
• Information extraction

// Dr. Gun Srijuntongsiri  Nationality: Thai

Education:
Ph.D.  Computer Science,
Cornell University, USA
M.S.  Computer Science,
Cornell University, USA
B.S.  Computer Science,
Cornell University, USA

Academic Awards:
• NRCT Dissertation Award 2012
• Thammasat University Young Researcher Award 2012
• 22nd Place in the 2000 ACM Programming Contest World Finals
• King’s Scholarship, 1997

Research Areas:
• Scientific computing and numerical analysis, with focus on intersection problems and optimization
Dr. Itthisek Nilkhamhang  
**Nationality: Thai**

**Education:**
- Ph.D. Integrated System Design Engineering, Keio University, Tokyo, Japan
- M.Eng. Integrated System Design Engineering, Keio University, Tokyo, Japan
- B.Eng. Electrical Engineering, (1st Class Honors) Sirindhorn International Institute of Technology, Thammasat University, Thailand

**Academic Awards:**
- Outstanding Young Researcher Award, Thammasat University, 2014
- Best Teaching Award, Sirindhorn International Institute of Technology, 2014
- Japanese Government (Monbukagakusho) Scholarship, 2005-2008
- Keio Graduate Scholarship, 2002-2005

**Research Areas:**
- Robust and adaptive control
- Iterative control
- System identification
- Nonlinear systems
- Mechatronics
- Robotics

Dr. Komwut Wipusitwarakun  
**Nationality: Thai**

**Education:**
- Ph.D. Communication Engineering, Osaka University, Osaka, Japan
- M.Eng. Communication Engineering, Osaka University, Osaka, Japan
- B.Eng. Electrical Engineering, (Honors) Chulalongkorn University, Thailand

**Academic Awards:**

**Research Areas:**
- Mobile Code
- 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
  - Network Virtualization
Dr. Nguyen Duy Hung  Nationality: Vietnamese

Education:
Ph.D. Remote Sensing and GIS, Asian Institute of Technology (AIT), Thailand
M.Eng. Computer Science, AIT, Thailand
B.Eng. Electronics and Telecommunication, Hanoi University of Technology, Vietnam

Academic Awards:
• JICA scholarship, 2003-2006, AIT
• Hisamatsu prize (Award for the Most Outstanding Computer Science Student), 2002, AIT
• Bronze medal in International Chemistry Olympiad, 1996, Russia

Research Areas:
• Artificial Intelligence
• Multi-agents
• Argumentation
• Proof Procedures
• Dialogues
• Contract Dispute Resolution Systems

Dr. Nirattaya Khamsemanan  Nationality: Thai

Education:
Ph.D. Mathematics, University of California, Los Angeles (UCLA), USA
M.A. Mathematics, University of California, Los Angeles (UCLA), USA
B.A. Mathematics, (Cum Laude) Cornell University, USA

Academic Awards:
• 2009 Best Teaching Award, Sirindhorn International Institute of Technology
• The Robert Sorgenfrey Distinguished Teaching Assistant Award 2005, Department of Mathematics, UCLA, CA
• The Cranson W. and Edna B. Shelly Award for Excellence in Undergraduate Research in Astronomy 1999-2000, Cornell University, NY
• Development and Promotion of Science and Technology Talents Project (DPST) Scholarship, 1996-2006

Research Areas:
• Algebraic topology
• Cryptography
• Intelligent User Interface (IUI)
• Machine learning
Dr. Pakinee Aimmanee

Nationality: Thai

Education:
Ph.D.  Applied Mathematics,  
University of Colorado, USA
M.S.  Applied Mathematics,  
University of Colorado, USA
B.S.  Mathematics,  
(Cum Laude) University of Delaware, USA

Academic Awards:
• The Best Journal paper award 2016 awarded by the Institute of Electronics, Information, and Communication Engineering, Japan
• A large project award 2014 awarded by Thammasat University
• A Very Good Research Award 2008 awarded by Thammasat University
• A Stribic fellowship awarded to women who succeed in teaching and researching by University of Colorado at Boulder, 2002-2003
• A William Clark Prize, a prize given to an excellent student in Mathematics by University of Delaware, 1999
• Development and Promotion of Science and Technology Talents Project (DPST) Scholarship, 1995-2005
• A Second prize winner in a science competition, Chiang Mai University, 1993

Research Areas:
• Information retrieval
• Data mining
• Applied mathematics
• Image processing
• Acoustic processing
• Information Hiding
• Information Extraction
Dr. Prapun Suksompong  Nationality: Thai

Education:
Ph.D.  Electrical and Computer Engineering, Cornell University, Ithaca, New York, USA
M.S.  Electrical and Computer Engineering, Cornell University, Ithaca, New York, USA
B.S.  Electrical and Computer Engineering (Summa Cum Laude) Engineering, Cornell University, Ithaca, New York, USA

Academic Awards:
• 2013 Best Teaching Award, Sirindhorn International Institute of Technology
• 2013 Outstanding Young Researcher Award, Thammasat University
• 2011 SIIT Research Award
• 2009 Best Teaching Award, Sirindhorn International Institute of Technology
• 2006 Teaching Assistant of the Year, Cornell IEEE student branch
• 2002 Fellowship, Cornell University
• King’s Scholarship, 1997

Research Areas:
• Wireless communications
• Cognitive radio
• Indoor positioning principles and localization techniques
• Computational neuroscience
• Energy-efficient coding
• Poisson process and Poisson convergence
• Community-contributed networks

Dr. Sasiporn Usanavasin  Nationality: Thai

Education:
Ph.D.  Software Engineering, Keio University, Japan
M.S.  Software Engineering, Keio University, Japan
B.Sc. Information Technology, Sirindhorn International Institute of Technology, Thailand (1st Class Honors)

Research Areas:
• Software Engineering
• Semantic Web and Knowledge Engineering
• Service Science and Service Innovation

Present Academic and Professional Activities:
• Head, Special Interest Group for Service Science in Education, NECTEC
• Committee, Service Research Innovation Technical Committees, NECTEC
Dr. Somsak Kittipiyakul  Nationality: Thai

Academic Rank: Assistant Professor
E-mail: somsak@siit.tu.ac.th

Education:
Ph.D. Electrical and Computer Engineering, University of California at San Diego, USA
M.Eng.&S.B. Electrical Engineering and Computer Science, Massachusetts Institute of Technology, USA

Research Areas:
- Wireless communications and networking
- Resource allocation and scheduling
- Performance analysis of queuing systems
- Optimization
- Smart grid
- Forecasting

Dr. Stanislav S. Makhanov  Nationality: Russian

Academic Rank: Professor
E-mail: makhanov@siit.tu.ac.th

Education:
Ph.D. Applied Mathematics, Computer Center of the Russian Academy of Science, Moscow, Russia
Diploma English Language, Moscow State University of Linguistics, Russia
M.Sci. Applied Mathematics, Moscow State University, Russia

Academic Awards:
- Excellent Publication Award 2016, SIIT
- Excellent Research Award 2015, SIIT
- Very Good Research Award, 2009, Thammasat University
- Very Good Research Award, 2007, Thammasat University
- Outstanding Research Award, 2006, Thammasat University

Research Areas:
- Robotics
- Image processing
- Pattern Recognition
- Grid generation
Dr. Toshiaki Kondo  Nationality: Japanese

Education:
Ph.D.  Image Processing,
      National University of Singapore, Singapore
M.Eng. Image Processing,
      The University of Sydney, Australia
M.Eng. Information Processing,
      Tokyo Institute of Technology, Japan
B.Eng. Mechanical Engineering,
      Tokyo Institute of Technology, Japan

Academic Awards:
• Best Paper Award at the 9th Regional Conference on Electrical and Electronics Engineering (RCEEE 2016), Vietnam, 2016.
• Best Teaching Award, Sirindhorn International Institute of Technology, 2016.
• Outstanding Presentation Award at the 30th JSST Annual Conference (JSST 2011), Japan, 2011.
• Outstanding Poster Award at the 12th International Conference on Biomedical Engineering (ICBME 2005), Singapore, 2005.
• NUS (National University of Singapore) Research Scholarship, 1999-2003.

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)

Dr. Teerayut Horanont  Nationality: Thai

Education:
Ph.D.  Spatial Information Engineering,
      The University of Tokyo, Japan
M.Sc.  Remote Sensing and Geographic Information System,
      Asian Institute of Technology (AIT), Thailand
B.Arch.  Architecture,
      Chulalongkorn University, Thailand

Academic Awards:
• Best Paper, PURBA Workshop, ACM Ubicomp conference 2013
• Best Paper, 5th International Conference on Health GIS 2013
• Best Paper, AsiaGIS conference 2008
• Young GIS Professional Award, Asia Geographic Information System Association, 2008
• Japanese Government Mombukagakusho Scholarship 2007-2010
• Biography in Asian/American Who’s Who, selected by editor, Vol. IV, 2004
• Ed Forrest Internship Program awards, The Geospatial Information & Technology Association (GITA), USA, 2003
• The John A. Hrones Prize for outstanding academic works, School of Advanced Technologies, AIT, 2002
• AIT Institute Fellowship (Full Scholarship) Award, 2001

Research Areas:
• Geographic Information System (GIS)
• Urban Computing
• Indoor Navigation
• Geospatial Big Data Platform Development and Analysis
• Smart City and Precision Agriculture
• Open Source Software and Open Standards Development

Present Academic and Professional Activities:
• Voting Member, IndoorGML, Open Geospatial Consortium (OGC)
Dr. Thanaruk Theeramunkong  Nationality: Thai

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

Academic Awards:
• 43rd Innovation contest at Geneva (2015)
• National Distinguished Researcher Award 2014 from National Research Council of Thailand (NRCT)
• Very Good Research Awards 2008-2010, Thammasat University
• Best Paper Award from the Japanese Society for Artificial Intelligence, 1994
• Scholarship from Tokyo Marine, 1992-1995
• Japanese Government (Monbukagakusho) Scholarship, 1985-1991

Research Areas:
• Natural language processing
• Artificial Intelligence
• Knowledge data discovery
• Information retrieval
• Data mining
• Machine Learning (ML)
• Intelligent information systems

Dr. Waree Kongprawechnon  Nationality: Thai

Education:
Ph.D.  Mathematics Engineering and Information Physics,
The University of Tokyo, Japan
M.Eng.  Control Engineering,
Osaka University, Japan
B.Eng.  Electrical Engineering,
(1st Class Honors) Chulalongkorn University, Thailand

Academic Awards:
• Japanese Government (Monbukagakusho) Scholarship, 1992-1998

Research Areas:
• The theory in \( H_{\infty} \) control
• Control theory
• Robust control
• System identification
• Adaptive control
• Learning control
• Neural network
• Machine learning
Dr. Virach Somlertlamvanich
Nationality: Thai

Education:
D.Eng. Computer Science, Tokyo Institute of Technology, Japan
M.Eng. Precision Mechanics, Kyoto University, Japan
B.Eng. Precision Mechanics, Kyoto University, Japan

Academic Awards:
- ASEAN Outstanding Engineering Achievement Award 2011, AFEO
- Best paper award in 2009 ACM International Workshop on Intercultural Collaboration
- Best paper award in 2009 National Conference on Computing and Information Technology
- The Most Outstanding Researcher of the Year 2003, in Information Technology and Communication, awarded by The National Research Council of Thailand
- Consolation Prize for "Thai Text to Speech Engine", awarded by Thai Research Council for Innovation in Science Technology and Industry section in 2002
- Researcher of the Year 2001, awarded by The Nation Newspaper
- 10 Best IT events of 2000, awarded by The Nation Newspaper to “ParSit” web-based machine translation service

Research Areas:
- Natural Language Processing (NLP)
- Machine translation
- Knowledge representation
- Interlingua (language intermediate representation)
- Corpus-based approach NLP
- Stochastic approach NLP
- Syntactic and morphological analysis
- Open source software activities
- Information retrieval/extraction
- Text summarization
- Web language engineering
- Social networking system
- Mobile application
- Data mining and big data
- Artificial Intelligence (AI)

Present Academic and Professional Activities:
- Chair (2016-present) Digital Cluster, Research University Network (RUN)
- Director (2006-present) Asia-Pacific Association for Machine Translation (AAMT)
- Executive Committee (2004-present) Asian Federation of NLP (AFNLP)
- Specialist (2001-present) W3C
- Specialist (2005-present) ISO/TC 37/SC 4 (Language resources management)
- Specialist (2005-present) ISO/IEC JTC 1/SC 34 (Document description and processing languages)
- Board member (2003-present) Asia Open Source Software Symposium (AOSS)
School of Management Technology

Dr. Aussadavut Dumrongsiri  Nationality: Thai

Education:
Ph.D. Business Administration Operations Management, University of Washington, Seattle, WA, USA
M.Sc. Industrial and Operations Engineering, The University of Michigan, Ann Arbor, MI, USA
M.Sc. Electrical Engineering, Michigan State University East Lansing, MI, USA
B.Eng. Electrical Engineering, Chulalongkorn University, Thailand

Academic Awards:
- Bertauche Endowment Fellowship, University of Washington, USA
- Evert McCabe Fellowship, University of Washington, USA

Research Areas:
- Operations management
- Supply chain management
- E-Business
- E-Word of Mouth
- Project management
- Inventory management
- Game theory
- Business competition

Present Academic and Professional Activities:
- Member of Institute for Operations Research and the Management Sciences (INFORMS)
- Member of Decision Science Institute (DSI)

Dr. Chawalit Jeenanunta  Nationality: Thai

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

Academic Awards:
- Development and Promotion of Science and Technology Talents Project (DPST) Scholarship, 1990-2004

Research Areas:
- Linear programming
- Integer programming
- Network optimization
- Simulation
- Supply chain management
Dr. Jing Tang  Nationality: Chinese

Education:
Ph.D.  Industrial Engineering and Management, Tokyo Institute of Technology, Japan
M.Eng. Industrial Engineering and Management, Tokyo Institute of Technology, Japan
B.A.  Industrial Engineering, Xi’an Jiaotong University, China
B.Eng. Computer Science and Technology, Xi’an Jiaotong University, China

Academic Awards:
- Japanese Government Scholarship (MEXT), 2009-2013

Research Areas:
- Enterprise engineering
- System modeling and simulation
- IT and business alignment
- Innovation Management

Dr. Morrakot Raweewan  Nationality: Thai

Education:
Ph.D.  Industrial Engineering, Clemson University, USA
M.S.  Mathematics, Virginia Polytechnic Institute and State University (Virginia Tech), USA
B.Sc.  Applied Mathematics, (2nd Class Honors) King Mongkut’s Institute of Technology Ladkrabang, Thailand

Academic Awards:
- Alpha Pi Mu Industrial Engineering Honor Society (since 2005)
- Royal Thai Government Scholarship, 1997-2003
- Bank of Thailand Scholarship, 1994-1995
- Thailand Science Academic Excellence Award, 1995
- ICI Company Limited Scholarship, 1991
- Selected nationally to present a science project at 1990 Asian Pacific Science Week, Singapore
- Young Creative Scientist of Thailand, 1989
- Best High School Science Project of Thailand, 1989

Research Areas:
- Analysis of supply chain models
- Simulation modeling
- Applied optimization
Dr. Narameth Nananukul  
Nationality: Thai

Education:
- Ph.D. Operations Research and Industrial Engineering, University of Texas at Austin, USA
- M.S. Industrial Engineering, Texas A&M University, USA
- M.Eng. Electrical Engineering, Chulalongkorn University, Thailand
- B.Eng. Electrical Engineering, Chulalongkorn University, Thailand

Academic Awards:
- Cullen Trust for Higher Education Endowed Professorship in Engineering Fellowship, University of Texas at Austin, 2006-2007
- Graduate School Continuing Fellowship, University of Texas at Austin, 2007-2008

Research Areas:
- Business Intelligence
- Inference and Data Mining
- Decision Support System
- Optimization in Supply chain
- Energy System and Online Advertising
- Quality Management

Present Academic and Professional Activities:
- Reviewer, Journal of Applied Mathematical Modelling
- Member, The Institute for Operations Research and the Management Sciences (INFORMS)

Dr. Nattharika Rittippant  
Nationality: Thai

Education:
- Ph.D. Strategic and International Management, The University of Texas at Arlington, USA
- M.M. E-Commerce, University of Dallas, USA
- M.B.A. International Business Management, University of Dallas, USA
- B.A. Economics, University of Dallas, USA
- B.S. Biology, University of Dallas, USA

Research Areas:
- Entrepreneurial intentions
- MNE and international strategies
- Strategic management
- CSR
Dr. Natsuda Kaothanthong  
**Nationality: Thai**

**Education:**
- Ph.D. Information Science, Tohoku University, Japan
- M.S. Information Science, Tohoku University, Japan
- B.S. Information Technology, Sirindhorn International Institute of Technology, Thammasat University, Thailand

**Research Areas:**
- Pattern Recognition
- Computer Vision
- Information Retrieval
- Data Mining
- Machine Learning

Dr. Pisit Chanvarasuth  
**Nationality: Thai**

**Education:**
- Ph.D. Management Information Systems, Rensselaer Polytechnic Institute, USA
- M.S. Management Information Systems, Rensselaer Polytechnic Institute, USA
- M.B.A. Finance, Loyola University Chicago, Chicago, USA
- D.V.M. Doctor of Veterinary Medicine, Chulalongkorn University, Thailand

**Research Areas:**
- Information technology management
- Electronic business
- Supply chain management
- Outsourcing
- Management of organizational business processes

Dr. Rujira Chaysiri  
**Nationality: Thai**

**Education:**
- Ph.D. (Systems Engineering), University of Virginia, USA
- M.S. (Operations Research), Columbia University, USA
- B.A. (Mathematics), University of Virginia, USA

**Academic Awards:**
- Development and Promotion of Science and Technology Talents Project (DPST) Scholarship, 2001-2016

**Research Areas:**
- Systems Integration
- Nonlinear Systems
- Dynamical Systems and Control
// Dr. Ryoju Hamada  Nationality: Japanese

Education:
- Ph.D. Information Science, Tohoku University, Japan
- M.Sc. Information Science, Tohoku University, Japan
- L.L.B. Labor Law, Tohoku University, Japan
  Diploma Information Technology for Business Value, National University of Ireland, Ireland

Academic Awards:
- Best Poster Award, 45th International Simulation and Gaming Association (ISAGA) Annual Conference, 2014
- Best Paper Award, Japan Association of Simulation and Gaming, 2014

Research Areas:
- Intellectual property
- Privacy
- Entrepreneurship
- Business Gaming

Present Academic and Professional Activities:
- Member, Editorial Committee, Japan Association of Simulation and Gaming, 2013- present
- Program Chair, 2nd annual conference of Japan Association of Simulation and Gaming, 2014
- Member, Editorial Committee, Japan Society of Security Management, 2006-2010
- Board member, Japan Society of Security Management, 2006-2010

// Dr. Suebsak Nanthavanij  Nationality: Thai

Education:
- Ph.D. Industrial Engineering, The University of Texas at Arlington, USA
- M.S. Industrial Engineering, The University of Texas at Arlington, USA
- B.S. Chemical Engineering, Chulalongkorn University, Thailand

Research Areas:
- Industrial ergonomics
- Product and workstation design
- Industrial noise
// Dr. Suthathip Suanmali  Nationality: Thai

Education:
Ph.D.  Mathematics,
North Carolina State University, USA
M.S.  Applied Mathematics,
North Carolina State University, USA
B.S.  Mathematics and Financial
(Summa Cum Laude) Economics, Methodist University, USA

Academic Awards:
• Distinguished Paper Award, 2014 International Symposium on Business and Management
• Best Paper Award 2012, World Business Research Conference (organized by World Business Institute)
• 2011 Best Teaching Award, Sirindhorn International Institute of Technology
• 2008 Best Teaching Award, Sirindhorn International Institute of Technology
• The Armstrong Maltbie Award for Excellence in Teaching, North Carolina State University, April 2006
• Outstanding Teaching Assistant Award, North Carolina State University, April 2005
• The Balaez-Ambrose Outstanding Mathematics Award, Methodist University, April 2002
• The Walter Clark Maximum Effort Award from the Reeves School of Business, Methodist University, April 2002

Research Areas:
• Applied linear algebra
• Highway assets maintenance and management system
• Regional trade analysis
• Cross border trade facilitation

// Dr. Thanwadee Chinda  Nationality: Thai-Australian

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

Academic Awards:
• Thammasat University Researcher Award, 2013
• “Master of Excellence 2002”, Griffith University, Australia

Research Areas:
• Construction safety management
• Construction waste
• System dynamics modeling
• Structural equation modeling
Dr. Veeris Ammarapala  Nationality: Thai

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

Academic Awards:
• Outstanding Research Award 2011, Thammasat University
• Outstanding Research Award 2010, Thammasat University
• Best Paper Award at the 8th International Conference on Information and Management Sciences (ICMIS 2009), Kunming, China, 2009
• Outstanding Research Award 2009, Thammasat University
• Outstanding Research Award 2008, Thammasat University

Research Areas:
• Decision support systems
• Risk management
• Transportation Maintenance Management System

Dr. Bundit Limmeechokchai  Nationality: Thai

Education:
D.Eng.  Energy Economics and Planning, Asian Institute of Technology (AIT), Thailand
M.Eng.  Energy Technology, Asian Institute of Technology (AIT), Thailand
B.Eng.  Mechanical Engineering, (1st Class Honors) King Mongkut’s Institute of Technology North Bangkok (KMITNB), Thailand

Research Areas:
• Energy efficiency, economics, planning and policy
• GHG mitigation
• Modeling of energy and environment systems
• Low-carbon technologies
Dr. Chung-Hao Hsu  Nationality: Taiwanese

Education:
Ph.D. Mechanical Engineering, Texas A&M University, USA
M.S. Applied Mechanics, National Taiwan University, Taiwan
B.S. Mechanical Engineering, National Chung Cheng University, Taiwan

Research Areas:
- Nano energy with application in renewable energy technologies and thermal management of integrated circuits (IC)
- Materials sciences and engineering
- Nanotechnology fabrication
- Mechanical design and automotive engineering
- Finance theory in technology management

Dr. Jirachai Buddhakulsomsiri  Nationality: Thai

Education:
Ph.D. Industrial Engineering, Oregon State University, USA
M.S. Statistics, Oregon State University, USA
M.S. Industrial Engineering, Oregon State University, USA
B.Eng. Chemical Engineering, Chulalongkorn University, Thailand

Research Areas:
- Logistics and supply chain management in inventory management and optimization, vehicle routing with transshipment, and supply contract
- Applied operations research
- Production planning and control
- Systems simulation
- Data mining
- Engineering economics analysis

Dr. Maroay Phlernjai  Nationality: Thai

Education:
D.Eng. Mechano-Micro Engineering, Tokyo Institute of Technology, Japan
M.Eng. Mechano-Micro Engineering, Tokyo Institute of Technology, Japan
B.Eng. Mechanical Engineering, Sirindhorn International Institute of Technology (SIIT), Thammasat University, Thailand

Research Areas:
- Variable transmission system in Robotics
- Machine design
- Differential mechanism
- CAD/CAM
Dr. Navee Chiadamrong  Nationality: Thai

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

Research Areas:
- Cellular manufacturing systems (CMS)
- Advanced manufacturing systems
- Systems simulation
- Production planning and control
- Supply chain management

Dr. Pisal Yenradee  Nationality: Thai

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

Research Areas:
- Production and Inventory control (P&I/C) systems, JIT, MRP, and TOC
- P&I/C systems for Thai industries
- P&I/C in supply chain
- Applied operations research
- Real time optimal vehicle route planning and control.

Dr. Satha Aphornratana  Nationality: Thai

Education:
Ph.D.  Mechanical Engineering, The University of Sheffield, England
B.Sc.  Mechanical Engineering, Prince of Songkla University, Thailand

Research Areas:
- Refrigeration systems
Dr. Stefano Starita  
Nationality: Italian

Education:
Ph.D.  (Management Science),
University of Kent, UK
M.S.  (Computer Science Engineering),
Federico II University of Naples, Italy
B.S.  (Computer Science Engineering),
Federico II University of Naples, Italy

Research Areas:
- Operational Research for disaster management
- Optimization approaches for critical infrastructure protection
- Infrastructure and transportation investment planning
- Air traffic management
- Revenue management
- Heuristic optimization

Dr. Suchada Rianmora  
Nationality: Thai

Education:
D.Eng.  Design and Manufacturing Engineering,
Asian Institute of Technology (AIT), Thailand
M.Eng.  Industrial Production Technology,
Kasetsart University, Thailand
B.Eng.  Industrial Engineering,
Sirindhorn International Institute of Technology (SIIT), Thammasat University, Thailand

Research Areas:
- Structured light system-based selective data acquisition
- Reverse engineering
- Application of image processing in manufacturing process
- Adaptive layered manufacturing
- CAD/CAM

Dr. Sun Olapiriyakul  
Nationality: Thai

Education:
Ph.D.  Industrial Engineering,
New Jersey Institute of Technology (NJIT), USA
M.S.  Industrial Engineering,
San Jose State University, USA
B.Eng.  Mechanical Engineering,
Sirindhorn International Institute of Technology (SIIT), Thammasat University, Thailand

Academic Awards:
- Best Presentation Award at the 5th KKU International Engineering Conference (KKU-IENC), 2014
- Doctoral Scholarship in Nanotechnology awarded by the Office of the Higher Education Commission (OHEC), 2005

Research Areas:
- Industrial Ecology
- Sustainability of Supply Chain Networks
- Sustainable Workforce Scheduling
// Dr. Thananchai Leephakpreeda  Nationality: Thai

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

Academic Awards:
- Gold Medal Award 2014, Taipei International Invention show & Technomart
- Very Good Research Award 2006, Thammasat University
- Thailand’s Young Scientist Award 2002, Foundation for the Promotion of Science and Technology under the Patronage of His Majesty the King, Thailand
- The Award-Winning Book of Thammasat University, Dynamic Systems and Control, 2002

Research Areas:
- Process control and modeling
- Robotics
- Expert control systems
- Neural networks and fuzzy logics
- System identification
- Numerical simulation and optimization

// Dr. Thunyaseth Sethaput  Nationality: Thai

Education:
Ph.D.  Systems and Control Engineering,
Case Western Reserve University, Ohio, USA
B.Eng.  Mechanical Engineering,
Sirindhorn International Institute of Technology (SiIT),
Thammasat University, Thailand

Research Areas:
- Systems Biology
- Biomedical Mechanics
- Neurosurgical Systems
- Cardiovascular Systems
- Simulation Modeling
- Signal Analysis
- Computational Fluid Dynamics (CFD)
Dr. Warut Pannakkong  Nationality: Thai

Education:
Ph.D.  Knowledge Science,  
Japan Advanced Institute of Science and Technology, Japan
M.Eng.  Logistics and Supply Chain Systems Engineering,  
Sirindhorn International Institute of Technology, Thammasat University, Thailand
B.Eng.  Industrial Engineering  
(1st Class Honors), Sirindhorn International Institute of Technology, Thammasat University, Thailand

Research Areas:
• Time series forecasting  
• Data mining  
• Logistics and supply chain management  
• Discrete-event systems simulation  
• Agro-industry management  
• Vehicle routing and scheduling

Dr. Vladimir I. Kuprianov  Nationality: Russian

Education:
D.Eng.  Steam Boilers and Steam Generators,  
Moscow Power Engineering Institute (MPEI), Russia  
Honors Diploma of Engineer  
(Equiv. to BEng & MEng in Mechanical Engineering), MPEI, Russia

Academic Awards:
• Outstanding Research Award 2015, Thammasat University
• Best Paper Award at the 7th TSME International Conference of Mechanical Engineering, 2016

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
Instructors

Department of Common and Graduate Studies English Training Unit

Mr. Aaron Larsen

Education:
M.Ed.  Teaching Foreign Languages, University of Southern Queensland, Australia.
B.A.  Applied Linguistics/Development Studies, Australian National University, Australia.
TESL/TEFL Certificate (120 hours), TEFLPlus Teaching Training, Patong Language School, Phuket, Thailand.
Advanced Certificate in Policing, Northern Territory University, Australia.

Dr. Egill Hedinn Bragason

Education:
Ph.D.  Psychology, Institute of Psychology, University of Aarhus, Denmark.
M.Sc.  Psychology, Institute of Psychology, University of Aarhus, Denmark.
B.A.  Psychology, University of Iceland, Reykjavik, Iceland.

Mr. Mark Edward Refsdal

Education:
M.B.A.  International Finance, Thunderbird School of Global Management, Arizona State University, USA
B.A.  English Literature, St. Olaf College, USA

Mr. Sasawat Mahavan

Education:
TESOL  Teaching English to Speakers of Other Languages, Payap University, Chiang Mai, Thailand.
B.A.  Management Information System, Armstrong University, Berkeley, CA, USA.
OCP  Oracle Certified Professional 7.3
Sirindhorn International Institute of Technology (SIIT)

SIIT at Rangsit

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99 Moo 18, Km. 41 on Paholyothin Highway
Khlong Luang, Pathum Thani 12120, Thailand
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SIIT at Bangkadi

Address: Bangkadi Industrial Park
131 Moo 5, Tiwanond Road
Mueang, Pathum Thani 12000, Thailand
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Fax.: +66-2-501-3524

Mailing Address: P.O. Box 22, Thammasat-Rangsit Post Office
Pathum Thani 12121, Thailand
Email: admissions@siit.tu.ac.th
Website: http://www.siit.tu.ac.th

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