

# MASTER OF ENGINEERING PROGRAM IN LOGISTICS AND SUPPLY CHAIN SYSTEMS ENGINEERING (INTERNATIONAL PROGRAM)

## CURRICULUM TITLE

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

## DEGREE TITLE

Master of Engineering (Logistics and Supply Chain Systems Engineering)

## APPLICANT'S QUALIFICATIONS

1. The applicant must hold a bachelor's degree in engineering, science, or a related field that is accepted by the SIIT Academic Committee.
2. The applicant must have a top 20% class rank for his/her bachelor's degree, or a cumulative GPA of at least 2.75, or a cumulative GPA of at least 2.5 with sufficient relevant research or work experience as specified by the SIIT Academic Committee.
3. The applicant must submit an official score of one of the following English language tests:
  - TOEFL score of not less than 400 (paper-based) or 97 (computer-based), or 32 (internet-based)
  - IELTS score of not less than 4.5
  - TU-GET score of not less than 400

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

In the case of no English score or a score less than the above requirements, the applicant may be admitted with conditions that he/she must take SIIT English remedial courses and/or SIIT English proficiency tests, and meet the requirement set by the institute.

## ADMISSION REQUIREMENTS

1. Two letters of recommendation.
2. The applicant must pass a selection process which may include an interview conducted by an SIIT Committee consisting of at least 3 faculty members.
3. Admission to the program requires approval by the SIIT Academic Committee.

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

## ACADEMIC SYSTEM

1. All courses are conducted in English. An academic year is divided into two semesters. Each semester consists of 15 weeks. Courses may be offered for a summer semester of at least eight weeks duration. The total number of lecture hours required for the summer semester is the same as that for the regular semester. Enrollment for summer courses is optional.
2. Curriculum
  - 2.1 Study Plan A  
This syllabus consists of prescribed coursework (24 credits) and thesis (15 credits). A total of 39 credits is required for completion of the program.
  - 2.2 Study Plan B  
This syllabus focuses on coursework (not less than 33 credits). Independent study (not less than 6 credits) and comprehensive examination are required for completion of the program.

### 3. Thesis (Study Plan A)

3.1 A student can register for thesis credit(s) after he or she has studied for at least 1 regular semester or has gained 12 credits with a minimum cumulative GPA of 3.00.

#### 3.2 Thesis's Committee

The Thesis Committee consists of at least three members:

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

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

#### 3.3 Thesis Final Defense Committee

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

### 4. Independent Study (Study Plan B)

4.1 A student can register for independent study after he or she has gained at least 18 credits with a minimum cumulative GPA of 3.00.

4.2 A student can take the final examination of an independent study only after he or she obtained "P" (Pass) for his or her comprehensive examination and satisfied English proficiency requirements.

#### 4.3 Independent Study Examination

SIIT shall appoint a project advisor and, if required, a project co-advisor to advise the student on the independent study

4.3.1 The project advisor must be a faculty member of SIIT with a doctoral degree or equivalent, or has an academic rank of at least associate professor in the program or a related program.

4.3.2 SIIT shall appoint a project committee of at least 3 persons consisting of the project advisor, project co-advisor (if needed), faculty member(s) of SIIT, and an external member if necessary.

#### 4.4 Comprehensive Examination

4.4.1 A comprehensive examination can be taken if the student has gained 24 credits with a minimum cumulative GPA of 3.00.

4.4.2 A student must pass the comprehensive examination within a maximum of three times. If the student cannot pass the comprehensive examination, the status of the student will be terminated. Results of all comprehensive examinations will be recorded in the student's academic record.

## PERIOD OF STUDY

The minimum period of study to complete the program is 2 academic years and the maximum is 5 academic years.

## REGISTRATION

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

## ACADEMIC PERFORMANCE EVALUATION AND GRADUATION

### 1. Evaluation of Academic Performance

- 1.1 A credit will be earned only if the grade is "S" or not lower than grade "C". Grade "D" or "F" will be included in the calculation of the grade point average of each semester and for the cumulative grade point average.
- 1.2 Any student, who gets grade "U","D", or "F" in a compulsory course, can re-enroll in that course only one more time. His or her student status will be terminated if he or she still fails to obtain grade "S" or at least "C" for the course in the second enrollment.
- 1.3 Thesis assessment and independent study assessment are graded as follows:
  - S (Satisfactory)
  - U (Unsatisfactory)Students must receive grade "S" for their theses/independent studies.
- 1.4 Additional course assessment and English proficiency requirements are graded as follows:
  - P (Pass)
  - N (Not Pass)

### 2. Graduation Requirements

- 2.1 Graduation requirements (Study Plan A)  
Students must meet the following minimum requirements:
  - 2.1.1 Twenty-four credits of courses required by the curriculum with a cumulative GPA of at least 3.00. In addition, the grade of each of these courses must be at least "C."
  - 2.1.2 Fifteen credits of thesis work with grade "S" and passing a thesis defense.
  - 2.1.3 Approval of the thesis by the thesis committee.
  - 2.1.4 At least one paper on thesis findings has been accepted for publication in an international journal, or a national journal approved by the Academic Review and Rank Assessment Committee of SIIT, or at least one paper has been accepted for publication in international conference proceedings.
  - 2.1.5 Having satisfied one of the following English proficiency requirements:
    - A TOEFL score of not less than 550 (paper-based) or 213 (computer-based), or 79 (internet-based)
    - An IELTS score of not less than 6.0
    - A TU-GET score of not less than 550
- 2.2 Graduation requirements (Study Plan B)  
Students must meet the following minimum requirements:
  - 2.2.1 Thirty-three credits of courses required by the curriculum with a cumulative GPA of at least 3.00. In addition, the grade of each of these courses must be at least "C."
  - 2.2.2 Having obtained "S" in his or her independent study for six credits and passing the comprehensive examination.
  - 2.2.3 At least one paper on the finding of the independent study has been submitted to SIIT for consideration for publication in journal or conference proceedings.
  - 2.2.4 Having satisfied one of the following English proficiency requirements:
    - A TOEFL score of not less than 550 (paper-based) or 213 (computer-based), or 79 (internet-based)
    - An IELTS score of not less than 6.0
    - A TU-GET score of not less than 550Students must satisfy one of the above English proficiency requirements before the final independent study examination.

## TRANSFERRED CREDITS

A maximum of nine credits of courses with grades B or better can be transferred.

# CURRICULUM

## 1. Total Credits Requirement

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

## 2. Structure and Components

### 2.1 Study Plan A

2.1.1 Compulsory Courses	9	Credits
2.1.2 Compulsory Elective Courses	15	Credits
2.1.3 Master's Thesis	15	Credits
<b>Total</b>	<b>39</b>	<b>Credits</b>

### 2.2 Study Plan B

2.2.1 Compulsory Courses	9	Credits
2.2.2 Compulsory Elective Courses	24	Credits
2.2.3 Independent Study	6	Credits
<b>Total</b>	<b>39</b>	<b>Credits</b>

## 3. Course Coding System

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

3.1 Subject code consists of letters and numbers.

3.2 ES indicates basic subjects.

ET indicates subjects in Engineering Technology.

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

SE indicates subjects in Logistics and Supply Chain Systems Engineering.

3.3 Numbers are composed of three digits.

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

## 4. List of Courses in the Curriculum

*Credits (lecture-practice-self study hours)*

### 4.1 Compulsory Courses, 9 Credits

ES605	Research Methodology	2(2-0-6)
ES606	Research Seminar	1(1-0-3)
SE601	Logistics and Supply Chain Systems	3(3-0-9)
SE602	Production Logistics	3(3-0-9)

### 4.2 Compulsory Elective Courses, 15 Credits

#### 4.2.1 Option I: Supply Chain Systems Engineering

##### 4.2.1.1 Study Plan A, 15 credits

SE600	Decision Making and Optimization	3(3-0-9)
or ET600	Numerical Methods for Engineers	3(3-0-9)
or ICT600	Computational Mathematics	3(3-0-9)
and		
SE61x	Technical Elective Course*	3(3-0-9)
SE61x	Technical Elective Course*	3(3-0-9)
SE61x	Technical Elective Course*	3(3-0-9)
SE61x	Technical Elective Course*	3(3-0-9)

**Credits (lecture-practice-self study hours)**

**4.2.1.2 Study Plan B, 24 credits**

SE600	Decision Making and Optimization	3(3-0-9)
or ET600	Numerical Methods for Engineers	3(3-0-9)
or ICT600	Computational Mathematics	3(3-0-9)
<i>and</i>		
SE61x	Technical Elective Course**	3(3-0-9)
SE61x	Technical Elective Course**	3(3-0-9)
SE61x	Technical Elective Course**	3(3-0-9)
SE61x	Technical Elective Course**	3(3-0-9)
SE61x	Technical Elective Course**	3(3-0-9)
SE61x	Technical Elective Course**	3(3-0-9)
SE61x	Technical Elective Course**	3(3-0-9)

List of Technical Elective Courses for Supply Chain Systems Engineering

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

\*\* For Study Plan B, select 7 courses (21 credits) from the following courses.

SE610	Simulation Modeling and Analysis in Supply Chain	3(3-0-9)
SE611	Procurement Logistics	3(3-0-9)
SE612	Laws and Regulations in Logistics	3(3-0-9)
SE613	Transportation Systems Design and Analysis	3(3-0-9)
SE614	Warehouse Design and Operations	3(3-0-9)
SE615	Operations Scheduling	3(3-0-9)
SE616	Design of Experiments in Supply Chain Systems	3(3-0-9)
SE617	Accounting and Financial Management for Logistics and Supply Chain Systems	3(3-0-9)
SE618	Special Topic in Logistics and Supply Chain Systems	3(3-0-9)
SE619	Current Topics in Logistics and Supply Chain Systems	3(3-0-9)

**4.2.2 Option II: Services Science and Engineering**

**4.2.2.1 Study Plan A, 15 credits**

SE600	Decision Making and Optimization	3(3-0-9)
or ET600	Numerical Methods for Engineers	3(3-0-9)
or ICT600	Computational Mathematics	3(3-0-9)
<i>and</i>		
SE62x	Technical Elective Course*	3(3-0-9)
SE62x	Technical Elective Course*	3(3-0-9)
SE62x	Technical Elective Course*	3(3-0-9)
SE62x	Technical Elective Course*	3(3-0-9)

**4.2.2.2 Study Plan B, 24 credits**

SE600	Decision Making and Optimization	3(3-0-9)
or ET600	Numerical Methods for Engineers	3(3-0-9)
or ICT600	Computational Mathematics	3(3-0-9)
<i>and</i>		
SE62x	Technical Elective Course**	3(3-0-9)
SE62x	Technical Elective Course**	3(3-0-9)
SE62x	Technical Elective Course**	3(3-0-9)
SE62x	Technical Elective Course**	3(3-0-9)
SE62x	Technical Elective Course**	3(3-0-9)
SE62x	Technical Elective Course**	3(3-0-9)
SE62x	Technical Elective Course**	3(3-0-9)

**Credits (lecture-practice-self study hours)**

List of Technical Elective Courses for Services Science and Engineering

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

\*\* For Study Plan B, select 7 courses (21 credits) from the following courses.

SE620	Services Science and Engineering	3(3-0-9)
SE621	Human Resources and Marketing Management	3(3-0-9)
SE622	Services System Simulation	3(3-0-9)
SE623	Organizational Behavior	3(3-0-9)
SE624	Enterprise Resources Management	3(3-0-9)
SE625	Intermediate Resource Economics	3(3-0-9)
SE626	Strategic Marketing Management	3(3-0-9)
SE627	IT Project Management	3(3-0-9)
SE628	Special Topic in Services Science and Engineering	3(3-0-9)
SE629	Current Topics in Services Science and Engineering	3(3-0-9)

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

**Study Plan A**

SE800	Thesis	15
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**Study Plan B**

SE799	Independent Study	6
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## COURSE DESCRIPTIONS

### COMPULSORY COURSES

**ES605 Research Methodology 2(3-0-6)**

Concepts of scientific and technological research; Statistics for research planning and research study; Data collection and data analysis; Interpretations, conclusions, and recommendations of research results.

**ES606 Research Seminar 1(1-0-3)**

Student-faculty interaction on advanced research topics.

**ET600 Numerical Methods for Engineers 3(3-0-9)**

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

**ICT600 Computational Mathematics 3(3-0-9)**

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

**SE600 Decision Making and Optimization 3(3-0-9)**

Fundamental optimization tools for quantitative analysis to develop modeling and decision-making skill in management sciences; Linear programming; Integer programming; Nonlinear programming; Goal programming; Game theory; Markov chains; Queuing theory and decision analysis techniques; Advanced topics in optimization.

**SE601 Logistics and Supply Chain Systems 3(3-0-9)**

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

**SE602 Production Logistics 3(3-0-9)**

Design, analysis and implementation of enterprise-wide resource and production planning and control systems;

Demand forecasting, aggregate planning; Decision support models for production planning; Master scheduling; Shop floor control; Inventory control and policy; Maintenance and reliability in engineering systems; Application of information technologies such as ERP and MRPII to production and operations planning and control.

### TECHNICAL ELECTIVE COURSES

**SE610 Simulation Modeling and Analysis in Supply Chain 3(3-0-9)**

Understanding the role of modeling and simulation in the development and improvement of logistics and supply chain operations; Methodology and modeling; Conducting a simulation study; Hands-on exercise of a particular software package and its application in a practical context.

**SE611 Procurement Logistics 3(3-0-9)**

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

**SE612 Laws and Regulations in Logistics 3(3-0-9)**

Logistics systems and legal framework for the domestic and international movement of goods; Operational characteristics of providers for exporting and importing services; Effects of government trade policies on global logistics.

**SE613 Transportation Systems Design and Analysis 3(3-0-9)**

Characteristics of various modes of domestic and international transportations; Vehicle types; Urban, air, ocean, highway, pick-up and delivery systems; Scheduling; Factors that influence transport demand; Costs; Market structures; Carrier pricing; Carrier operating and service characteristics and their influence on other supply chain costs and supply chain performance such as routes; Labor; Competition.

**SE614 Warehouse Design and Operations 3(3-0-9)**

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

**SE615 Operations Scheduling 3(3-0-9)**

Sequencing and scheduling activities including: static and dynamic problems; Deterministic and stochastic models, single machine processing; Parallel machine processing; Flow-shop and job-shop scheduling; Project scheduling; Workforce scheduling; Exact and heuristic solution methods and applications in logistics and supply chain systems.

**SE616 Design of Experiments in Supply Chain Systems 3(3-0-9)**

Fundamental of Design of Experiment; Simple experiment design, factorial, fractional factorial experiments; ANOVA analysis, model adequacy analysis, mixed level designs, response surface methodology and Taguchi design; Review of successful experimentation in Supply Chain Management practices.

**SE617 Accounting and Financial Management for Logistics and Supply Chain Systems 3(3-0-9)**

Profitability, liquidity; Analysis and interpretation of published financial statements; Cost behavior analysis; Profit, volume analyses; Budget preparation and control; Standard costing; Divisional, segmental performance measurement; Capital investment; Risk and uncertainty analysis; Effects of inflation and taxation; Introduction to computer based financial modeling; Good corporate governance.

**SE618 Special Topic in Logistics and Supply Chain Systems 3(3-0-9)**

Advanced topics in integrated logistics and supply chain operations; Procurement strategies and strategic sourcing; Dynamic pricing and revenue management tactics; Mitigation of supply chain risk through supply contracts; Risk analysis in global environment; Strategic outsourcing of supply chain functions and operations; Management and operation of third party logistics providers; Management of supply chain security.

**SE619 Current Topics in Logistics and Supply Chain Systems 3(3-0-9)**

A study on current interests in the field of logistics and supply chain systems and operations.

**SE620 Services Science and Engineering 3(3-0-9)**

Design, control, planning, and evaluation of service enterprises; Service quality management; Service performance measurement; Service supply chain management; Design and reengineering of service processes; Human Resource Management in service organizations, demand management and technology, quantitative tools for managing services.

**SE621 Human Resource and Marketing Management 3(3-0-9)**

Manpower planning, recruitment and selection, job analysis and design, performance management and appraisal, training and development, compensation and rewards; Marketing management; Service marketing; Market-focused culture; Customer and competitor analysis; Value delivery; Relationship management;

Brand management, sales, and marketing communication; Extended marketing mix, product/service, pricing, promotion, place, people; Customer management process, and physical evidence (i.e., the serviceability and service environment).

**SE622 Services System Simulation 3(3-0-9)**

Discrete-event simulation using commercial simulation software; Basic statistics; Simple queuing model; Simulation model building; Data collection and analysis, Input analysis, Output analysis; Optimization of simulation model; Comparison of the scenarios using statistical analysis from simulation; Selected examples of application in service industries, such as multi-teller bank, restaurant, hotel, airport, hospital, customer service call center, and supermarket.

**SE623 Organizational Behavior 3(3-0-9)**

Individual behavior, attitudes and job satisfaction; Personality and values; Perception and individual decision-making; Motivation concepts; Emotions and moods; Foundations of group behavior, work teams, communication, leadership, power and politics; Conflict and negotiation; Foundations of organization structure; Organizational culture; Human resource policies and practices; Organizational change and stress management.

**SE624 Enterprise Resources Management 3(3-0-9)**

Operations strategy in a global environment, a global view of operations, achieving competitive advantage; Global operations strategy options; Capacity management; Applying investment analysis to strategy-driven investments; Location and layout strategy and decision, retail layout, warehousing and storage management; Material requirements planning and Enterprise resource planning; Scheduling and sequencing; Designing services, waiting line analysis for service improvement, lean services.

**SE625 Intermediate Resource Economics 3(3-0-9)**

Supply and demand; Consumer behavior; Individual and market demand; Profit maximization and competitive market; Uncertainty and risk management; Game theory and competitive strategies.

**SE626 Strategic Marketing Management 3(3-0-9)**

Strategic Management, sustainable competitive advantage; Strategy formulation, implementation, and evaluation; Corporate-level, business-level, and functional strategies; Corporate ethics and social responsibility; Marketing management, service marketing, market-focused culture, customer and competitor analysis; Value delivery, relationship management, brand management, sales, and marketing communication; Extended marketing mix, product/service, pricing, promotion, place, people, customer management process, and physical evidence (i.e., the serviceability and service environment).

**SE627 IT Project Management 3(3-0-9)**

Business foundation and project management concepts; Theories, and techniques, project life cycle; Organization,



planning, and controlling of projects; Defining project scope; Schedule and resources; Work breakdown structure and gantt charts; Network diagrams; Scheduling techniques, and resource allocation decisions; Hardware, software, vendor relationships, and communication mechanisms.

**SE628 Special Topic in Services Science 3(3-0-9) and Engineering**

Advanced topics in an integration of services science and engineering for an improvement of designing, controlling, planning, and evaluation of service enterprise, service quality management, service performance measurement, service supply chain management; Design and reengineering of service processes; Human resource management in service organizations, demand management and technology.

**SE629 Current Topics in Services Science and Engineering 3(3-0-9)**

A study on current interests in the field of Services Science and Engineering.

## MASTER'S THESIS

**SE800 Thesis 15 credits**

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

## INDEPENDENT STUDY

**SE799 Independent Study 6 credits**

Students will conduct research studies in the area of logistics and supply chain systems engineering under the supervision of their project advisors. Progress of the research studies must be reported at the end of semester. Research output must lead to publication in international conference proceedings, or national/international refereed journal.