

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 behavioral 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 like 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	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	51 Credits
2.2 Specialized Courses	63 Credits
3. Free Elective Courses	6 Credits
Total	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) 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 GTS133 GTS202 ITS100	9 Credits
2. Major Courses	114 Credits
2.1 Basic Courses	51 Credits
2.1.1 Basic Mathematics and Science Courses IES201 MAS116 MAS117 MAS210 SCS126 SCS138 SCS139 SCS176 SCS183 SCS184	24 Credits
2.1.2 Basic Engineering Courses CES370 EES203 EES204 GTS302 MES231 MES300 MES302 MES311 MES341 MES371 MES390	27 Credits
2.2 Specialized Courses	63 Credits
2.2.1 Compulsory Engineering Courses	48 Credits
2.2.1.1 Materials and Manufacturing Process IES301 IES361 IES362	7 Credits
2.2.1.2 Work Systems and Safety IES312 IES315 IES343	7 Credits
2.2.1.3 Quality Systems IES331	3 Credits
2.2.1.4 Economic and Finance IES341	3 Credits
2.2.1.5 Production and Operations Management IES313 IES321 IES323 IES332 IES351 IES376 IES377	21 Credits
2.2.1.6 Integration of Industrial Engineering Techniques IES302 IES305 IES391	7 Credits
2.2.2 Elective Engineering Courses	15 Credits
Students can choose among three optional tracks:	6 Credits
1. For students who wish to join the Senior Project Track (2 courses) IES304 IES401	
2. For students who wish to join the Foreign Exchange Track (3 courses) IES304 IES402 IES405	
3. For students who wish to join the Extended Training Track (1 course) IES404	
2.2.2.1 Option I: Industrial Engineering	
2.2.2.1.1 IES342 IES392	6 Credits
2.2.2.1.2 IE Technical Elective	3 Credits
Select IE Technical Elective 1 course from the following courses:	
IES324 IES334 IES335 IES336 IES345 IES353 IES363 IES364 IES365 IES371 IES372 IES374 IES375 IES376 IES394 IES395 IES396	
2.2.2.2 Option II: Manufacturing Engineering	
2.2.2.2.1 EES307 EES308 IES363	6 Credits
2.2.2.2.2 IE Technical Elective	3 Credits
Select IE Technical Elective 1 course from the following courses:	
IES334 IES335 IES336 IES364 IES365	
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

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(2-3-4)
MES341	Fluids Dynamics	3(3-0-6)
Sub-Total		21(19-6-38)

Semester II

CES370	Mechanics for Materials	3(3-0-6)
EES204	Basic Electrical Engineering Laboratory	1(0-3-0)
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	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)

Option I: Industrial Engineering

IES392	Systems Simulation	3(3-0-6)
IESxxx	IE Technical Elective	3(3-0-6)
Sub-Total		20(18-6-36)

Option II: Manufacturing Engineering

EES308	Basic Electromechanical Energy Conversion	3(3-0-6)
IESxxx	IE Technical Elective	3(3-0-6)
Sub-Total		20(18-6-36)

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)

Fourth Year

Semester I

IES305	Industrial Engineering Project I	1(0-3-0)
IES332	Factory Automation and Control Methods	3(3-0-6)
IES343	Safety Engineering	3(3-0-6)
IES351	Maintenance Engineering	3(3-0-6)
IES377	Distribution Network Models: Warehouse Inventory and Transportation	3(3-0-6)

Option I: Industrial Engineering

IES342	Industrial Cost Analysis and Control	3(3-0-6)
Sub-Total		16(15-3-30)

Option II: Manufacturing Engineering

EES307	Basic Electromechanical Energy Conversion Laboratory	1(0-3-0)
IES363	Manufacturing Engineering Laboratory II	2(1-3-2)
Sub-Total		16(12-9-22)

Semester II

Select one of the following 3 tracks:

1) Senior Project Track

IES401	Industrial 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

IES402	Special Studies in IE I	3(3-0-6)
IES405	Special Studies in IE 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

IES404	Extended Industrial Training	6(0-40-0)
Sub-Total		6(0-40-0)