Industrial Engineering (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 places emphasis upon developing the 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 industry, health care services, research and development, financial centers, public service enterprises, and business corporations.

In order to accomplish these objectives, the Industrial Engineering 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, ergonomics/safety, operations research/quantitative analysis, management, and manufacturing systems. The offering of courses is carefully arranged so that those providing basic and fundamental courses are taught in the early years to build adequate technical background. Then, their 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 those who like working with industrial equipment and machines and prefer the factory environment to the business office, the manufacturing engineering option will provide them with practical knowledge and experience to help them quickly adapt themselves to their 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 Humanities	2 Credits
1.1.2 Social Sciences	5 Credits
1.1.3 Languages	9 Credits
1.1.4 Science and Mathematics	5 Credits
1.2 Part II	9 Credits
2. Core Courses	**114 Credits**
2.1 Compulsory Courses	99 Credits
2.2 Compulsory Elective Courses	15 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 Humanities (1 course) — 2 Credits
TU110

1.1.2 Social Sciences (2 courses) — 5 Credits
TU100 TU120

1.1.3 Languages (3 courses) — 9 Credits
EL171 EL172 TU140

1.1.4 Science and Mathematics (2 courses) — 5 Credits
ITS100 TU130

1.2 Part II — 9 Credits
GTS132 GTS133 GTS202

2. Core Courses — **114 Credits**

2.1 Compulsory Courses — 99 Credits

2.1.1 Science and Mathematics — 24 Credits
IES201 MAS116 MAS117 MAS210
SCS126 SCS138 SCS139 SCS176
SCS183 SCS184

2.1.2 IE Common Courses — 48 Credits
IES301 IES302 IES305 IES312
IES313 IES315 IES321 IES323
IES331 IES332 IES341 IES343
IES351 IES353 IES361 IES362
IES364 IES391

2.1.3 Non-IE Courses — 27 Credits
CES370 ECS203 ECS204 GTS302
MES231 MES300 MES302 MES310
MES341 MES371 MES390

2.2 Compulsory Elective 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 IES403
3. **For students who wish to join the Extended Training Track** (1course)
IES404

2.2.1 **Option I: Industrial Engineering**

2.2.1.1 IES342 IES392 — 6 Credits

2.2.1.2 IE Technical Elective — 3 Credits
Select IE Technical Elective 1 course from the following courses:
IES324 IES334 IES335 IES336
IES345 IES363 IES365 IES371
IES372 IES374 IES375 IES376
IES394 IES395 IES396

2.2.2 Option II: Manufacturing Engineering

2.2.2.1 ECS307 ECS308 IES363 — 6 Credits

2.2.2.2 IE Technical Elective — 3 Credits
Select IE Technical Elective 1 course from the following courses:
IES334 IES335 IES336 IES365

3. Free Elective Courses — **6 Credits**
Students may choose any free elective courses (not less than 6 credits in total) including general basic courses, except:
1. General basic courses in Science and Mathematics
2. All general basic TU courses in both part 1 and part 2

Total Credit Requirement — **150 Credits**

IE Curriculum : 150 Credits

Course		Credits (lecture-practice-self study hours)
First Year		
Semester I		
EL171	English Course II	3(3-0-6)
GTS132	Introduction to Biological Science	3(3-0-6)
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)
TU130	Integrated Sciences and Technology	2(2-0-4)
	Sub-Total	**22(20-6-40)**
Semester II		
EL172	English Course III	3(3-0-6)
GTS133	Environmental Studies	3(2-2-5)
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)
TU140	Thai Studies	3(3-0-6)
	Sub-Total	**19(16-8-33)**
Second Year		
Semester I		
ECS203	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)
ECS204	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)
MES310	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)
TU110	Integrated Humanities	2(2-0-4)
	Sub-Total	**20(19-4-37)**
Semester II		
IES313	Industrial Plant Design	3(3-0-6)
IES323	Production Planning and Control	3(3-0-6)
IES353	Pollution Control and Waste Treatment	3(3-0-6)
IES362	Manufacturing Engineering Lab. I	1(0-3-0)
IES364	Manufacturing Processes Technologies	3(3-0-6)
MES390	Basic Mechanical Engineering Laboratory	1(0-3-0)
	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	
ECS308	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	0(0-0-0)
	Sub-Total	**0(0-0-0)**
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	Senior 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)
TU120	Integrated Social Sciences	2(2-0-4)
	Option I: Industrial Engineering	
IES342	Industrial Cost Analysis and Control	3(3-0-6)
	Sub-Total	**15(14-3-28)**
	Option II: Manufacturing Engineering	
ECS307	Basic Electromechanical Energy Conversion Laboratory	1(0-3-0)
IES363	Manufacturing Engineering Laboratory II	2(1-3-2)
	Sub-Total	**15(12-9-24)**
Semester II		
Select one of the following 3 tracks:		
1) Senior Project Track		
IES401	Senior Project II	6(0-18-0)
XXXxxx	Free Elective	3(x-x-x)
XXXxxx	Free Elective	3(x-x-x)
	Sub-Total	**12(x-x-x)**
2) Foreign Exchange Track		
IES402	Special Study in IE I	3(3-0-6)
IES403	Special Study in IE II	3(3-0-6)
XXXxxx	Free Elective	3(x-x-x)
XXXxxx	Free Elective	3(x-x-x)
	Sub-Total	**12(x-x-x)**
3) Extended Training Track		
IES404	Extended Industrial Training	6(0-40-0)
	Sub-Total	**6(0-40-0)**