

For Student with I.D. 66xxxxx | 67xxxxx

INDUSTRIAL ENGINEERING PROGRAM CATALOG

2023 - 2024

Department of Industrial Engineering
Faculty of Engineering
Mahidol University

Academic Catalog

The Industrial Engineering Program Catalog is provided on the basis of the best information available at the time of publication. It is for informational purposes only and does not constitute a contract. Courses are not necessarily offered each term or each year. Individuals should be consulted from the curriculum and the Department of Industrial Engineering for information regarding of courses offered.

Industrial Engineering Program

Degree Offered

Bachelor of Engineering Program in Industrial Engineering:
B.Eng.(Industrial Engineering)

The Field

This program provides knowledge and skills in Industrial Engineering. The program focuses to build your competency in problem solving and providing engineering solutions. Moreover, communication skills, teamwork skills, learning skills, professional standard and ethics are also provided to craft you to be ready in workplaces. The program gives you not only in-class and laboratory experiences, but factory visits, internship and co-curricular activities are also offered to enhance your perspectives in real practices. Our major classes focus on design and improvement of integrated systems or process that produce and deliver products or service to obtain competitive advantages with the consideration of safety, environment, economy and community.

Career Opportunities

Graduates can work in government and private sectors in the following areas:

- Manufacturing / Production Engineering
 - Safety Engineering
 - Quality Control / Quality Assurance
 - Maintenance
 - Production planning and control
 - Project Management
 - Product Development
 - Logistics and Supply Chain Management
 - Operations management
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Graduates can work as academics or researchers in IE fields.

Curriculum Structure

Course	Credits
General Education Courses	24
Basic Math and Science Courses	30
Required Major Courses	72
Elective Major Courses	12
Free Elective Courses	6
Total	144

Course List

General Education Courses (24 Credits)

MUGE	100	General Education for Human Development*	3 (3-0-6)
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Languages			6 Credits
LATH	100	Arts of Using Thai Language in Communication	2 (2-0-4)
LAEN	122	Pre-intermediate English	2 (2-0-4)
LAEN	123	Intermediate English	2 (2-0-4)
LAEN	124	Upper intermediate English	2 (2-0-4)
LAEN	125	Advanced English	2 (2-0-4)

Other topics in General Educations			13 Credits
Health Literacy			
CFGE	101	Life Design	2 (2-0-4)
ENGE	105	Integrated Health & Environment	3 (3-0-6)
LALA	274	Philosophy of Love	3 (3-0-6)
PYGE	101	Herbs in Daily Life	2 (2-0-4)
SPGE	137	Badminton for Health	2 (1-2-3)
SPGE	161	Social Dance for Health	2 (1-2-3)
SPGE	162	Yoga for Health	2 (1-2-3)
SPGE	164	The Arts of Self-Defense for Health	2 (1-2-3)
SPGE	165	Aerobic for Health	2 (1-2-3)
SPGE	166	Table Tennis for Health	2 (1-2-3)
SPGE	169	Basketball for Health	2 (1-2-3)
SPGE	170	Bike for Health	2 (1-2-3)
SPGE	171	Football for Health	2 (1-2-3)
SPGE	173	Body & Mind for Health	2 (1-2-3)
SPGE	174	Sport and Travel	2 (1-2-3)

Course List

Other topics in General Educations			13 Credits
Science and Environmental Literacy			
EGCO	103	Information Technology in the Daily Life	3 (3-0-6)
EGID	102	New Product Development	3 (3-0-6)
ILGE	152	Learning to be a Smart Learner	2 (2-0-4)
SCGE	280	Enjoying Plant Propagation	2 (2-0-4)
SHED	129	Modern Environmental Movement	2 (2-0-4)
SHED	135	Lifestyle for Circular Economy	2 (2-0-4)
SHSS	193	Innovation for Better Environment	2 (2-0-4)
ENGE	100	The Earth and Nature	3 (3-0-6)
Intercultural & Global Awareness Literacy			
LACH	101	Elementary Chinese	3 (3-0-6)
LACH	209	Chinese Calligraphy	2 (1-2-3)
LAJP	101	Elementary Japanese	3 (3-0-6)
LAJP	102	Japanese for Every Situation	3 (3-0-6)
LALA	111	Japanese Studies for Work Preparation	3 (3-0-6)
LAFR	101	Elementary French	3 (3-0-6)
LAFR	150	Window to France	3 (3-0-6)
LATH	116	Thai Literary Works & Films	2 (2-0-4)
LALA	179	Food and Culture	3 (3-0-6)
LAEN	273	English Translation for Life & Work	3 (3-0-6)
LAFE	147	Psychology for Better Life	3 (3-0-6)
Civic Literacy			
EGID	300	Philosophy, Ethics and Laws for Engineers	1 (1-0-2)
EGIE	102	System Thinking and Problem Solving	3 (3-0-6)
LALA	118	Contemporary World Politics	3 (3-0-6)
LAFE	149	Interpersonal Relation Development	3 (3-0-6)
SHHU	153	Professional Code of Ethics	2 (2-0-4)
SHHU	161	Group Dynamics and Teamwork	2 (2-0-4)

Course List

Other topics in General Educations			13 Credits
Civic Literacy			
SHHU	162	Gender & Development	2 (2-0-4)
SHHU	166	Human & Social in the Digital World	2 (2-0-4)
SHHU	168	Human Relations & Self Development	2 (2-0-4)
SHHU	176	Arts of MC	2 (2-0-4)
Finance and Management Literacy			
EGIE	107	Finance and Accounting Literacy for Management	3 (3-0-6)
MUGE	105	Building a Secure Financial Future	2 (2-0-4)
MUGE	106	E-Commerce for Entrepreneurs	2 (2-0-4)
SHED	132	Sustain Human Resource Development	2 (2-0-4)
SHED	133	Marketeer for a Small Business	2 (2-0-4)
SHSS	186	The Approach of Administration and Management	2 (2-0-4)

*Required coursed by the IE Program

For more General Education courses, please visit at the weblink.

https://docs.google.com/spreadsheets/d/1yy9Fwtvcv7XqpD_PAeNC9AgnGwXJ7fNRkIObS_5rHw PI/edit#gid=745924370

Math and Basic Science (30 Credits)

SCMA	115	Calculus	3 (3-0-6)
SCMA	165	Ordinary Differential Equations	3 (3-0-6)
SCCH	115	General Chemistry	3 (3-0-6)
SCCH	118	Chemistry Laboratory	1 (0-3-1)
SCPY	110	General Physics Laboratory	1 (0-3-1)
SCPY	120	Physics Laboratory II	1 (0-3-1)
SCPY	130	Fundamental Physics 1	3 (3-0-6)
SCPY	140	Fundamental Physics 2	3 (3-0-6)
EGME	202	Mathematics for Engineers	3 (3-0-6)
EGIE	203	Basic Engineering Mathematics	3 (3-0-6)

Course List

Math and Basic Science (30 Credits)

EGME	206	Numerical Methods for Engineers	3 (3-0-6)
EGIE	261	Probability and Statistics	3 (3-0-6)

Required Major courses (72 Credits)

EGIE	105	Engineering Drawing	3 (2-3-5)
EGCO	111	Computer Programming	3 (2-3-5)
EGME	213	Mechanics of Materials I	3 (3-0-6)
EGME	220	Engineering Mechanics	3 (3-0-6)
EGME	371	Mechanical Engineering Laboratory I	1 (0-3-1)
EGEE	217	Fundamental of Electrical Engineering	3 (3-0-6)
EGEE	218	Fundamental of Electrical Engineering Laboratory	1 (0-3-1)
EGIE	103	Engineering Materials	3 (3-0-6)
EGIE	104	Introduction to Industrial Processes and Tools	1 (0-3-1)
EGIE	201	Thermofluids for Industrial Engineer	3 (3-0-6)
EGIE	202	Engineering Economy	3 (3-0-6)
EGIE	204	Manufacturing Processes	3 (3-0-6)
EGIE	209	3D Modelling	3 (2-3-5)
EGIE	210	Digital Twin in Manufacturing	3 (2-3-5)
EGIE	301	Manufacturing Process Laboratory	1 (0-3-1)
EGIE	302	Engineering Training	3 (0-18-3)
EGIE	342	Operations Research	3 (3-0-6)
EGIE	361	Production Planning and Control	3 (3-0-6)
EGIE	360	Industrial Work Study	3 (2-2-5)

Course List

Required Major courses (72 Credits)

EGIE	363	Quality Control	3 (3-0-6)
EGIE	364	Industrial Engineering Laboratory	1 (0-3-1)
EGIE	365	Plant and Facilities Design	3 (3-0-6)
EGIE	370	Quality Assurance	3 (3-0-6)
EGIE	375	Industrial Robot Automation and Internet Of Things	3 (2-3-5)
EGIE	378	Maintenance Engineering	3 (3-0-6)
EGIE	379	Safety Engineering	3 (3-0-6)
EGIE	491	Capstone Design Proposal	1 (0-3-1)
EGIE	492	Capstone Design Project	3 (0-9-3)

Elective Major Courses (12 Credits)

Productive Manufacturing			
EGIE	310	Human-Machine design for Production system	3 (3-0-6)
EGIE	311	Lean Manufacturing	3 (3-0-6)
EGIE	410	Energy and Environmental Management	3 (3-0-6)
EGIE	411	Design of Experiments and Analysis	3 (3-0-6)
Logistics and Supply Chain Management			
EGIE	368	Simulation Modeling	3 (3-0-6)
EGIE	369	Engineering Management	3 (3-0-6)
EGIE	460	Logistics and Supply Chain Management	3 (3-0-6)
EGIE	463	Introduction to Railway Engineering	3 (3-0-6)
EGIE	466	Data Analytics	3 (3-0-6)

Course List

Elective Major Courses (12 Credits)

Computer Aided Manufacturing

EGIE	345	Mechatronics Design	3 (3-0-6)
EGIE	355	Innovative product development	3 (3-0-6)
EGIE	441	Digital Reverse Engineering and Additive Manufacturing	3 (2-3-5)
EGIE	442	Computer Aided Engineering / CFD	3 (2-3-5)

Smart Factory

EGIE	323	Principle and Programming for Data Science	3 (2-3-5)
EGIE	324	Artificial Intelligence and Machine Learning	3 (3-0-6)
EGIE	424	Industrial Internet Of Things in Automation and Robotics	3 (2-3-5)
EGIE	466	Data Analytics	3 (3-0-6)

Materials Science and Manufacturing

EGIE	354	Industrial Metallurgy	3 (2-3-5)
EGIE	355	Innovative Product Development	3 (3-0-6)
EGIE	402	Welding Engineering	3 (2-3-5)
EGIE	454	Failure Analysis	3 (3-0-6)

Free Elective Courses

6 Credits

Students can enroll any courses offered by the IE program, GE courses or any course that is not a compulsory subject as free elective courses under the supervision of the academic advisor at the IE program and the approval of the instructor of that course to register.

Grading System

Grade	Achievement	Score
A	Excellent	4.0
B+	Very Good	3.5
B	Good	3.0
C+	Fairly Good	2.5
C	Fair	2.0
D+	Poor	1.5
D	Very Poor	1.0
F	Fail	0

Other symbols without scores including meaning are assigned for course work taken as follows:

Symbols	Meaning
AU	Audit
O	Outstanding
S	Satisfactory
T	Transfer of Credit
U	Unsatisfactory
I	Incomplete
P	In progress
X	No report
W	Withdrawal

According to MU Regulation, the grade F and other symbols without numerical equivalence can be described in more details as follows:

The symbol F will be given in the following situations;

1. The student took the examination and failed in the exam or project.
2. The student was absent from the exam without any permission from the faculty committee
or person appointed by the faculty committee.

3. The student was not allowed to take the exam according to MU Regulation (Study time:

The student has to be present in a theoretical, lecture, practice, internship, or field study no less than 80 percent of the total study time of that course in order to be allowed to take the exam).

4. The student violated the examination regulation; for example, being late to the exam, dressed inappropriately according to student uniform regulation or act as in Rule of MU Regulation (Dishonesty Punishments).

5. The student who received an I and did not take the exam or finish the project within one regular semester or trimester after they received the I grade, except that the student has the permission as in Rules of MU Regulation (Leave of Absence).

6. The student who received a P and did not take the exam and/or did not hand in report on time.

7. The student who does not retake the exam or redo the project as indicated in MU Regulation (Symbols with 1.00 or 1.5 points, or the symbol U, means that knowledge or ability of the student is below average. Other grading results are at the discretion of the faculty committee or the person appointed by the committee. On regrading a course, the grade score will be 2.00 (or S), at the maximum.), or the student has retaken the exam or redone the project and is still evaluated as "failed".

8. The student who received an F from a subject and then retake that subject again. The accumulated GPA will not include the "F" from the previous class, the accumulated GPA will include the retake class only. However, the students who received an F, they cannot receive any honors.

The symbol O in each course signifies outstanding knowledge, ability, and skills or knowledge, ability, and skills that are above the normal criteria used for the assessment of each course.

The symbol S or U are given only in non-credit courses or courses with credits for which the faculty has decided to use the non-score grading system.

The symbol AU is given only in the courses in which the student gives his/her intention to study for no credit and the student must participate in classes or practical activities not less than 80 percent of the total study time and practice time period must not be less than 80 percent.

The symbol I will be given in accordance with the following situations;

1. The student did not come to the exam or did not hand in the report in time due to ill health, as evidenced by a medical certificate endorsed by the university's Health Service Unit. However, the final decision will be made by the person appointed by the committee.
2. The student was not allowed to take the exam according to MU Regulation due to ill health, as evidenced by a medical certificate endorsed by the university's Health Service Unit. However, the final decision will be made by the committee.
3. The student was not able to take the exam or hand in the report due to force majeure. However, the final decision will be made by the person appointed by the committee.

The symbol P can be given only in the courses in which the classes are still on going, and/or the courses last longer than one semester/trimester.

The symbol T can be given in the case that the credits for the course have been transferred from another faculty or institute.

The symbol W will be given in the following situations;

1. The student is allowed to withdraw from the courses according to MU Regulation (Course withdrawal can be done after the second week of the regular session or after the first week of the summer session, or after the first week of the courses that do not start at the start of the session, until the week before the exams are held. Courses that are withdrawn will be shown in the transcript and grade report, and the course is counted as registered once.).
2. The student is allowed to take a leave of absence.
3. The student is suspended.

The symbol X can be given only in courses in which the faculty has not yet received the grade report.

Rules of MU Regulation regarding class attendance, load, grades, and appeals are located in the course syllabus to be distributed hand out at the first hour of the class. Students who fail to meet the criteria for good standing a term and cumulative GPA of at least 2.0 are placed on academic warning or probation. Student classification or status for a freshman is classified at the end of the second semester after entry. From sophomore onwards, classification is made at the end of the academic year for the continuing program of study. For students who request to graduate with a diploma or a bachelor's degree, classification may be done at the end of the summer session. A student is classified normal or as under probation according to the following;

- Normal status applies to students who are registered in the very first session or students who have CUM GPA of at least 2.00.
- Probation status applies to students who have CUM GPA greater than or equal to 1.50 but less than 2.00, which can be further classified into 2 types.
 - Type 1 means a group of students who have CUM GPA of 1.50 or higher but less than 1.80.
 - Type 2 means a group of students who have CUM GPA of 1.80 or higher but less than 2.00.

Graduation Requirements

In order to graduate from the industrial engineering program, Mahidol University, a graduating student has to fulfill all of the following requirements listed below in order to be awarded the degree of Bachelor of Engineering in Industrial Engineering:

- Pass the English language proficiency assessment criteria announced by Mahidol University;
- Pass the senior (capstone) project course;
- Pass the Engineering training course (minimum of 240 hours of Engineering Training in the industrial sector);
- Obtain minimum cumulative credits of Industrial Engineering (including the senior project and engineering training);
- Achieved minimum CUM GPA of 2.00;
- Completed and passed all courses and any requirements set forth in the curriculum of the Industrial Engineering degree program as follows:

General Education Courses			24 Credits
MUGE	100	General Education for Human Development*	3 (3-0-6)
LATH	100	Arts of Using Thai Language in Communication*	2 (2-0-4)
LAEN	x	Language	2 (x-x-x)
LAEN	x	Language	2 (x-x-x)
EGID	300	Philosophy, Ethics and Laws for Engineers	1 (1-0-2)
EGIE	102	System Thinking and Problem Solving	3 (3-0-6)
EGIE	107	Finance and Accounting Literacy for Management	3 (3-0-6)
x	x	(Other General Education Courses)	8 (x-x-x)

Math and Basic Science (30 Credits)

SCMA	115	Calculus	3 (3-0-6)
SCMA	165	Ordinary Differential Equations	3 (3-0-6)

Graduation Requirements

Math and Basic Science (30 Credits)

SCCH	115	General Chemistry	3 (3-0-6)
SCCH	118	Chemistry Laboratory	1 (0-3-1)
SCPY	110	General Physics Laboratory	1 (0-3-1)
SCPY	120	Physics Laboratory II	1 (0-3-1)
SCPY	130	Fundamental Physics 1	3 (3-0-6)
SCPY	140	Fundamental Physics 2	3 (3-0-6)
EGME	202	Mathematics for Engineers	3 (3-0-6)
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EGIE	261	Probability and Statistics	3 (3-0-6)

Required Major courses (72 Credits)

EGIE	105	Engineering Drawing	3 (2-3-5)
EGCO	111	Computer Programming	3 (2-3-5)
EGME	213	Mechanics of Materials I	3 (3-0-6)
EGME	220	Engineering Mechanics	3 (3-0-6)
EGME	371	Mechanical Engineering Laboratory I	1 (0-3-1)
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EGIE	201	Thermofluids for Industrial Engineer	3 (3-0-6)
EGIE	202	Engineering Economy	3 (3-0-6)
EGIE	204	Manufacturing Processes	3 (3-0-6)

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Required Major courses (72 Credits)

EGIE	209	3D Modelling	3 (2-3-5)
EGIE	210	Digital Twin in Manufacturing	3 (2-3-5)
EGIE	301	Manufacturing Process Laboratory	1 (0-3-1)
EGIE	302	Engineering Training	3 (0-18-3)
EGIE	342	Operations Research	3 (3-0-6)
EGIE	361	Production Planning and Control	3 (3-0-6)
EGIE	360	Industrial Work Study	3 (2-2-5)
EGIE	363	Quality Control	3 (3-0-6)
EGIE	364	Industrial Engineering Laboratory	1 (0-3-1)
EGIE	365	Plant and Facilities Design	3 (3-0-6)
EGIE	370	Quality Assurance	3 (3-0-6)
EGIE	375	Industrial Robot Automation and Internet Of Things	3 (2-3-5)
EGIE	378	Maintenance Engineering	3 (3-0-6)
EGIE	379	Safety Engineering	3 (3-0-6)
EGIE	491	Capstone Design Proposal	1 (0-3-1)
EGIE	492	Capstone Design Project	3 (0-9-3)

Elective Major Courses

12 (x-x-x)

Free Electives

6 (x-x-x)

Total

144 (x-x-x)

Honors and Awards

A student who has studied in an undergraduate engineering program is eligible to receive a degree with honors. However, transferred courses require at least Grade B (or equivalent) and are not used to calculate the CUM GPA. In order to receive First Class honors, the student must have a CUM GPA of 3.50 or above, while a Second-Class honors student must have a CUM GPA of 3.25 or above, also a student must;

- Not used time that exceeds that which is indicated in the curriculum.
 - Never have regraded or registered in other courses or retaken an exam or redone a report or project in any course in the curriculum including the transferred courses.
 - If the student has transferred some credits, the sum of the transferred credits should not exceed one quarter of the total number of credits in the curriculum.
-