Industrial Engineering

Introduction

Industrial Engineering is a branch of engineering that engages in the study of how to describe, evaluate, design, modify, control, and improve the performance of integrated systems of people, materials, and technology, viewed over time and within their relevant context. Industrial engineering is unique in its blend of fundamental topics in mathematics, physical and engineering sciences knowledge with the principles and methods of engineering analysis and design. This field identifies human being as central contributors to the inherent complexity of such systems. Globalization has opened up more doors for service industries worldwide, which leads to an increased demand for industrial engineers. The Industrial Engineering curriculum at BINUS UNIVERSITY is structured to adapt the movement of globalization and tailored to the needs of the globalized world.

The study program emphasizes the application of engineering fundamentals with a balanced treatment of theory, design, and experience. Computer applications are integrated throughout the curriculum. Industrial Engineering department allows flexibility to its students to study certain topics in breadth and depth by offering three tracks: Supply Chain Engineering, Service Systems Engineering, and Manufacturing Systems Engineering.

Some of the core courses require the students to not only having a full grasp of the theoretical aspects but also on how to implement them in a time study analysis. The Industrial Engineering facilities are well-equipped in the areas of engineering graphics, industrial engineering systems design, and human performance. The laboratories are available for students to use during their study are but not limited to: Physics Lab, Manufacturing Process Lab, Technical Drawing Lab, Simulation Lab, Work Design, and Ergonomics Lab.

Vision

The most prestigious and dynamic Industrial Engineering school in Indonesia by producing globally accepted graduates.

Mission

The mission of Industrial Engineering Department are to:

1. Providing a solid educational experience through the diffusion and integration of knowledge of Industrial Engineering, and services to industries.
2. Educating students from a diverse background in the fundamental skills, knowledge and practice of Industrial Engineering in order to prepare them for a position in global industries and continue for advanced degrees in Industrial Engineering or related disciplines.
3. Providing research and professional services to streamline and optimize operations which contribute to the enhancement of the quality of life.
4. Acknowledging all talents that positively contribute to the quality of life of Indonesians and the international community.

Program Objective

The objectives of the program are:

1. Utilize appropriate engineering design methods and tools that are principal to work beneficially within their professions & communities.
2. Possess effective teamwork and leadership skills and commit to the standard of profession and ethical practice.

3. Continuously develop oneself to meet the evolving demands and increasing responsibilities of a successful career, to benefit the organization and society.

Student Outcomes

After completing the study, graduates are:

1. Able to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics;
2. Able to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors;
3. Able to communicate effectively with a range of audiences;
4. Able to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts;
5. Able to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives;
6. Able to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions;
7. Able to acquire and apply new knowledge as needed, using appropriate learning strategies.

Prospective Career of the Graduates

Industrial engineers are employed in manufacturing and service industries. The type of works industrial engineers are doing are but not limited to:

1. Manufacturing Industry: Inventory Management, Logistics, Operation Management, Production Management, and Warehousing.
2. Research and Development: Data Analysis, Environmental Protection and Preservation, and Human Factors Engineering.
3. Service Industry: Client Management, Commercial Banking and Real Estate, Financial Consulting, Health Systems, and Human Resource Consulting.
4. Business and Management: Business Strategy, Investment Banking, Management Analysis, Project Management, and Business Development.
5. Education: Teaching and Research, consulting.
6. Information Technology: Computer Integration, Database Design, Telecommunication, and Web Development.

Curriculum

Industrial Engineering Program is about designing, modifying, controlling, and improving complex systems. Therefore, a strong basis in the "queen of the sciences", better known as mathematics, and computer science is a must in modeling and solving such complex systems. The Industrial Engineering curriculum is structured in such a way that the students should master the following scientific fields: mathematics, physics, humanities/social sciences, computer science and management, general engineering sciences, industrial engineering core, lab sciences, professional engineering practice, and industrial engineering specialization.

Course Structure

Sem	Code	Course Name	SCU	Total
1	CHAR6013	Character Building: *Pancasila*	2	20
	SCIE6004	Physics I	4	
	SCIE6051	Chemistry	3	
	MATH6014	Calculus I	4	
	ENGR6093	Technical Drawing**	2/1	
	LANG6027	Indonesian	2	
	English University Courses I			
	ENGL6128	English in Focus	2	
	ENGL6130	English for Business Presentation	2	
2	CHAR6014	Character Building: *Kewarganegaraan*	2	20
	SCIE6017	Biology	2	
	SCIE6050	Physics II	4/1	
	MATH6016	Calculus II	4	
	STAT6003	Probability Theory	2	
	COMP6714	Introduction to Programming	2/1	
	English University Courses II			
	ENGL6129	English Savvy	2	
	ENGL6131	English for Written Business Communication	2	
3	CHAR6015011	Character Building: *Agama*	2	20
	MATH6004011	Linear and Discrete Mathematics	4	
	MATH6019011	Calculus III	4	
	STAT6172011	Applied Statistics	2	
	ISYE6157011	Human-Integrated Systems	2/1	
	ISYE6123011	Deterministic Optimization*&**	3	
	ENTR6509001	Entrepreneurship: Ideation	2	
4	ISYE6207011	Stochastic Processes	2	20
	ENTR6510001	Entrepreneurship: Prototyping	2	
	ISYE6158011	Engineering Data Analysis	3	
	ISYE6181011	System Engineering & Analysis**	2	
	ISYE6182011	Supply Chain: Logistics*	2	
	ISYE6041011	Engineering Economy**	2	
	ISYE6113011	Leadership & Organizational Behavior*&**	2	
	Streaming: Supply Chain Engineering			
	ISYE6164011	E-Supply Chain Management	2/1	
	ISYE6183011	Warehouse Management Systems	2	
	Streaming: Service Systems Engineering			
	ISYE6166011	Dynamic Service Facility Design	2/1	
	ISYE6066011	Human Interaction in Service Systems	2	
	Streaming: Manufacturing Systems			
	ENGR6005011	Mechanics of Materials	2	
	ISYE6184011	Manufacturing Processes	2/1	
	Free Electives		5	

Sem	Code	Course Name	SCU	Total
6	ENTR6511001	Entrepreneurship: Market Validation	2	20
	ISYE6125011	Quality Engineering**	3	
	ISYE6185011	Systems Simulation**	3	
	ISYE6163011	Research Methodology	2	
	ISYE6116011	Health and Safety Engineering	2	
	ISYE6070011	Facility Planning	2	
	ISYE6186011	Production & Operation Analysis**	3/1	
	Elective Supply Chain Engineering Courses ***			
	ISYE6067011	Global Supply Chain*	2	
	ISYE6165011	Supply Chain Risk & Negotiation	2	
	ISYE6115011	Transportation Modeling	2	
	Elective Service Systems Engineering Courses**			
	MKTG6128011	Market Research	2	
	ISYE6167011	Decision Support System	2	
	ISYE6168011	Financial Engineering*	2	
	Elective Manufacturing Systems Courses**			
	ISYE6130011	Project Management	2	
	ISYE6169011	Maintenance Management Systems	2	
	ISYE6170011	Sustainable Engineering Systems*	2	
	Free Electives		2	
6	**Enrichment Program I**		20	20
7	**Enrichment Program II**		20	20
8	ISYE6205011	Pre – Thesis	2	6
	ISYE6206011	Thesis	4	
	ISYE6171011	Thesis	6	
			TOTAL CREDITS 146 Credits	

 *) *This course is delivered in English*
 **) *Global Learning System Course*
***) *Elective Track Courses:*
 − *For Semester 5: Students choose 2 credits of elective track course based on preferred track.*

Streaming/Free Electives:
-) *For 4th and 5th Semester: Students are required to choose streaming or free electives.*

English University Courses:
-) *For 1st Semester: English University Courses I, students with Binus University English Proficiency Test score less than 500 will take English in Focus, and student with test score greater than or equal to 500 will take English for Business Presentation.*
-) *For 2nd Semester: English University Courses II, students with Binus University English Proficiency Test score less than 500 will take English Savvy, and students with test score greater than or equal to 500 will take English for Written Business Communication.*
-) *Students must pass English Savvy with a minimum Grade of C.*

Pre-thesis (2 SCU) & Thesis (4 SCU) *can be taken in the 6th and/or 7th semester by the students who meet the requirements from the Study Program*

Appendix: Free Electives (4th Semester & 5th Semester)

No	Course Owner Department	Course Code	Course Name	SCU	Semester
1	Business Creation	ENTR6580005	Digital Business Transformation	2	4
2	Business Creation	ENTR6582005	Business Strategy	2	4
3	Business Creation	ENTR6494005	Managing Growing Business	2	5
4	Business Management	MGMT6399005	Fundamentals of Supply Chain Management	2	4
5	Business Management	MGMT6401005	Digital Supply Chain Management	2	4
6	Business Management	MKTG6298005	Service Marketing Management	2	4
7	Business Management	MGMT6362005	Global Supply Chain Services	2	5
8	Business Management	MGMT6365005	Current Issue in Service Business and Technology	2	5
9	Business Management	MGMT6400005	Supply Chain Strategy	2	5
10	International Business Management	BUSS6162005	Market Entry Strategy	2	4
11	International Business Management	BUSS6191005	Export-Import Management	2	4
12	International Business Management	MGMT6369005	Corporate Strategy in International Business	2	4
13	International Business Management	BUSS7009005	Export-Import Cost Management	2	5
14	International Business Management	MGMT6370005	E-Business for International Business	2	5
15	International Business Management	MGMT7169005	Global Supply Chain Management	2	5
16	Management	BUSS6088005	Current Issue in Business and Technology	2	4
17	Management	BUSS6069005	Business Simulation	2	5
18	Management	BUSS6163005	Organization Development Strategy	2	5
19	Management	BUSS6194005	Business Negotiation Strategy	2	5
20	Management	MGMT6029005	Knowledge Management	2	5
21	Management	MGMT6063005	Strategic Management	2	5
22	Management	MGMT6145005	Compensation and Performance Management	2	5
23	Management	MGMT6412005	Customer Relationship Management	2	5
24	Accounting	ACCT6353020	Management Information System	2	4
25	Accounting	TAXN6050020	Sales Tax and Customs	2	4
26	Accounting Bekasi	ACCT6382020	Business Process Analysis and Solution	2	4
27	Accounting Bekasi	ACCT6389020	Big Data Analytics in Accounting & Finance	2	5
28	Marketing Communication	COMM6435019	Global Consumer Behavior	2	4
29	Marketing Communication	COMM6540019	Communication & Public Affairs	2	4
30	Tourism	TRSM6160022	Tourism Transportation	2	5
31	Architecture	ARCH6054014	Interior Design Principles	2	4
32	Architecture	ARCH6059014	Building Material Knowledge	2	4
33	Architecture	ARCH6061014	Sustainable Architecture	2	5
34	Civil Engineering	CIVL6007013	Harbour Engineering	2	5
35	Civil Engineering	CIVL6009013	Urban Drainage	2	5
36	Civil Engineering	CIVL6015013	Geosyntetics Application in Civil Engineering	2	5
37	Civil Engineering	CIVL6025013	Hydrology	2	5

No	Course Owner Department	Course Code	Course Name	SCU	Semester
38	Civil Engineering	CIVL6035013	Airport Engineering	2	5
39	Civil Engineering	CIVL6037013	Railway Engineering	2	5
40	Civil Engineering	CIVL6080013	Construction Methods & Heavy Equipment	2	5
41	Civil Engineering	CIVL8038013	Soil Improvement Method	2	5
42	Civil Engineering	CIVL8056013	Bridge Engineering	2	5
43	Civil Engineering	COMP6046013	Computer Applications in Construction Management	2	5
44	Computer Engineering	CPEN6225010	Telco Network & Switching System	2	5
45	Computer Engineering	CPEN6232010	Cloud Technology Practice	2	5
46	Food Technology	FOOD6073015	Current Issues in Food Technology	2	4
47	Industrial Engineering	ISYE6181011	System Engineering & Analysis	2	4
48	Industrial Engineering	ISYE6067011	Global Supply Chain	2	5
49	Industrial Engineering	ISYE6115011	Transportation Modeling	2	5
50	Industrial Engineering	ISYE6130011	Project Management	2	5
51	Business Law	LAWS6110028	Cyber Law	2	4
52	Business Law	LAWS6159028	Legal Aspect in Business	2	4
53	Business Law	LAWS6171028	Business Competition & Consumer Protection Law	2	4
54	Business Law	LAWS6181028	Industrial Relations & Alternative Dispute Resolution	2	4
55	Business Law	LAWS6172028	Environmental and Natural Resources Law	2	5
56	Business Law	LAWS6174028	Contract & Legislative Drafting	2	5
57	English Literature	ENGL6169024	English for Professionals	2	4
58	English Literature	SOCS6021024	Social and Digital Media Writing	2	4
59	International Relations	INTR6161029	Political Economy of Global Media	2	5
60	International Relations	INTR6162029	Multiculturalism and Digital Society	2	5
61	International Relations	INTR6167029	International Political Economy of Multinational Corporations	2	5
62	International Relations	INTR8049029	Global Economic Architecture	2	5
63	Primary Teacher Education	EDUC6061030	ICT for Distance Learning	2	5
64	Primary Teacher Education	EDUC8004030	School Based Management	2	5
65	Psychology	PSYC6123027	Educational Psychology	2	5
66	Cyber Security	COMP6582001	Computer Security	2	4
67	Game Application & Technology	GAME6082001	Game Animation	2	4
68	Mobile Application & Technology	MOBI6057001	Wearable Technology	2	5
69	Mobile Application & Technology	MOBI6059001	Mobile Programming	2	5
70	Statistics	RSCH6483049	Research Methodology in Data Science	2	5
71	Statistics	STAT6158049	Data Management and Organization	2	5
72	Computer Science	COMP6745001	Machine Learning	2	4
73	Computer Science	COMP7084001	Multimedia Systems	2/1	4
74	Computer Science	COMP6578001	Information Visualization	2	5
75	Computer Science	COMP6586001	Embedded Systems	2	5
76	Interior Design	DSGN6608008	Interior Design and culture	2	4

No	Course Owner Department	Course Code	Course Name	SCU	Semester
77	Interior Design	DSGN6611008	Business in Interior Design	2	4
78	Interior Design	DSGN6886008	Rendering and Presentation Techniques	2	4
79	Business Information Technology	ISYS6577003	Machine Learning & Foundations	2	4
80	Business Information Technology	ISYS6606003	Smart Application	2	4
81	Information Systems	ISYS6016003	Social Media Fundamental	2	4
82	Information Systems	ISYS6210003	Data Visualization	2	4
83	Information Systems	ISYS6285003	Digital and New Media	2	4
84	Information Systems	ISYS6478003	Research Methods in Information Systems	2	4
85	Information Systems	ISYS6196003	Business Analytics	2	5
86	Information Systems Accounting & Auditing	ISYS6608003	IT Service & Risk Management	2	5

Enrichment Program I (6th Semester) & Enrichment Program II (7th Semester):
-) *Student will take one of enrichment program tracks (off campus). See enrichment appendix for the tracks detail.*

Enrichment Track Scheme

Track	Semester 6							Semester 7							
	IN	RS	EN	CD	SA	IS	etc	IN	RS	EN	CD	SA	IS	FS	etc
1	v							v							
2		v						v							
3			v					v							
4				v				v							
5						v		v							
6	v													v	
7		v												v	
8				v										v	
9					v									v	
10						v								v	
11	v								v						
12		v							v						
13				v					v						
14					v				v						
15						v			v						
16	v											v			
17		v										v			
18				v								v			
19					v							v			
20						v						v			
21	v												v		
22		v											v		
23				v									v		
24					v								v		
25			v								v				

Note:

IN	: Certified Internship	SA	: Certified Study Abroad
RS	: Certified Research	IS	: Certified Specific Independent Study
EN	: Certified Entrepreneurship	FS	: Further Study
CD	: Certified Community Development	etc	: Study Program Special Purposes

Description:
Student will take one of enrichment program tracks

Certified Internship Track

Code	Course Name	SCU	Total
Enrichment Program I			20
ISYE6208011	Industrial Practice I	8	
ISYE6210011	Engineering Ethics and Competence I	8	
ISYE6212011	EES in Industrial Engineering I	4	
Enrichment Program II			20
ISYE6209011	Industrial Practice II	8	
ISYE6211011	Engineering Ethics and Competence II	8	
ISYE6213011	EES in Industrial Engineering II	4	

Certified Entrepreneurship Track

Code	Course Name	SCU	Total
Enrichment Program I			20
ENPR6214011	New Venture Industrial Initiation	8	
ENPR6215011	Industrial Product Development Process	8	
ENPR6216011	EES in New Industrial Business I	4	
Enrichment Program II			20
ENPR6218011	Industrial Product Launching	8	
ENPR6219011	Industrial Business Development	8	
ENPR6217011	EES in New Industrial Business II	4	

Certified Research Track

Code	Course Name	SCU	Total
Enrichment Program I			20
RSCH6701011	Research Experience I	8	
RSCH6703011	Scientific Writing in Industrial Engineering I	8	
RSCH6705011	Global EES in Industrial Engineering I	4	
Enrichment Program II			20
RSCH6702011	Research Experience II	8	
RSCH6704011	Scientific Writing in Industrial Engineering II	8	
RSCH6706011	Global EES in Industrial Engineering II	4	

Certified Community Development Track

Code	Course Name	SCU	Total
Enrichment Program I			20
CMDV6459011	Community Outreach Project Implementation I	8	
CMDV6461011	Design Project I	8	
CMDV6463011	Employability and Entrepreneurial Skills in Industrial Engineering I	4	
Enrichment Program II			20
CMDV6460011	Community Outreach Project Implementation II	8	
CMDV6462011	Design Project II	8	

Code	Course Name	SCU	Total
CMDV6464011	Employability and Entrepreneurial Skills in Industrial Engineering II	4	

Certified Study Abroad Track

Code	Course Name	SCU	Total
Enrichment Program I			
Elective courses list for study abroad*			
GLOB6005011	Elective Course for Study Abroad 1	4	
GLOB6006011	Elective Course for Study Abroad 2	4	
GLOB6007011	Elective Course for Study Abroad 3	4	
GLOB6008011	Elective Course for Study Abroad 4	4	
GLOB6009011	Elective Course for Study Abroad 5	2	
GLOB6010011	Elective Course for Study Abroad 6	2	
GLOB6011011	Elective Course for Study Abroad 7	2	20
GLOB6012011	Elective Course for Study Abroad 8	2	
GLOB6013011	Elective Course for Study Abroad 9	2	
GLOB6014011	Elective Course for Study Abroad 10	2	
GLOB6015011	Elective Course for Study Abroad 11	2	
GLOB6016011	Elective Course for Study Abroad 12	2	
GLOB6249011	Elective Course for Study Abroad 27	3	
GLOB6250011	Elective Course for Study Abroad 28	3	
GLOB6251011	Elective Course for Study Abroad 29	4	
Enrichment Program II			
GLOB6017011	Elective Course for Study Abroad 13	4	
GLOB6018011	Elective Course for Study Abroad 14	4	
GLOB6019011	Elective Course for Study Abroad 15	4	
GLOB6020011	Elective Course for Study Abroad 16	4	
GLOB6021011	Elective Course for Study Abroad 17	2	
GLOB6022011	Elective Course for Study Abroad 18	2	
GLOB6023011	Elective Course for Study Abroad 19	2	
GLOB6024011	Elective Course for Study Abroad 20	2	20
GLOB6025011	Elective Course for Study Abroad 21	2	
GLOB6026011	Elective Course for Study Abroad 22	2	
GLOB6027011	Elective Course for Study Abroad 23	2	
GLOB6028011	Elective Course for Study Abroad 24	2	
GLOB6041011	Elective Course for Study Abroad 25	3	
GLOB6252011	Elective Course for Study Abroad 30	3	
GLOB6253011	Elective Course for Study Abroad 31	4	

*) Transferred courses will be transferred based on credit transfer policies on study program with total of 20 credits.

Certified Specific Independent Study

Code	Course Name	SCU	Total
Elective courses list for certified specific independent study*			
Enrichment Program I/II			
MICR6033011	Course Certification I	3	
MICR6034011	Technical Skill Enrichment I	4	
MICR6035011	Industrial Project I	9	
MICR6036011	Soft Skill Enrichment I	4	
MICR6001011	Elective Course for Micro Credential Course 1	8	
MICR6002011	Elective Course for Micro Credential Course 2	8	
MICR6003011	Elective Course for Micro Credential Course 3	6	
MICR6004011	Elective Course for Micro Credential Course 4	6	
MICR6005011	Elective Course for Micro Credential Course 5	6	
MICR6006011	Elective Course for Micro Credential Course 6	5	
MICR6007011	Elective Course for Micro Credential Course 7	5	
MICR6008011	Elective Course for Micro Credential Course 8	5	
MICR6009011	Elective Course for Micro Credential Course 9	5	
MICR6010011	Elective Course for Micro Credential Course 10	4	
MICR6011011	Elective Course for Micro Credential Course 11	4	
MICR6012011	Elective Course for Micro Credential Course 12	4	
MICR6013011	Elective Course for Micro Credential Course 13	4	
MICR6014011	Elective Course for Micro Credential Course 14	4	20
MICR6015011	Elective Course for Micro Credential Course 15	3	
MICR6016011	Elective Course for Micro Credential Course 16	3	
MICR6017011	Elective Course for Micro Credential Course 17	3	
MICR6018011	Elective Course for Micro Credential Course 18	3	
MICR6019011	Elective Course for Micro Credential Course 19	3	
MICR6020011	Elective Course for Micro Credential Course 20	3	
MICR6021011	Elective Course for Micro Credential Course 21	2	
MICR6022011	Elective Course for Micro Credential Course 22	2	
MICR6023011	Elective Course for Micro Credential Course 23	2	
MICR6024011	Elective Course for Micro Credential Course 24	2	
MICR6025011	Elective Course for Micro Credential Course 25	2	
MICR6026011	Elective Course for Micro Credential Course 26	2	
MICR6027011	Elective Course for Micro Credential Course 27	2	
MICR6028011	Elective Course for Micro Credential Course 28	2	
MICR6029011	Elective Course for Micro Credential Course 29	1	
MICR6030011	Elective Course for Micro Credential Course 30	1	
MICR6031011	Elective Course for Micro Credential Course 31	1	
MICR6032011	Elective Course for Micro Credential Course 32	1	

) For students who take BINUS certified specific independent study courses, they should take the first 4 courses on the list above (20 credits). Meanwhile, electives courses 1 to 32 are transferred courses for students who take certified specific independent study outside BINUS University. Transferred courses will be transferred based on credit transfer policies on study program with total of 20 credits.

Further Study Track

Code	Course Name	SCU	Total
Enrichment Program II			
ISYE6227011	Engineering System and Optimization	6	
ISYE6228011	System Simulation and Modeling	6	20
ISYE6226011	Industrial Design Project	8	

The Table of Prerequisite for Industrial Engineering Study Program

Course		SCU	Sem.	Course Prerequisite		SCU	Sem.
MATH6019011	Calculus III	4	3	MATH6014	Calculus I	4	1
ISYE6207011	Stochastic Processes	2	4	STAT6003	Probability Theory	2	2
ISYE6186011	Production & Operation Analysis	3/1	5	ISYE6123011	Deterministic Optimization	3	3
ISYE6125011	Quality Engineering	3	5	STAT6172011	Applied Statistics	2	3

Student should pass all of these quality controlled courses as listed below:

No.	Course Code	Course Name	Minimal Grade
1	CHAR6013	Character Building: *Pancasila*	B
2	ENTR6511001	Entrepreneurship: Market Validation	C
3	ISYE6123011	Deterministic Optimization*	C
4	ISYE6157011	Human-Integrated Systems	C
5	ISYE6125011	Quality Engineering*	C
6	ISYE6186011	Production & Operation Analysis*	C
Streaming: Supply Chain Engineering			
7	ISYE6164011	E-Supply Chain Management	C
8	ISYE6183011	Warehouse Management Systems	C
Streaming: Service Systems Engineering			
7	ISYE6066011	Human Interaction in Service Systems	C
8	ISYE6166011	Dynamic Service Facility Design	C
Streaming: Manufacturing Systems			
7	ENGR6005011	Mechanics of Materials	C
8	ISYE6184011	Manufacturing Processes	C

*) Tutorial & Multipaper