

Industrial Engineering

Introduction

Engineering plays a vital role in economic growth and nation development. Engineering plays a major role in designing a safe, efficient, and sustainable systems while also considering the economic and social impact of their designs. Industrial Engineering undergraduate program (S1) BINUS at Semarang Campus provides an updated Industrial & system engineering knowledge and skills. Through this program, student engages in the study of how to describe, evaluate, design, modify, control, and improve the performance of integrated systems. The program emphasizes the application of engineering fundamentals with a balanced treatment of theory, design, and experience. The curriculum provides with the principles and methods of engineering analysis and design and blend in fundamental topics in mathematics, physical and engineering sciences knowledge. Students will also learn the topics of computer applications, management and social sciences, such as programming, data analysis, financial management, human resources management, economy, cost accounting, and industrial psychology.

The program has been BAN-PT accredited since 2022. The main focus of the program is optimizing the performance of systems in an effective, efficient, and productive way within the framework of the industrial digital transformation. The object designed is not only the tangible objects such as products or building, but also an integrated system consisting of people, machines, materials, energy, information system and how the implementation in industry 4.0 era.

Vision

To become a reputable and an innovative Industrial Engineering study program through the integration of updated technology to foster and empower the nation's society

Mission

The mission of Industrial Engineering Department is to contribute to the development of Indonesian community through the provision education by:

1. Providing world-class education experiences in the field of Industrial system engineering
2. Providing high-impact and innovative research and professional services by utilizing updated knowledge and technologies.
3. Organizing community services activities to foster a society that is relevant to Industrial System Engineering or related disciplines.
4. Empowering the society to contribute to improving the quality of life of the Indonesian communities

Program Objective

1. (PO 1) Utilize appropriate engineering design methods and tools that are principal to work beneficially within their professions & communities
2. (PO 2) Possess effective teamwork and leadership skills and commit to the standard of profession and ethical practice.
3. (PO 3) Continuously develop oneself to meet the evolving demands and increasing responsibilities of a successful career, to benefit the organization and society.

Student Outcomes (or Learning Goals only for BBS Program)

1. (SO 1) Able to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. (SO 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. (SO 3) Able to communicate effectively with a range of audiences
4. (SO 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. (SO 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. (SO 6) Able to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. (SO 7) Able to acquire and apply new knowledge as needed, using appropriate learning strategies

Prospective Career of the Graduates

Industrial engineers are employed in BUMN, BUMS, academic sector, private company in manufacturing, supply chain and service industries. The type of works industrial engineers are doing are but not limited to:

- Supply Chain Engineer
- Production Engineer
- Operation Engineer
- Quality Assurance Engineer
- Product Analyst/Specialist
- System Analyst
- Service System Engineer
- Safety & Health Engineer
- Human Resources Analyst
- Education: Teaching and Research, Consulting.

Curriculum

The curriculum of the Industrial Engineering Program BINUS @ Semarang has been developed in line with the National Curriculum (BAN-PT), and with the international engineering education standard and market trends. All students obtain 146 credit, 120 student activity transcript point and 30 hours community services regarding the hard skill and soft skill development. There are 30 credit hours of basic science course that delivered in first until 3rd semester along with Fundamental Engineering course, Industrial Engineering Core Courses and Character Building Group courses: Pancasila, Kewarganegaraan, and Agama (Religion). The Curriculum provides a flexibility learning process and student studies until 4th semester at Semarang Campus and has a mobility opportunity to other BINUS campus in 5th semester. In 5th semester, students freely to choose 10 credit hours of certain topics in breadth and depth between streaming in Semarang Campus: Industrial Digital Transformation and three Streaming in Jakarta Campus: Supply Chain Engineering, Service Systems Engineering, and Manufacturing Systems. In the sixth and seventh semesters students have the opportunity to enrich their learning with various partners of Bina Nusantara University for one year through Enrichment Program. The Enrichment

Program offers seven optional tracks: Internship, Entrepreneurship, Research, Community Development, Fast Track, Study Abroad, and Independent study. On the last semester every student takes a thesis as final course and will be guided by Faculty Member of Industrial Engineering BINUS Semarang Campus.

Course Structure

Sem	Code	Course Name	SCU	Total
1	CHAR6044054	Character Building: Pancasila	2	20
	SCIE6070054	Physics I	4	
	SCIE6071054	Chemistry	3	
	MATH6202054	Calculus I	4	
	ENGR6095054	Technical Drawing **	2/1	
	LANG6114054	Indonesian	2	
	ISYE6247054	System Engineering & Analysis **	2	
	Foreign Language Courses			
2	CHAR6045054	Character Building: Kewarganegaraan	2	20
	SCIE6072054	Biology	2	
	SCIE6073054	Physics II	4/1	
	MATH6203054	Calculus II	4	
	STAT6203054	Probability Theory	2	
	ISYE6249054	Deterministic Optimization *&**	3	
	ISYE6250054	Industrial Economy and Accounting	2	
	Foreign Language Courses			
3	CHAR6043054	Character Building: Agama	2	19
	MATH6206054	Linear and Discrete Mathematics	4	
	MATH6207054	Calculus III	4	
	STAT6208054	Applied Statistics*	2	
	ISYE6251054	Human-Integrated Systems	2/1	
	COMP6958054	Introduction to Programming	2	
	ENPR6098054	Entrepreneurship: Ideation	2	
	Foreign Language Courses			
4	ISYE6253054	Stochastic Processes	2	21
	ENPR6099054	Entrepreneurship: Prototyping	2	
	ISYE6254054	Data Analysis & Visualization	2	
	ISYE6313054	Information & Production Systems**	3/1	
	ISYE6304054	Facility Planning & Safety Engineering	4	
	ISYE6260054	Leadership & Organizational Behavior*&**	2	
	ISYE6259054	Engineering Economy**	2	
	ISYE6258054	Additive & Manufacturing Process*	2/1	
Foreign Language Courses			0	
5	ENPR6100054	Entrepreneurship: Market Validation	2	20
	ISYE6256054	Quality Engineering**	3	
	ISYE6321054	Supply Chain and Simulation**	3	
	ISYE6262054	Research Methodology	2	

Sem	Code	Course Name	SCU	Total
	Streaming: Industrial Digital Transformation (Semarang)			
	ISYE6305054	Digital Transformation Strategies*&**	3	
	ISYE6314054	Database & Warehouse System**	3/1	
	ISYE6315054	Data Science: Machine Learning	2/1	
	Streaming : Supply Chain Engineering (Greater Jakarta)1)			
	ISYE6164011	E-Supply Chain Management	2/1	
	ISYE6183011	Warehouse Management Systems	2	
	ISYE6301011	Data Science: Machine Learning	3	
	Streaming : Service Systems Engineering (Greater Jakarta)1)			
	ISYE6166011	Dynamic Service Facility Design	2/1	
	ISYE6066011	Human Interaction in Service Systems	2	
	ISYE6302011	E-Service and Usability Engineering	3	
	Streaming : Manufacturing Systems(Greater Jakarta)1)			
	ISYE6184011	Manufacturing Processes	2/1	
	ENGR6005011	Mechanics of Materials	2	
	ISYE6303011	Smart Manufacturing	3	
	Elective Supply Chain Engineering Courses2)			
	ISYE6067011	Global Supply Chain*	2	
	ISYE6165011	Supply Chain Risk & Negotiation	2	
	ISYE6115011	Transportation Modeling	2	
	Elective Service Systems Engineering Courses2)			
	MKTG6128011	Market Research	2	
	ISYE6167011	Decision Support System	2	
	ISYE6168011	Financial Engineering*	2	
	Elective Manufacturing Systems Courses2)			
	ISYE6130011	Project Management	2	
	ISYE6169011	Maintenance Management Systems	2	
	ISYE6170011	Sustainable Engineering Systems*	2	
	Free Electives		10	
	Minor		10	
6	Enrichment Program I		20	20
7	Enrichment Program II		20	20
8	ISYE6275054	Pre-Thesis	2	6
	ISYE6276054	Thesis	4	
	ISYE6277054	Thesis	6	
			Total Credits 146 SCU	

*) This course is delivered in English

**) Global Learning System Course

For 5th Semester:

- 1) Conducted for student mobility program in BINUS @Greater Jakarta
- 2) Students choose 1 course (2 credits) of elective track course based on preferred track.

For Free Electives, students are required to choose from the list of Free Electives in Appendix

Streaming/Minor/Free Electives:

-) For 5th Semester: Students are required to choose one of the streamings/ minor program/free electives/ cross streaming.

-) **AOL** – Assurance of Learning Process System

Foreign Language Courses:

Students will take foreign language courses according to BINUS University English proficiency test results. See foreign language courses appendix for the details. Students must pass 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/Program

Appendix Foreign Language Courses

Foreign language courses are personalized courses that can be taken by the students according to their own pace from semester 1 until semester 4 or before they take enrichment. The courses are available at BINUSMAYA – Beelingua.

The following are the provisions of the courses that must be taken by students:

Course	SCU
Foreign Language Courses	
ENGL6264054 English for Frontrunners	0
ENGL6265054 English for Independent Users	0
ENGL6266054 English for Professionals	0
JAPN6207054 Basic Japanese Language*	0
CHIN6184054 Basic Chinese Language*	0

1. Students with Binus University English Proficiency Test score less than 437 are required to take English for Frontrunners and English for Independent Users.
2. Students with Binus University English Proficiency Test score less than 520 are required to take English for Independent Users and English for Professionals.
3. Students with Binus University English Proficiency Test score equal to or greater than 520 are required to take English for Professionals. Additionally, students may choose to take either Basic Japanese Language or Basic Chinese Language.
4. Students are required to pass the foreign language courses before they take enrichment.
5. Students can see the requirements to pass the foreign language courses at BINUSMAYA – Beelingua.

Minor Scheme

Minor Program	Semester 5
Sustainable Development	v
Interactive & Users Experience Design	v
Data Analytics	v
Robotic Process Automation	v
Event Business and Entertainment	v
Creative Digital Storytelling	v
Digital Transformation	v
Virtual Services Experience	v
Metaverse in Business	v
Content Creation	v

The minor programs can change anytime based on the trends of knowledge and industry each year. Students will receive information about the updated minor programs during the registration period.

1. Minor: Sustainable Development

Minor Fundamental Courses

Course	SCU
ISYE6154011 Sustainable Design and Manufacture	4
CPEN6217010 Digital for Sustainable Development	4
ARCH6119014 Introduction to Sustainable Development	2
Total SCU	10

2. Minor: Interactive & Users Experience Design

Minor Fundamental Courses

Course	SCU
ISYS6553003 User-Centered Research and Evaluation	4
PSYC6176027 Psychology and User Experience	4
DSIN6003007 Fundamental of Interface Design	2
Total SCU	10

3. Minor: Data Analytics

Minor Fundamental Courses

Course	SCU
ISYS6680003 Introduction to Data Analytics	2
ISYS6681003 Data Management & Descriptive Analytics	4
STAT6198049 Statistical for Decision Making	4
Total SCU	10

4. Minor: Robotic Process Automation

Minor Fundamental Courses

Course	SCU
COMP6857001 Basic Programming for Automation	2
COMP6858001 RPA Concept & Design	2
ISYS6684003 RPA Developer Fundamental	4
ISYS6687003 Business Process Improvement	2
Total SCU	10

5. Minor Program: Event Business and Entertainment

Fundamental Courses

Course	SCU
HTMN6151021 Event Marketing Management	2
HTMN6152021 Catering Management	4
TRSM6232022 MICE (Meeting, Incentive, Convention, Exhibition) Management	4
Total SCU	10

6. Minor Program: Creative Digital Storytelling

Fundamental Courses

Course	SCU
ENGL6274024 Approaches in Multimodal Storytelling	2
DSIN6033007 Visual Storytelling	2
ENGL6275024 Storytelling for Business	2
FILM6118009 Script Development & Pitching	4
Total SCU	10

7. Minor Program: Digital Transformation

Fundamental Courses

Course	SCU
ISYS6559003 Business Models and Technology Innovation	4
ISYS6557003 Business Data Management	4
MGMT6484005 Digital Strategy	2
Total SCU	10

8. Minor Program: Virtual Services Experience

Fundamental Courses

Course	SCU
ISYS6561003 Fundamental of Virtual Services	2
ACCT6350020 Virtual Financial Services	4
MGMT6354005 Virtual Operation and Supply Chain	4
Total SCU	10

9. Minor Program: Metaverse in Business

Fundamental Courses

Course	SCU
ISYS6777052 Business Model	2
COMP6889051 Virtual Reality	4
COMP6890051 Augmented reality	4
Total SCU	10

10. Minor Program: Content Creation

Fundamental Courses

Course	SCU
FILM6105009 Filmmaking Fundamental	4
MKTG6336055 Content Marketing Analytics	4
DSIN6042053 Photography for Creators	2
Total SCU	10

Appendix: Free Electives (5th Semester)

No	Course Owner Department	Course Code	Course Name	SCU	Semester
1	Business Management	MGMT6459005	Retail Management	4	5
2	Business Management	MKTG6324005	Retail Marketing Management	2	5
3	Business Management	MGMT6461005	Category Management	2	5
4	Global Business Marketing	MKTG6321005	Marketing Data Analytics	4	5
5	Global Business Marketing	MKTG6322005	Sales and Customer Relationship Management	4	5
6	Civil Engineering	CIVL6030013	Environmental Engineering	2	5
7	Industrial Engineering	ISYE6115011	Transportation Modeling	2	5
8	Industrial Engineering	MKTG6128011	Market Research	2	5
9	Industrial Engineering	ISYE6167011	Decision Support System	2	5
10	Industrial Engineering	ISYE6168011	Financial Engineering	2	5
11	Industrial Engineering	ISYE6130011	Project Management	2	5
12	Industrial Engineering	ISYE6169011	Maintenance Management Systems	2	5
13	Industrial Engineering	ISYE6170011	Sustainable Engineering Systems	2	5
14	Industrial Engineering	ISYE6113011	Leadership & Organizational Behavior	2	5
15	Computer Science	COMP6800001	Human and Computer Interaction	2/2	5
16	Computer Science	COMP6590001	Geographical Information System	2/2	5
17	Marketing Communication	COMM6541019	Digital Corporate Communication	2/2	5
18	Marketing Communication	COMM6638019	Social Media Planning & Engagement	2/2	5

No	Course Owner Department	Course Code	Course Name	SCU	Semester
19	Tourism	MGMT6408022	Strategic Management for Tourism	2	5
20	Tourism	TRSM6224022	Environmental Health and Safety in Tourism	2	5
21	Hotel Management	HTMN6018021	Consumer Behavior in Hospitality	2	5
22	Hotel Management	HTMN6123021	Hygiene and Safety for Hospitality	4	5
23	Finance	FINC6189020	Introduction to Financial Market and Fin-Tech	2	5
24	Mobile Application & Technology	MOBI6068001	Web Design	2	5
25	Mobile Application & Technology	MOBI6070001	Embedded System and Internet of Things	3	5
26	Mobile Application & Technology	MOBI6059001	Mobile Programming	2	5
27	Statistics	STAT6157049	Data Mining and Visualization	2	5
28	Information Systems	ISYS6402003	Business Analytics	2/2	5
29	Business Information Technology	ISYS6579003	Knowledge-Based AI: Cognitive Systems	4	5
30	Business Law	LAWS6159028	Legal Aspect in Business	2	5
31	Business Law	LAWS6170028	Investment Law	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	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	

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
ISYE6278054	Industrial Practice I	8	
ISYE6279054	Engineering Ethics and Competence I	8	
ISYE6280054	EES in Industrial Engineering I	4	
Enrichment Program II			20
ISYE6281054	Industrial Practice II	8	
ISYE6282054	Engineering Ethics and Competence II	8	
ISYE6283054	EES in Industrial Engineering II	4	

Certified Research Track

Code	Course Name	SCU	Total
Enrichment Program I			20
RSCH6648054	Research Experience	8	
RSCH6649054	Scientific Writing in Industrial Engineering	8	
RSCH6650054	Global EES in Industrial Engineering	4	

Certified Community Development Track

Code	Course Name	SCU	Total
Enrichment Program I			20
CMDV6419054	Community Outreach Project Implementation	8	
CMDV6420054	Design Project	8	
CMDV6421054	Employability and Entrepreneurial Skills in Industrial Engineering	4	

Certified Study Abroad Track

Code	Course Name	SCU	Total
Enrichment Program I			20
GLOB6455054	Elective Course for Study Abroad 1	4	
GLOB6456054	Elective Course for Study Abroad 2	4	
GLOB6457054	Elective Course for Study Abroad 3	4	
GLOB6458054	Elective Course for Study Abroad 4	4	
GLOB6459054	Elective Course for Study Abroad 5	4	
GLOB6460054	Elective Course for Study Abroad 6	2	
GLOB6461054	Elective Course for Study Abroad 7	2	
GLOB6462054	Elective Course for Study Abroad 8	2	
GLOB6463054	Elective Course for Study Abroad 9	2	

Code	Course Name	SCU	Total
GLOB6464054	Elective Course for Study Abroad 10	2	
GLOB6465054	Elective Course for Study Abroad 11	2	
GLOB6466054	Elective Course for Study Abroad 12	2	
GLOB6467054	Elective Course for Study Abroad 13	2	

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

Certified Specific Independent Study Track

Code	Course Name	SCU	Total
Elective courses list for Specific Independent Study*			
Enrichment Program I/II			
CSIS6061054	Course Certification	3	20
CSIS6062054	Technical Skill Enrichment	4	
CSIS6063054	Industrial Project	9	
CSIS6064054	Soft Skill Enrichment	4	
CSIS6065054	Elective Course for Specific Independent Study 1	8	
CSIS6066054	Elective Course for Specific Independent Study 2	8	
CSIS6067054	Elective Course for Specific Independent Study 3	6	
CSIS6068054	Elective Course for Specific Independent Study 4	6	
CSIS6069054	Elective Course for Specific Independent Study 5	6	
CSIS6070054	Elective Course for Specific Independent Study 6	5	
CSIS6071054	Elective Course for Specific Independent Study 7	5	
CSIS6072054	Elective Course for Specific Independent Study 8	5	
CSIS6073054	Elective Course for Specific Independent Study 9	5	
CSIS6074054	Elective Course for Specific Independent Study 10	4	
CSIS6075054	Elective Course for Specific Independent Study 11	4	
CSIS6076054	Elective Course for Specific Independent Study 12	4	
CSIS6077054	Elective Course for Specific Independent Study 13	4	
CSIS6078054	Elective Course for Specific Independent Study 14	4	
CSIS6079054	Elective Course for Specific Independent Study 15	3	
CSIS6080054	Elective Course for Specific Independent Study 16	3	
CSIS6081054	Elective Course for Specific Independent Study 17	3	
CSIS6082054	Elective Course for Specific Independent Study 18	3	
CSIS6083054	Elective Course for Specific Independent Study 19	3	
CSIS6084054	Elective Course for Specific Independent Study 20	3	
CSIS6085054	Elective Course for Specific Independent Study 21	2	
CSIS6086054	Elective Course for Specific Independent Study 22	2	
CSIS6087054	Elective Course for Specific Independent Study 23	2	
CSIS6088054	Elective Course for Specific Independent Study 24	2	
CSIS6089054	Elective Course for Specific Independent Study 25	2	
CSIS6090054	Elective Course for Specific Independent Study 26	2	
CSIS6091054	Elective Course for Specific Independent Study 27	2	

Code	Course Name	SCU	Total
CSIS6092054	Elective Course for Specific Independent Study 28	2	
CSIS6093054	Elective Course for Specific Independent Study 29	1	
CSIS6094054	Elective Course for Specific Independent Study 30	1	
CSIS6095054	Elective Course for Specific Independent Study 31	1	
CSIS6096054	Elective Course for Specific Independent Study 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 courses outside BINUS University. Transferred courses will be transferred based on credit transfer policies on study program with total of 20 credits

Certified Further Study Track

Code	Course Name	SCU	Total
Enrichment Program II			20
ISYE6227054	Engineering System and Optimization	6	
ISYE6228054	System Simulation and Modeling	6	
ISYE6226054	Industrial Design Project	8	

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

No	Course Code	Course Name	Minimal Grade
1.	CHAR6044054	Character Building: Pancasila	B
2.	ISYE6249054	Deterministic Optimization*	C
3.	ISYE6251054	Human-Integrated Systems	C
4.	ISYE6313054	Information & Production Systems*	C
5.	ISYE6304054	Facility Planning and Safety Engineering	C
6.	ISYE6259054	Engineering Economy	C
7.	ENPR6100054	Entrepreneurship: Market Validation	C
8.	ISYE6256054	Quality Engineering*	C

*) Tutorial & Multipaper