

Industrial Engineering

Introduction

Industrial Engineering program 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.

Industrial Engineering program emphasizes the application of engineering fundamentals with a balanced treatment of theory, design, and experience. Computer applications are integrated throughout the curriculum. This program allows flexibility to its students to study certain topics in breadth and depth by offering Supply Chain Engineering. The specialization of Supply Chain Engineering covers how modern production and operations management techniques can respond to the pressures of the competitive global marketplace by integrating all activities in the supply chain, adding flexibility to the system and reducing production cost.

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-machine integration. 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

Becoming a world class online learning industrial engineering study program in 2035 to fostering and empowering the society in building and serving the nation

Mission

The mission of Distance Learning Program in Industrial Engineering is to contribute to the global community through the provision of world-class education by:

1. Developing excellent characters through holistic approach that meets global standards
2. Resolving the nation's issues in Industrial Engineering field study through high impact research
3. Fostering BINUSIAN as lifelong learners through self-enrichment in adapting to new system engineering and technology
4. Empowering BINUSIAN to continuously serve society-based needs through industrial engineering applied technology
5. Being the main driver to enrich the BINUS Higher Education system by using industrial knowledge and technology

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 will have the following competencies an ability to:

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.
8. Able to solve problems through the multidisciplinary approach

Prospective Career of the Graduates

Industrial engineers are employed in manufacturing and service industries. Several career options for industrial engineers include, are but not limited to, the following:

1. Production/Operation Engineer
2. Quality Assurance Engineer
3. Supply Chain Engineer
4. Data Engineer
5. System Analyst
6. Product Specialist
7. Service Engineer
8. Maintenance Engineer

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 requirement in modeling and solving such complex systems. The Distance Learning Program in 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	STAT6174037	Probability Theory and Applied Statistics	4	20
	SCIE6091037	Physics	2/2	
	MATH6195037	Mathematics	4	
	SCIE6057037	Chemistry and Biology	4	
	ISYE6187037	Engineering Economy and System Analysis	4	
2	CHAR6019037	Character Building: Pancasila	2	20
	ISYE6328037	Human-Integrated Systems and Organizational Behaviour	2/2	
	ISYE6348037	Deterministic Optimization and Stochastic Processes	4/2	
	ISYE6329037	Systems Simulation and Engineering Data Analysis	4	
	LANG6031037	Indonesian	2	
	COSC6012037	Foundations of Artificial Intelligence	2	
3	CHAR6020037	Character Building: Kewarganegaraan	2	20
	MATH6216037	Calculus	4	
	ARCH6102037	Technical Drawing	2/2	
	ISYE6094037	Quality Engineering	4	
	ISYE6190037	Facility Planning and Safety Engineering	4	
	ISYE6087037	Introduction to Manufacturing Processes	4	
4	CHAR6021037	Character Building: Agama	2	20
	ISYE6330037	Production and Operation Analysis	2/2	
	ISYE6332037	Research Methodology and Experimental Design	4/2	
5	ENPR6253037	Entrepreneurship	2	20
	ENGL6163037	English Professional	4	
	Stream: Supply Chain Engineering			
	ISYE6333037	Supply Chain: Logistics and Transportation	4	
	ISYE6127037	Warehouse Management System	4	
	MGMT6560037	Leadership and Global Industrial Strategic	4	
	ISYE6095037	E-Supply Chain Management	2/2	
	ISYE6335037	Data Science for Supply Chain Analysis	4	
	Stream: Industrial Manufacturing System			
	ISYE6077037	Project Management	4	
	ISYE6194037	Environmental Engineering and Waste Management	4	
	MGMT6560037	Leadership and Global Industrial Strategic	4	
	ISYE6346037	Sustainable Manufacturing Systems	2/2	
ISYE6347037	Maintenance Management System	4		
Stream: Industrial Digital Transformation				
ISYE6342037	Digital Transformation Strategies	4		

Sem	Code	Course Name	SCU	Total
	ISYE6343037	Digitalization Product Development	4	
	ISYE6344037	Digital Logistics Management	4	
	COSC6106037	Data Science: Machine Learning	4	
	MGMT6560037	Leadership and Global Industrial Strategic	4	
6	Minor Program			20
	Free Electives			
	Enrichment Program I			
7	Free Electives			20
	Enrichment Program II			
8	RSCH6692037	Pre Thesis	0	6
	RSCH6493037	Thesis	0	
	RSCH6687037	Pre Thesis	2	
	RSCH6688037	Thesis	4	
	RSCH6494037	Thesis	6	
Total Credit 146 SCU				

*Semester 6: Students are required to choose Minor Program or Free Electives or Enrichment Program. See appendix for the details.

*Semester 7: Students are required to choose Free Electives or Individual Development Project or one of enrichment program tracks. See appendix for the details.

***Pre thesis (0 SCU)** can be taken in the first period of the 6th semester, meanwhile **pre thesis (2 SCU)** can be taken in the second period of the 6th semester by the students who meet the requirements from the Study Program/Program. Then, **thesis (0 SCU)** can be taken in the first period of the 7th semester, meanwhile **thesis (4 SCU)** can be taken in the second period of the 7th semester by the students who meet the requirements from the Study Program/Program.

Appendix: Minor Program Minor Scheme

Minor Program	Semester 6	
	1 st Period	2 nd Period
Minor @ Binus Online Learning		
Technopreneurship	V	v
Artificial Intelligence in Business	V	v

Minor Program: Technopreneurship

Code	Course Name	SCU
ACCT6384039	Accounting for Small Medium Enterprise	4
MKTG6296038	Digital Marketing for Manager	4
ISYS6619035	UX for Digital Business	4
COMP6725036	Big Data Technologies	4
ISYE6196037	Industrial Feasibility Analysis	4
Total SCU		20

Minor Program: Artificial Intelligence in Business

Code	Course Name	SCU
ISYS6776035	Managerial Support Systems	4
ACCT6473039	Artificial Intelligence for Audit, Forensic Accounting, and Valuation	4
COMP6936036	Machine Learning	4
MGMT6483038	AI Marketing and Predicting Consumer Experiences	4
ISYE6284037	Cognitive Ergonomics	4
Total SCU		20

Appendix: Free Electives
Free Elective

For students who take free electives track in the 6th semester, the following is a list of courses that students can take for 20 credits.

No	Study Program	Course Code	Course	SCU	Semester
1	Management PJJ	MKTG6117038	Entrepreneurial Marketing	4	6
2	Management PJJ	ENTR6053038	Entrepreneurial Finance	4	6
3	Management PJJ	COMM6092038	Business Communication	4	6
4	Computer Science PJJ	COSC6023036	Artificial Intelligence	2/2	6
5	Industrial Engineering PJJ	ISYE6195037	Human Interaction in Service Systems	4	6
6	Industrial Engineering PJJ	ISYE6285037	Financial Engineering	4	6
7	Industrial Engineering PJJ	ISYE6286037	Market Research for Engineer	4	6
8	Industrial Engineering PJJ	ISYE6098037	Supply Chain Risk & Negotiation	4	6
9	Accounting PJJ	FINC6221039	Financial Management	2/2	6
10	Accounting PJJ	ACCT6525039	Strategic Management Accounting	4	6
11	Information Systems PJJ	ISYS6701035	User Experience Research and Design	4	6
12	Information Systems PJJ	ISYS6878035	Data Modelling and Analytics	4	6
13	Information Systems PJJ	ISYS6877035	IT Governance and Security	4	6
14	Information Systems PJJ	ISYS6321035	Technology & Infrastructure of e-Business	4	6

For students who take free electives track in the 7th semester, the following is a list of courses that students can take for 20 credits.

No	Study Program	Course Code	Course	SCU	Semester
1	Management PJJ	ENPR6300038	Managing Entrepreneurial Organization and Leadership	4/2	7
2	Management PJJ	MGMT6563038	E-Marketing and E-CRM	4/2	7
3	Management PJJ	BUSS6049038	Managing Innovation	4	7
4	Management PJJ	MGMT6553038	Digital Retail and Merchandising	4	7
5	Computer Science PJJ	COMP6941036	Data Mining for Business Analytics	4/2	7
6	Industrial Engineering PJJ	ISYE6287037	Industry 4.0 and Implementation	4	7
7	Industrial Engineering PJJ	ISYE6288037	Smart Manufacturing	4	7
8	Industrial Engineering PJJ	ISYE6349037	Manufacturing Execution Systems	4/2	7
9	Industrial Engineering PJJ	ISYE6350037	Digital Simulation and Manufacturing System	4/2	7
10	Information Systems PJJ	ISYS6941035	Social Informatics	4/2	7

Appendix: Enrichment

Enrichment Track Scheme

Track scheme for semester 6 and 7. Student will take one of the tracks:

Enrichment Program Track									
Track	Semester 6	Semester 7							
	IS	IN	EN	RS	CD	SA	IS	FS	IDP
1	v	v							
2	v		v						
3	v			v					
4	v				v				
5	v					v			
6	v						v		
7	v								v

Students in semester 6 who take minor program or free electives, in semester 7 can take the enrichment track as follows:

Enrichment Program Track								
Track	Semester 7							
	IN	EN	RS	CD	SA	IS	FS	IS
1	v							

2		v						
3			v					
4				v				
5					v			
6						v		
7							v*	
8								v

*) Regarding the implementation of the Further Study enrichment track as illustrated on the table above, if students wish to choose the Further Study track in semester 7, then their choice in semester 6 must be the Minor Program or Free Electives

Note:

- IN : Certified Internship
- EN : Certified Entrepreneurship
- RS : Certified Research
- CD : Certified Community Development
- SA : Certified Study Abroad
- FS : Further Study
- IS : Certified Specific Independent Study
- IDP : Certified Individual Development Project

Certified Internship Track

Code	Course Name	SCU	Total SCU
ISYE6221037	Working Experience in Industrial Engineering	6	20
ISYE6222037	Industrial Engineering in Practice	4	
ISYE6224037	Industrial Experience in Industrial Engineering	6	
ISYE6223037	Employability and Entrepreneurial Skills in Industrial Engineering Industry	4	

Certified Entrepreneurship Track

Code	Course Name	SCU	Total SCU
ENPR6041037	Business Start Up in Industrial Engineering	6	20
ENPR6042037	Business Model & Validation in Industrial Engineering	4	
ENPR6043037	Launching New Venture in Industrial Engineering	6	
ENPR6044037	Entrepreneurship and Managing New Business in Industrial Engineering	4	

Certified Research Track

Code	Course Name	SCU	Total SCU
RSCH6683037	Industrial Engineering Research Experience	6	20
RSCH6684037	Scientific Writing in Industrial Engineering Research	4	
RSCH6685037	Academic Writing for Industrial Engineering Research	6	
RSCH6686037	Global Employability and Entrepreneurial Skills in Industrial Engineering Research	4	

Certified Community Development Track

Code	Course Name	SCU	Total SCU
CMDV6450037	Community Development Project Implementation in Industrial Engineering	6	20
CMDV6451037	Community Development Project Design in Industrial Engineering	4	
CMDV6452037	Industrial Engineering Program Execution for Community	6	
CMDV6453037	Employability and Entrepreneurial Skills in Industrial Engineering Community	4	

Certified Study Abroad Track

Code	Course Name	SCU	Total SCU
GLOB6415037	Elective Course for Study Abroad 1	4	20
GLOB6416037	Elective Course for Study Abroad 2	4	
GLOB6417037	Elective Course for Study Abroad 3	3	
GLOB6418037	Elective Course for Study Abroad 4	3	
GLOB6419037	Elective Course for Study Abroad 5	3	
GLOB6420037	Elective Course for Study Abroad 6	2	
GLOB6421037	Elective Course for Study Abroad 7	2	
GLOB6422037	Elective Course for Study Abroad 8	2	
GLOB6423037	Elective Course for Study Abroad 9	1	
GLOB6424037	Elective Course for Study Abroad 10	1	
GLOB6425037	Elective Course for Study Abroad 11	4	
GLOB6426037	Elective Course for Study Abroad 12	4	
GLOB6427037	Elective Course for Study Abroad 13	3	
GLOB6428037	Elective Course for Study Abroad 14	3	
GLOB6429037	Elective Course for Study Abroad 15	3	
GLOB6430037	Elective Course for Study Abroad 16	2	
GLOB6431037	Elective Course for Study Abroad 17	2	
GLOB6432037	Elective Course for Study Abroad 18	2	
GLOB6433037	Elective Course for Study Abroad 19	1	
GLOB6434037	Elective Course for Study Abroad 20	1	

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

**Certified Specific Independent Study Track
 Enrichment Program I**

Code	Course Name	SCU
CSIS6037037	Course Certification	3
CSIS6038037	Technical Skill Enrichment	4
CSIS6039037	Industrial Project	9
CSIS6040037	Soft Skill Enrichment	4
CSIS6041037	Elective Course for Specific Independent Study 1	4

Code	Course Name	SCU
CSIS6042037	Elective Course for Specific Independent Study 2	4
CSIS6043037	Elective Course for Specific Independent Study 3	3
CSIS6044037	Elective Course for Specific Independent Study 4	3
CSIS6045037	Elective Course for Specific Independent Study 5	3
CSIS6046037	Elective Course for Specific Independent Study 6	2
CSIS6047037	Elective Course for Specific Independent Study 7	2
CSIS6048037	Elective Course for Specific Independent Study 8	2
CSIS6049037	Elective Course for Specific Independent Study 9	1
CSIS6050037	Elective Course for Specific Independent Study 10	1
CSIS6051037	Elective Course for Specific Independent Study 11	4
CSIS6052037	Elective Course for Specific Independent Study 12	4
CSIS6053037	Elective Course for Specific Independent Study 13	3
CSIS6054037	Elective Course for Specific Independent Study 14	3
CSIS6055037	Elective Course for Specific Independent Study 15	3
CSIS6056037	Elective Course for Specific Independent Study 16	2
CSIS6057037	Elective Course for Specific Independent Study 17	2
CSIS6058037	Elective Course for Specific Independent Study 18	2
CSIS6059037	Elective Course for Specific Independent Study 19	1
CSIS6060037	Elective Course for Specific Independent Study 20	1
CSIS6097037	Elective Course for Specific Independent Study 21	6
CSIS6098037	Elective Course for Specific Independent Study 22	6
CSIS6099037	Elective Course for Specific Independent Study 23	6
Total SCU		20

**) 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 23 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.*

Enrichment Program II

For students who take Specific Independent Study track in the 7th semester, they should take these courses:

Code	Course Name	SCU
CSIS6037037	Course Certification	3
CSIS6038037	Technical Skill Enrichment	4
CSIS6039037	Industrial Project	9
CSIS6040037	Soft Skill Enrichment	4
CSIS6100037	Elective Course for Specific Independent Study 24	4
CSIS6101037	Elective Course for Specific Independent Study 25	4
CSIS6102037	Elective Course for Specific Independent Study 26	3
CSIS6103037	Elective Course for Specific Independent Study 27	3
CSIS6104037	Elective Course for Specific Independent Study 28	3
CSIS6105037	Elective Course for Specific Independent Study 29	2
CSIS6106037	Elective Course for Specific Independent Study 30	2
CSIS6107037	Elective Course for Specific Independent Study 31	2

Code	Course Name	SCU
CSIS6108037	Elective Course for Specific Independent Study 32	1
CSIS6109037	Elective Course for Specific Independent Study 33	1
CSIS6110037	Elective Course for Specific Independent Study 34	4
CSIS6111037	Elective Course for Specific Independent Study 35	4
CSIS6112037	Elective Course for Specific Independent Study 36	3
CSIS6113037	Elective Course for Specific Independent Study 37	3
CSIS6114037	Elective Course for Specific Independent Study 38	3
CSIS6115037	Elective Course for Specific Independent Study 39	2
CSIS6116037	Elective Course for Specific Independent Study 40	2
CSIS6117037	Elective Course for Specific Independent Study 41	2
CSIS6118037	Elective Course for Specific Independent Study 42	1
CSIS6119037	Elective Course for Specific Independent Study 43	1
CSIS6120037	Elective Course for Specific Independent Study 44	6
CSIS6121037	Elective Course for Specific Independent Study 45	6
CSIS6122037	Elective Course for Specific Independent Study 46	6
Total SCU		20

*) 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 24 to 46 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

Students will receive information about Further Study Track courses during the registration period.

Individual Development Project Track

Code	Course Name	SCU	Total SCU
ISYE6292037	Industrial Project Planning in Industrial Engineering	6	20
ISYE6293037	Industrial Project Implementation in Industrial Engineering	4	
ISYE6294037	Industrial Project Evaluation and Reporting in Industrial Engineering	6	
ISYE6295037	Business Ethics in Industrial Engineering Industry	4	

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

No.	Course Code	Course	SCU	Minimal Grade	Semester	Period
1	CHAR6019037	Character Building: Pancasila	2	B	2	1
2	ENTR6081037	Entrepreneurship	4	C	2	2
3	ISYE6189037	Deterministic Optimization & Stochastic Processes	6	C	3	2
4	ISYE6188037	Human-Integrated Systems	3/1	C	3	1
5	ISYE6094037	Quality Engineering	4	C	4	1
6	ISYE6096037	Production & Operation Analysis	4/2	C	5	1

Stream: Supply Chain Engineering						
7	ISYE6090037	Supply Chain: Logistics	4	C	5	2
8	ISYE6236037	E-Supply Chain Management	3/1	C	5	2
Stream: Industrial Manufacturing System						
7	ISYE6077037	Project Management	4	C	5	2
8	ISYE6237037	Sustainable Manufacturing Systems	3/1	C	5	2

