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 is to contribute to the global community through the provision of world-class education by:

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. An ability to apply mathematics, science, and engineering.
2. An ability to design and conduct experiments, as well as to analyze and interpret data.
3. An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
4. An ability to identify, formulate, and solve industrial engineering problems.
5. An ability to function on multidisciplinary teams.
6. An understanding of professional and ethical responsibility.
7. An ability to communicate effectively.
8. The broad education necessary to understand impact of industrial engineering solutions in a global, economic, environmental, and societal context.
9. A recognition of the need for, and an ability to engage in life-long learning.
10. A knowledge of contemporary issues.
11. An ability to use the techniques, skills, and modern engineering tools necessary for industrial engineering practice.

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	
	SCIE6025	Chemistry	4	
	MATH6014	Calculus I	4	
	ENGR6004	Technical Drawing**	2/2	
	English University Courses I			
	ENGL6128	English in Focus	2	
	ENGL6130	English for Business Presentation	2	
2	CHAR6014	Character Building: Kewarganegaraan	2	21
	SCIE6017	Biology	2	
	SCIE6005	Physics II	4/2	
	MATH6016	Calculus II	4	
	LANG6061	Indonesian	1	
	Economic Electives* **			
	ECON6039	Managerial Economics	2	
	ACCT6125	Managerial Accounting	2	
	ECON6017	Economics Theory	2	
	ACCT6139	Financial Accounting	2	
	English University Courses II			
	ENGL6129	English Savvy	2	
	ENGL6131	English for Written Business Communication	2	
3	CHAR6015	Character Building: Agama	2	20
	MATH6004	Linear and Discrete Mathematics	4	
	MATH6019	Calculus III	4	
	ENTR6003	Entrepreneurship I	2	
	STAT6003	Probability Theory	2	
	Computer Science Electives* **			
	COMP6178	Introduction to Programming	2/2	
	ISYS6123	Introduction to Database Systems*	2/2	
	COMP6175	Object Oriented Programming	2/2	
	Engineering Electives* **			
	CIVL6030	Environmental Engineering	2	
	CPEN6080	Electronic Devices	4/1	
	CPEN6079	Electric Circuit Theory	2/1	
	CPEN6099	Signal and System	4	

Sem	Code	Course Name	SCU	Total
	CPEN6028	Actuators and Sensors	2	
	COMP6014	Introduction to Data Structure	2	
	CIVL6023	Fluid Mechanics and Hydraulics	4/1	
	CIVL6021	Statics	4/1	
	CIVL6022	Soil Mechanics	4/1	
	CIVL6025	Hydrology	2	
4	ENTR6014	Entrepreneurship Business Project I	1	18
	ISYE6041	Engineering Economy**	2	
	ISYE6123	Deterministic Optimization*&**	3	
	ISYE6113	Leadership & Organizational Behavior*&**	2	
	ISYE6124	System Engineering & Analysis**	3	
	ISYE6059	Human-Integrated Systems	2/2	
	STAT6084	Applied Statistics	3	
5	STAT6096	Stochastic Processes	4	21
	ISYE6125	Quality Engineering**	3	
	ENTR6004	Entrepreneurship II	2	
	Supply Chain Engineering			
	Required Track Courses			
	ISYE6048	Supply Chain : Logistics	4	
	ISYE6114	Warehouse Management Systems	4	
	Elective Track Courses****			
	ISYE6055	E-Supply Chain Management*	2/2	
	Service Systems Engineering			
	Required Track Courses			
	ISYE6066	Human Interaction in Service Systems	2	
	ISYE6047	Decision Support System	4	
	MKTG6128	Market Research	2	
	Elective Track Courses****			
	ISYE6065	Dynamic Service Facility Design	2/2	
	Manufacturing Systems			
	Required Track Courses			
	ENGR6005	Mechanics of Materials	2	
	ISYE6061	Manufacturing Processes	4/2	
	Elective Track Courses****			
	ISYE6130	Project Management	2	
	ISYE6070	Facility Planning	2	
	ISYE6064	Sustainable Engineering Systems*	4	
	ISYE6116	Health and Safety Engineering	2	
6	ENTR6015	Entrepreneurship Business Project II	1	15
	ISYE6101	Production & Operation Analysis**	4/2	
	ISYE6075	Systems Simulation**	4	
	STAT6002	Research Methodology	2	

Sem	Code	Course Name	SCU	Total
6	**Supply Chain Engineering**			15
	Elective Track Courses****			
	ISYE6067	Global Supply Chain*	2	
	ISYE6165	Supply Chain Risk & Negotiation	2	
	ISYE6115	Transportation Modeling	2	
	Service Systems Engineering			
	Elective Track Courses****			
	ISYE6130	Project Management	2	
	ISYE6168	Financial Engineering*	2	
	Manufacturing Systems			
	Elective Track Courses****			
	ISYE6130	Project Management	2	
	ISYE6070	Facility Planning	2	
	ISYE6064	Sustainable Engineering Systems*	4	
	ISYE6116	Health and Safety Engineering	2	
7	**Enrichment Program I**		15	15
8	**Enrichment Program II**		8	16
	ISYE6153	Thesis	8	
TOTAL CREDITS 146 SCU				

**) This course is delivered in English*

***) Global Learning System Course*

****) Elective Courses list:*

- *For 2nd Semester: Students choose 4 credits from Economic Elective courses list*
- *For 3rd Semester: Students choose 4 credits from Computer Science Elective courses list*
- *For 3rd Semester: Students choose 2 credits from Engineering Elective courses list*

*****) Elective Track Courses*

- *For 5th Semester: Students choose 4 credits of elective track course based on preferred track*
- *For 6th Semester: Students choose 2 credits of elective track course based on preferred track. Choosen elective course in semester 6 should be different with choosen elective course in semester 5*

English University Courses:

-) *For 1st Semester: English University Courses I, student with score BINUS UNIVERSITY English Proficiency Test less than 500 will take English in Focus, and student with score test greater than or equal to 500 will take English for Business Presentation*

-) *For 2nd Semester: English University Courses II, student with score BINUS UNIVERSITY English Proficiency Test less than 500 will take English Savvy, and student with score test greater than or equal to 500 will take English for Written Business Communication*

-) Students must pass English Savvy with a minimum Grade of C.

Enrichment Program I (7th Semester) & Enrichment Program II (8th Semester):

-) *Student will take one of enrichment program tracks (off campus). See enrichment appendix for the tracks detail.*

Enrichment Track Scheme

Track	Semester 7						Semester 8						
	IN	RS*	EN	CD*	SA	etc	IN	RS	EN	CD	SA	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	

*) Need approval from program study

Notes:

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

Notes:
Student will take one of enrichment program tracks

Enrichment Internship Track

Code	Course Name	SCU	Total
Enrichment Program I			15
ISYE6117	Industrial Practice	8	
ISYE6139	Engineering Ethics	3	
ISYE6140	Sustainable Productivity Engineering	4	
Enrichment Program II			8
ISYE6141	Technical Communication	4	
ISYE6142	Future Trend in Industry	4	

Enrichment Research Track

Code	Course Name	SCU	Total
RSCH6228	Research Experience	8	15
RSCH6126	Scientific Writing in Industrial Engineering	4	
RSCH6127	Global EES in Industrial Engineering	3	

Enrichment Community Development Track

Code	Course Name	SCU	Total
CMDV6129	Community Outreach Project Implementation	8	15
CMDV6049	Design Project	4	
CMDV6050	Employability and Entrepreneurial Skills in Industrial Engineering	3	

Enrichment Study Abroad Track*

Code	Course Name	SCU	Total
GLOB6005	Elective Course for Study Abroad 1	4	15
GLOB6006	Elective Course for Study Abroad 2	4	
GLOB6007	Elective Course for Study Abroad 3	4	
GLOB6008	Elective Course for Study Abroad 4	4	
GLOB6009	Elective Course for Study Abroad 5	2	
GLOB6010	Elective Course for Study Abroad 6	2	
GLOB6011	Elective Course for Study Abroad 7	2	
GLOB6012	Elective Course for Study Abroad 8	2	
GLOB6013	Elective Course for Study Abroad 9	2	
GLOB6014	Elective Course for Study Abroad 10	2	
GLOB6015	Elective Course for Study Abroad 11	2	
GLOB6016	Elective Course for Study Abroad 12	2	
GLOB6041	Elective Course for Study Abroad 25	3	
GLOB6042	Elective Course for Study Abroad 26	1	

*) Transferred courses will be transferred based on credit transfer policies on study program with total of 15 credits.

Enrichment Further Study Track

Code	Course Name	SCU	Total
Enrichment Program II			8
ISYE6226	Industrial Design Project	8	

The Table of Prerequisite for Industrial Engineering (S1)

Course		SCU	Sem.	Prerequisite Course		SCU	Sem.
MATH6019	Calculus III	4	3	MATH6014	Calculus I	4	1
STAT6096	Stochastic Processes	4	5	STAT6003	Probability Theory	2	3
ISYE6101	Production & Operation Analysis	4/2	6	ISYE6123	Deterministic Optimization	3	4
ISYE6125	Quality Engineering	3	5	STAT6084	Applied Statistics*	3	4
Stream : Supply Chain Engineering							
ISYE6048	Supply Chain : Logistics	4	5	ISYE6123	Deterministic Optimization*	3	4
Stream : Service Systems Engineering							
ISYE6168	Financial Engineering	2	6	ISYE6123	Deterministic Optimization*	3	4

**) Industrial Engineering department and related lecturer will monitor the exam and grading collection to be first priority*

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	ENTR6004	Entrepreneurship II	C
3	ISYE6123	Deterministic Optimization*	C
4	ISYE6059	Human-Integrated Systems	C
5	ISYE6125	Quality Engineering*	C
6	ISYE6101	Production & Operation Analysis	C
Stream : Supply Chain Engineering			
7	ISYE6048	Supply Chain : Logistics*	C
8	ISYE6114	Warehouse Management Systems	C
Stream : Service Systems Engineering			
7	ISYE6066	Human Interaction in Service Systems*	C
8	ISYE6047	Decision Support System	C
Stream : Manufacturing Systems			
7	ENGR6005	Mechanics of Materials	C
8	ISYE6061	Manufacturing Processes	C

*) Tutorial & Multipaper