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 increase 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 on 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.
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. Able to apply mathematics, science, and engineering principles to solve engineering problems in integrated systems (including human, material, tool, energy, and information).
2. Able to find source of engineering problems in integrated systems through the process of investigation, analysis, data & information interpretation based on analytical, computational, and experimental approach.
3. Able to conduct research that includes identification, formulation and analysis of engineering problems in integrated systems.
4. Able to develop solutions for complex integrated systems that consider economical, public health & safety, cultural, social, and environmental factors.
5. Able to design and control integrated systems in accordance to the technical standards, environment health and safety and considering performance and reliability, ease of implementation and sustainability, economy, social, and culture.
6. Able to choose resources and utilize engineering design and analysis tools that are based on information technology, communication, and computation to conduct engineering activities.
7. Able to design integrated systems, especially in the area of service and supply chain, based on systems design principles and methods.

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	

Sem	Code	Course Name	SCU	Total
	Engineering Electives**			
	CIVL6030	Environmental Engineering	2	
	CPEN6080	Electronic Devices	4/1	
	CPEN6079	Electric Circuit Theory	2/1	
	CPEN6099	Signal and System	4	
	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	
	ISYE6059	Human-Integrated Systems	2/2	
	ISYE6123	Deterministic Optimization*	3	
	STAT6084	Applied Statistics	3	
	ISYE6113	Leadership & Organizational Behavior*	2	
	ISYE6124	System Engineering & Analysis	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	Warehousing Management Systems	4	
	Elective Track Courses***			
	ISYE6055	E-Supply Chain Management*	2/2	
	ISYE6067	Global Supply Chain*	2	
	ISYE6056	Supply Chain Risk & Negotiation	4	
	ISYE6115	Transportation Modeling	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***			
	ISYE6130	Project Management	2	
	ISYE6065	Dynamic Service Facility Design	2/2	
	ISYE6062	Financial Engineering*	4	

Sem	Code	Course Name	SCU	Total
	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	
	Supply Chain Engineering			
	Elective Track Courses* **			
	ISYE6055	E-Supply Chain Management*	2/2	
	ISYE6067	Global Supply Chain*	2	
	ISYE6056	Supply Chain Risk & Negotiation	4	
	ISYE6115	Transportation Modeling	2	
	Service Systems Engineering			
	Elective Track Courses* **			
	ISYE6130	Project Management	2	
	ISYE6065	Dynamic Service Facility Design	2/2	
	ISYE6062	Financial Engineering*	4	
	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 CREDIT 146 SCU	

**) This course is delivered in English*

***) Elective Courses*

- *For 2nd Semester: Students choose 4 credits from Economic Elective course list*
- *For 3rd Semester: Students choose 4 credits from Computer Science Elective course 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. Choose elective course in semester 6 should be different with choosen elective course in 5 semester*

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*

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

-) *Student will take one of enrichment program tracks (off campus).*

Enrichment Track Scheme

Track	Semester 7						Semester 8					
	IN	RS	ENTR	CD	SA	*etc	IN	RS	ENTR	CD	SA	*etc
1	v						v					
2		v					v					
3				v			v					
4					v		v					

Notes:
I : Internship
RS : Research
ENTR : Entrepreneurship
CD : Community Development
SA : Study Abroad
*etc : Study Program Special Purposes

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	
ISYE6132	Advanced Systems Engineering I	4	
ISYE6131	Engineering Ethics & Technical Communication I	3	
Enrichment Program II			8
ISYE6134	Engineering Ethics & Technical Communication II	4	
ISYE6133	Advanced Systems Engineering II	4	
Enrichment Program II: *For student who only takes Internship track only in semester 8, should take these courses:*			
ISYE6085	Engineering Ethics & Technical Communication	4	
ISYE6086	Advanced Systems Engineering	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.

The Table of Prerequisite for Industrial Engineering (S1)

Subject		Credits	Sem	Prerequisites		Credits	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							
ISYE6062	Financial Engineering	4	5	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 examination as listed below:

No.	Code	Course Name	Minimum 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	Warehousing 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