جامعة الفيصل
Alfaisal University

Bachelor of Industrial Engineering

College of Engineering & Advanced Computing, Alfaisal University

Effective: Fall 2026 with tracks

About the Program

The Bachelor of Industrial Engineering at Alfaisal University provides a broad and rigorous education across the core areas of the discipline. Industrial engineering is about choices. Other engineering disciplines apply skills to very specific areas. An industrial engineering education offers the best of both worlds: an education in both engineering and management.

The most distinctive aspect of industrial engineering is the flexibility it offers. Whether it's shortening a rollercoaster line in an amusement park, streamlining an operating room in a hospital, distributing products worldwide, or manufacturing superior automobiles, these challenges share the common goal of saving money and increasing efficiencies. An industrial engineering education offers the best of both worlds: an education in both engineering and management.

As companies adopt management philosophies of continuous productivity and quality improvement to survive in the increasingly competitive world market, the need for industrial engineers is growing. Why? Industrial engineers are the only engineering professionals trained specifically to be productivity and quality improvement specialists. Industrial engineers figure out how to do things better. They work to eliminate waste of time, money, materials, energy and other commodities. This is why many industrial engineers end up being promoted into management positions.

Many people are misled by the term industrial engineer. It's not just about manufacturing. It also encompasses service industries, with many industrial engineers employed in entertainment industries, shipping and logistics businesses, and health care organizations. The program is accredited by the Engineering Accreditation Commission of ABET, reflecting alignment with international standards.

Students gain depth through technical electives and may pursue a track in **Digital Design and Manufacturing** or a general pathway. Additional opportunities exist to complement the major with minors or double majors across the university. Real-world preparation is emphasized through a required internship and a year-long capstone design project.

Graduates gain strong analytical grounding, practical engineering competence, and professional readiness. They pursue careers across sectors such as supply chains and logistics, healthcare systems, manufacturing and emerging technology domains, or pursue advanced study.

Curriculum Structure and Study Plan

The Bachelor of Industrial Engineering curriculum is composed of **132** Credit Hours (CRHs) divided as follows:

I. University General Education Requirements (18 CRHs)
- a. Arts & Humanities (9 CRHs)
- b. Social Sciences (6 CRHs)
- c. Sciences (3 CRHs)

II. College Requirements (66 CRHs)
- a. Mathematics and Statistics (21 CRHs)
- b. Basic Sciences (12 CRHs)
- c. Engineering requirements (33 CRHs)

III. Major Requirements (48 CRHs)
- a. Core Major Requirements (39 CRHs)
- b. Technical Electives (9 CRHs)
- c. Internship (0 CRHs)

I. University General Education Requirements (18 CRHs)

a) Arts & Humanities (9 CRHs)

Course Code	Course-Title	Credit Hours (CRHs)				Prerequisite Course Code	Co-Requisite Course Code
		Total-CRHs	Lect.	Lab	Tut		
ENG 101	University Writing	3	3	0	0		
ENG 222	Technical Writing	3	3	0	0	ENG 101	
____	Arts & Humanities Elective I*	3	3	0	0		

* Select any 3-CRHs course from the University-approved list of Arts & Humanities courses.

b) Social Sciences (6 CRHs)

Course Code	Course-Title	Credit Hours (CRHs)				Prerequisite Course Code	Co-Requisite Course Code
		Total-CRHs	Lect.	Lab	Tut		
____	Social Sciences Elective I*	3	3	0	0		
____	Social Sciences Elective II *	3	3	0	0		

* Select any two 3-CRHs courses (i.e., 6 CRHs in total) from the University-approved list of Social Sciences courses.

c) Sciences (3 CRHs)

Course Code	Course-Title	Credit Hours (CRHs)				Prerequisite Course Code	Co-Requisite Course Code
		Total-CRHs	Lect.	Lab	Tut		
AI 102	AI for Everyone: Foundations and Applications	3	3	0	0		

II. College Requirements (66 CRHs)

a) Mathematics and Statistics (21 CRHs)

Course Code	Course-Title	Credit Hours (CRHs)				Prerequisite Course Code	Co-Requisite Course Code
		Total-CRHs	Lect.	Lab	Tut		
MAT 101	Calculus I	3	3	0	0		
MAT 112	Calculus II	3	3	0	0	MAT 101	
MAT 211	Calculus III	3	3	0	0	MAT 112	
MAT 212	Linear Algebra	3	3	0	0	MAT 112	
MAT 213	Differential Equations	3	3	0	0	MAT 112	MAT 212
MAT 224	Numerical Methods	3	3	0	0	MAT 212	
STA 212	Probability and Statistics	3	3	0	0	MAT 112	

b) Basic Sciences (12 CRHs)

Course Code	Course-Title	Credit Hours (CRHs)				Prerequisite Course Code	Co-Requisite Course Code
		Total-CRHs	Lect.	Lab	Tut		
CHM 101	General Chemistry I	3	3	0	1		
CHM 101 L	General Chemistry I Lab	1	0	2	0		CHM 101
PHU 103	Physics I	3	3	0	1		MAT 101
PHU 103 L	Physics I Lab	1	0	2	0		PHU 103
PHU 124	Physics II	3	3	0	1	PHU 103, MAT 101	
PHU 124 L	Physics II Lab	1	0	2	0	PHU 103, MAT 101	PHU 124

c) Engineering Requirements (33 CRHs)

Course Code	Course-Title	Credit Hours (CRHs)				Pre-Requisite Course Code	Co-Requisite Course Code
		Total-CRHs	Lect	Lab	Tut		
EE 207	Foundations of Electrical Engineering	3	3	0	1	PHU 124	MAT 213
EE 207 L	Foundations of Electrical Engineering Lab	1	0	2	0	PHU 124	MAT 213, EE 207
SE 100	Programming for Engineers	3	3	0	0		
SE 100 L	Programming for Engineers Lab	1	0	2	0		SE 100
ME 201	Materials Science and Engineering	3	3	0	0	CHM 102	
ME 201 L	Materials Science and Engineering Lab	1	0	2	0	CHM 102	ME 201
ME 205	Introduction to Computer Aided Design	3	3	0	0		
ME 206	Thermal Fluids Engineering I	3	3	0	0	PHU 103	
ME 206 L	Thermal Fluids Engineering I Lab	1	0	2	0	PHU 103	ME 206
ME 305	Manufacturing and Workshop Training	3	3	0	0	ME 201	
ME 305 L	Manufacturing and Workshop Training Lab	1	0	2	0	ME 201	ME 305
ME 308	Advanced Manufacturing Processes	3	3	0	0	ME 305	
ME 308 L	Advanced Manufacturing Processes Lab	1	0	2	0	ME 305	ME 308
ME 238	Solid Mechanics for Engineers	3	3	0	0	PHU 103, MAT 112	
ME 238 L	Solid Mechanics for Engineers Lab	1	0	2	0	PHU 103, MAT 112	ME 238

III. Major Requirements (48 CRHs)

a) Core Major Requirements (39 CRHs)

Course Code	Course-Title	Credit Hours (CRHs)				Pre-Requisite Course Code	Co-Requisite Course Code
		Total-CRHs	Lect	Lab	Tut		
IE 301	Operations Research I	3	3	0	0	MAT 212	
IE 302	Operations Research II	3	3	0	0	IE 301, STA 212	
IE 304	Production and Service Systems Planning I	3	3	0	0	STA 212	IE 301
IE 305	Production and Service Systems Planning II	3	3	0	0	IE 304	
IE 307	Work System Analysis & Design	3	3	0	0	STA 212	
IE 307 L	Work System Analysis & Design Lab	1	0	2	0		IE 307
IE 309	Human Factors and Ergonomics	3	3	0	0	STA 212	IE 307
IE 309 L	Human Factors and Ergonomics Lab	1	0	2	0		IE 309
IE 315	Engineering Economy and Cost Analysis	3	3	0	0	STA 212	
IE 330	Simulation	3	3	0	0	SE 100, STA 212	
IE 330 L	Simulation Lab	1	0	2	0		IE 330
IE 401	Network Models and Project Management	3	3	0	0	IE 301	
IE 406	Quality Engineering	3	3	0	0	IE 305	
IE 495	Industrial Engineering Capstone Project I	3	0	6	0	IE 302, IE 305	
IE 496	Industrial Engineering Capstone Project II	3	0	6	0	IE 495	

b) Technical Electives (9 CRHs)

Students are required to complete minimum of six credit hours from IE*** courses and three credit hours from the approved elective list:

Course Code	Course-Title	Credit Hours (CRHs)				Pre-Requisite Course Code	Co-Requisite Course Code
		Total-CRHs	Lect	Lab	Tut		
IE 400	Special Topics in Industrial Engineering	3	3	0	0	IE 305	
IE 403	Design of Experiments	3	3	0	0	STAT 212	
IE 404	Quantitative Methods for Engineering Decision Making	3	3	0	0	STAT 212 IE 301	
IE 405	Lean Manufacturing Systems	3	3	0	0	IE 307	
IE 415	Production Information Systems	3	3	0	0	IE 305	
IE 420	Reliability and Maintenance Engineering	3	3	0	0	IE 305	
IE 435	Undergraduate Research in Industrial Engineering	3	0	6	0	Department approval. A GPA of at least 3.0/4.0, and a signed research contract	
IE 445	Cognitive Ergonomics	3	3	0	0	IE 309	
IE 450	Management for Engineers	3	3	0	0	IE 305	
IE 455	Data Mining and Applications in Engineering	3	3	0	0		
IE 460	Industrial Internet of Things	3	3	0	0		
OPM 425	Special Topics in Operations Management	3	3	0	0		
OPM 450	Management of Innovation	3	3	0	0		

OPM 485	Project Risk Management	3	3	0	0		
BAN 403	Supply Chain Data Analytics	3	3	0	0		
BAN 410	Applied Business Analytics Project	3	3	0	0		
SE 447	Introduction to Machine Learning	3	3	0	0		
SE 449	Data Analytics	3	3	0	0		
ME 419	Product Design and Development	3	3	0	0		
ME 420	Advanced Visualization and Simulation	3	3	0	0		

c) Internship (0 CRHs)

Course Code	Course-Title	Credit Hours (CRHs)	Pre-Requisite Course Code	Co-Requisite Course Code
IE 390	Industrial Engineering Internship	0	Department Approval	

Typical Study Plan-Electrical Engineering Program

4-Year Curriculum: *132 Credit Hours Total*

Each course below follows the following format:
Course Code, Course Title, and Course Credit Hours (Lecture contact hours – Lab contact hours – Tutorial contact hours)

1st Year			
Fall	**Course Code**	**Course-Title**	**CRHs**
	CoE 100	**Student Orientation and Academic Success**	**1**
	CHM 101	**General Chemistry I**	**3 (3-0-1)**
	CHM 101 L	**General Chemistry I Lab**	**1 (0-2-0)**
	MAT 101	**Calculus I**	**3 (3-0-0)**
	PHU 103	**Physics I**	**3 (3-0-1)**
	PHU 103 L	**Physics I Lab**	**1 (0-2-0)**
	ENG 101	**University Writing I**	**3 (3-0-0)**
	AI 102	**AI for Everyone: Foundation and Applications**	**3 (0-6-0)**
		Total	18
Spring	**Course Code**	**Course-Title**	**CRHs**
	SE 100	**Programming for Engineers**	**3 (3-0-0)**
	SE 100 L	**Programming for Engineers Lab**	**1 (0-2-0)**
	ME 201	**Materials Science and Engineering**	**3 (3-1-0)**
	ME 201 L	**Materials Science and Engineering Lab.**	**1 (0-2-0)**
	MAT 112	**Calculus II**	**3 (3-0-0)**
	PHU 124	**Physics II**	**3 (3-2-1)**
	PHU 124 L	**Physics II Lab**	**1 (0-2-0)**
	University Elective	**Arts and Humanities Elective I**	**3 (3-0-0)**
		Total	**18**

2nd Year			
Fall	Course Code	Course-Title	CRHs
	ME 205	Introduction to Computer Aided Design	3 (3-0-0)
	ME 305	Manufacturing and Workshop Training	3 (3-0-0)
	ME 305 L	Manufacturing and Workshop Training Lab	1 (0-2-0)
	MAT 211	Calculus III	3 (3-0-0)
	MAT 212	Linear Algebra	3 (3-0-0)
	MAT 213	Differential Equations	3 (3-0-0)
		Total	16
Spring	Course Code	Course-Title	CRHs
	EE 207	Foundations of Electrical Engineering	3 (3-0-1)
	EE 207 L	Foundations of Electrical Engineering Lab	1 (0-2-0)
	ME 206	Thermal Fluids Engineering I	3 (3-0-0)
	ME 206 L	Thermal Fluids Engineering I Lab	1 (0-2-0)
	ME 238	Solid Mechanics for Engineers	3 (3-0-0)
	ME 238	Solid Mechanics for Engineers Lab	1 (0-2-0)
	MAT 224	Numerical Methods	3 (3-0-0)
	STA 212	Probability and Statistics	3 (3-0-0)
		Total	18

3rd Year			
Fall	Course Code	Course-Title	CRHs
	IE 301	Operations Research I	3 (3-0-0)
	IE 304	Production and Service Systems Planning I	3 (3-0-0)
	IE 307	Work Systems Analysis & Design	3 (3-0-0)
	IE 307 L	Work Systems Analysis & Design Lab	1 (0-2-0)
	IE 309	Human Factors and Ergonomics	3 (3-0-0)
	IE 309 L	Human Factors and Ergonomics Lab	1 (0-2-0)
	ENG 222	Technical Writing	3 (3-0-0)
		Total	**17**
Spring	**Course Code**	**Course-Title**	**CRHs**
	IE 302	Operations Research II	3 (3-0-0)
	IE 305	Production and Service Systems Planning II	3 (3-0-0)
	IE 315	Engineering Economy and Cost Analysis	3 (3-0-0)
	IE 330	Simulation	3 (3-0-0)
	IE 330 L	Simulation Lab	1 (0-2-0)
	ME 308	Advanced Manufacturing Processes	3 (3-0-0)
	ME 308 L	Advanced Manufacturing Processes Lab	1 (0-2-0)
		Total	**17**
Summer	**Course Code**	**Course-Title**	**CRHs**
	IE 390	Industrial Engineering Internship	0 (0-0-0)
		Total	**0**

4th Year			
Fall	Course Code	Course-Title	CRHs
	IE 401	Network Models and Project Management	3 (3-0-0)
	IE 4**	Technical Elective	3 (3-0-0)
	IE 4**	Technical Elective	3 (3-0-0)
	IE 495	Industrial Engineering Capstone Project I	3 (0-6-0)
	University Elective	Social Sciences Elective I	3
		Total	15
Spring	Course Code	Course-Title	CRHs
	IE 499	Ethics and Professional Development	1
	IE 406	Quality Engineering	3 (3-0-0)
	IE 4**	Technical Elective	3 (3-0-0)
	IE 496	Industrial Engineering Capstone Project II	3 (0-6-0)
	University Elective	Social Sciences Elective II	3 (2-0-0)
		Total	13

Industrial Engineering Track: Digital Design and Manufacturing

Industrial Engineering (IE) students have the option to select electives in the fourth year according to their desired academic objective in consultation with their academic advisor. Regular non-track students select any three of the offered IE electives in the fourth year. IE students also have the option to follow the Digital Design and Manufacturing track in the program. Irrespective of whether a student opts for the Digital Design and Manufacturing track or not, the total credits for electives must be 9 CRHs. All offered technical electives are available for regular non-track students, whether they opt for the track or not.

In summary, all IE students follow the same curriculum and take the same required courses, with the difference being the designation of the electives in the fourth year.

A regular non-track student would have the following electives distribution in the fourth year.

4th Year Electives			
Fall	**Course Code**	**Course-Title**	**CRHs**
	IE 4**	**Technical Elective**	**3 (3-0-0)**
	IE 4**	**Technical Elective**	**3 (3-0-0)**
		Total	**6**
Spring	**Course Code**	**Course-Title**	**CRHs**
	IE 4***	**Technical Elective**	**3 (3-0-0)**
		Total	**3**

Per standing policy, and with the approval of the department chair, a student may opt to take one of the 3 CRH technical electives from another engineering program.

Digital Design and Manufacturing track

The industrial and information revolutions made tremendous impact on manufacturing and communication systems of today. Technologies developed in those revolutions are fusing into a new industrial revolution now known as Industry 4.0 where digital information is inherent in manufacturing activities. Industry 4.0 changes the way products are designed and manufactured today and will revolutionize product development in future.

Industrial Engineering (IE) department, in conjunction with the Mechanical Engineering (ME) department, offers the Digital Design and Manufacturing track to prepare students for Industry 4.0. Students opting for this track will gain focused knowledge by taking electives offered by ME and IE departments in this interdisciplinary area.

Course Requirements for Digital Design and Manufacturing track
Select ANY 3 courses from the following list:

- ME 419 Product Design and Development (To be offered in Spring semester)
- ME 420 Advanced Visualization and Simulation (To be offered in Spring semester)
- IE 455 Data Mining and Application in Engineering
- IE 460 Industrial Internet of Things
- ME 420 Advanced Visualization and Simulation (3 CRHs) (To be offered in Spring semester)

- IE 455 Data Mining and Application in Engineering (3 CRHs)
- IE 460 Industrial IoT (3 CRHs)

A student opting for the Digital Design and Manufacturing track can take two and one electives in the Fall and Spring semesters, respectively or vice versa based on electives distribution in the fourth year.

Minor in Industrial Engineering (for ME students)

IE department offers a minor in Industrial Engineering which is open to ME students only. Students opting for this minor will gain concentrated knowledge by taking advanced IE courses.

Students taking the IE minor are expected to take additional 15 CRHs on top of their existing ME study plan courses from the following list of existing ME courses:

Required Courses (6 CRHs)

- IE 301 Operations Research I (3 CRHs).
- IE 304 Production and Service Systems Planning I (3 CRHs).

Optional Courses (select 9 CRHs)

- IE 302 Operations Research II (3 CRHs).
- IE 305 Production and Service Systems Planning II (3 CRHs)
- IE 307 Work System Analysis &Design (3 CRHs).
- IE 307 L Work System Analysis & Design Lab (1 CRH).
- IE 315 Engineering Economy and Cost Analysis 3 CRHs).
- IE 330 Simulation (3 CRHs).
- IE 330 L Simulation Lab (1 CRH).
- IE 401 Network Models and Project Management 3 CRHs).
- IE 406 Quality Engineering (3 CRHs).

General Guidelines

1. The student must complete a total of additional 15 CRHs from IE department
2. Entry Point: Nominally before or at end of Year 2 (sophomore-level) to allow for sufficient time to complete all the courses.
3. The student must have a minimum GPA of 3.25. Admission to the minor is subject to the approval of the ME and IE departments.
4. The student should complete the main degree requirements before starting the minor.
5. Any of the pre-approved courses can be taken whenever the course is offered by IE department and subject to prevailing academic regulations.
6. Lab courses cannot be taken on their own. A Lab course has to be taken with or after the corresponding course has been taken.
7. Completion of a minor program is posted on the transcript alongside the main major. Minor programs are not noted on diplomas.

Minor in Innovation and Entreprenership

Required Courses (6 CRHs)

1. IE 315 Engineering Economy and Cost (3 CRHs)
2. EE 481 Innovations and Entrepreneurship in Engineering (3 CRHs)
3. **OR** BME 422 Medical Device Innovation and Entrepreneurship (3 CRHs).
4. **OR** ME 419 Product Design and Development

Optional Courses (select 9 CRHs)

1. IE 401 Network Models and Project Management (3 CRHs).
2. IE 404 Quantitative Methods for Engineering Decision Making (3 CRHs).
3. IE 406 Quality Engineering (3 CRHs).
4. IE 450 Management for Engineers (3 CRHs).
5. IE 460 Industrial Internet of Things (3 CRHs).
6. EE 410 Cyber Physical Systems (3 CRHs)
7. MGT 375: Introduction to Entrepreneurship Analysis (3 CRHs).

Double Major in Industrial Engineering

Required Courses (9 CRHs)
IE 301 Operations Research I (3 CRHs).
IE 304 Production and Service Systems Planning I (3 CRHs).
IE 401 Network Models and Project Management (3 CRHs).

Optional Courses (select 15 CRHs)
IE 307 Work System Analysis &Design (3 CRHs).
IE 307 L Work System Analysis & Design Lab (1 CRH).
IE 315 Engineering Economy and Cost Analysis (3 CRHs).
IE 330 Simulation (3 CRHs).
IE 330 L Simulation Lab (1 CRH).
IE 406 Quality Engineering (3 CRHs).
IE 302 Operations Research II (3 CRHs).
IE 305 Production and Service Systems Planning II (3 CRHs).

The Industrial Engineering Program

1st Year

	Course Code	Course-Title	CRHs
Fall	CoE 100	Student Orientation and Academic Success	1
	CHM 101	General Chemistry I	3 (3-0-1)
	CHM 101 L	General Chemistry I Lab	1 (0-2-0)
	MAT 101	Calculus I	3 (3-0-0)
	PHU 103	Physics I	3 (3-0-1)
	PHU 103 L	Physics I Lab	1 (0-2-0)
	ENG 101	University Writing I	3 (3-0-0)
	AI 102	AI for Everyone: Foundation and Applications	3 (0-6-0)
		Total	18

	Course Code	Course-Title	CRHs
Spring	SE 100	Programming for Engineers	3 (3-0-0)
	SE 100 L	Programming for Engineers Lab	1 (0-2-0)
	ME 201	Materials Science and Engineering	3 (3-1-0)
	ME 201 L	Materials Science and Engineering Lab.	1 (0-2-0)
	MAT 112	Calculus II	3 (3-0-0)
	PHU 124	Physics II	3 (3-2-1)
	PHU 124 L	Physics II Lab	1 (0-2-0)
	University Elective	Arts and Humanities Elective I	3 (3-0-0)
		Total	18

2nd Year

	Course Code	Course-Title	CRHs
Fall	ME 205	Introduction to Computer Aided Design	3 (3-0-0)
	ME 305	Manufacturing and Workshop Training	3 (3-0-0)
	ME 305 L	Manufacturing and Workshop Training Lab	1 (0-2-0)
	MAT 211	Calculus III	3 (3-0-0)
	MAT 212	Linear Algebra	3 (3-0-0)
	MAT 213	Differential Equations	3 (3-0-0)
		Total	16

	Course Code	Course-Title	CRHs
Spring	EE 207	Foundations of Electrical Engineering	3 (3-0-1)
	EE 207 L	Foundations of Electrical Engineering Lab	1 (0-2-0)
	ME 206	Thermal Fluids Engineering I	3 (3-0-0)
	ME 206 L	Thermal Fluids Engineering I Lab	1 (0-2-0)
	ME 238	Solid Mechanics for Engineers	3 (3-0-0)
	ME 238	Solid Mechanics for Engineers Lab	1 (0-2-0)
	MAT 224	Numerical Methods	3 (3-0-0)
	STA 212	Probability and Statistics	3 (3-0-0)
		Total	18

3rd Year

	Course Code	Course-Title	CRHs
Fall	IE 301	Operations Research I	3 (3-0-0)
	IE 304	Production and Service Systems Planning I	3 (3-0-0)
	IE 307	Work Systems Analysis & Design	3 (3-0-0)
	IE 307 L	Work Systems Analysis & Design Lab	1 (0-2-0)
	IE 309	Human Factors and Ergonomics	3 (3-0-0)
	IE 309 L	Human Factors and Ergonomics Lab	1 (0-2-0)
	ENG 222	Technical Writing	3 (3-0-0)
		Total	17

	Course Code	Course-Title	CRHs
Spring	IE 302	Operations Research II	3 (3-0-0)
	IE 305	Production and Service Systems Planning II	3 (3-0-0)
	IE 315	Engineering Economy and Cost Analysis	3 (3-0-0)
	IE 330	Simulation	3 (3-0-0)
	IE 330 L	Simulation Lab	1 (0-2-0)
	ME 308	Advanced Manufacturing Processes	3 (3-0-0)
	ME 308 L	Advanced Manufacturing Processes Lab	1 (0-2-0)
		Total	17

	Course Code	Course-Title	CRHs
Summer	IE 390	Industrial Engineering Internship	0 (0-0-0)
		Total	0

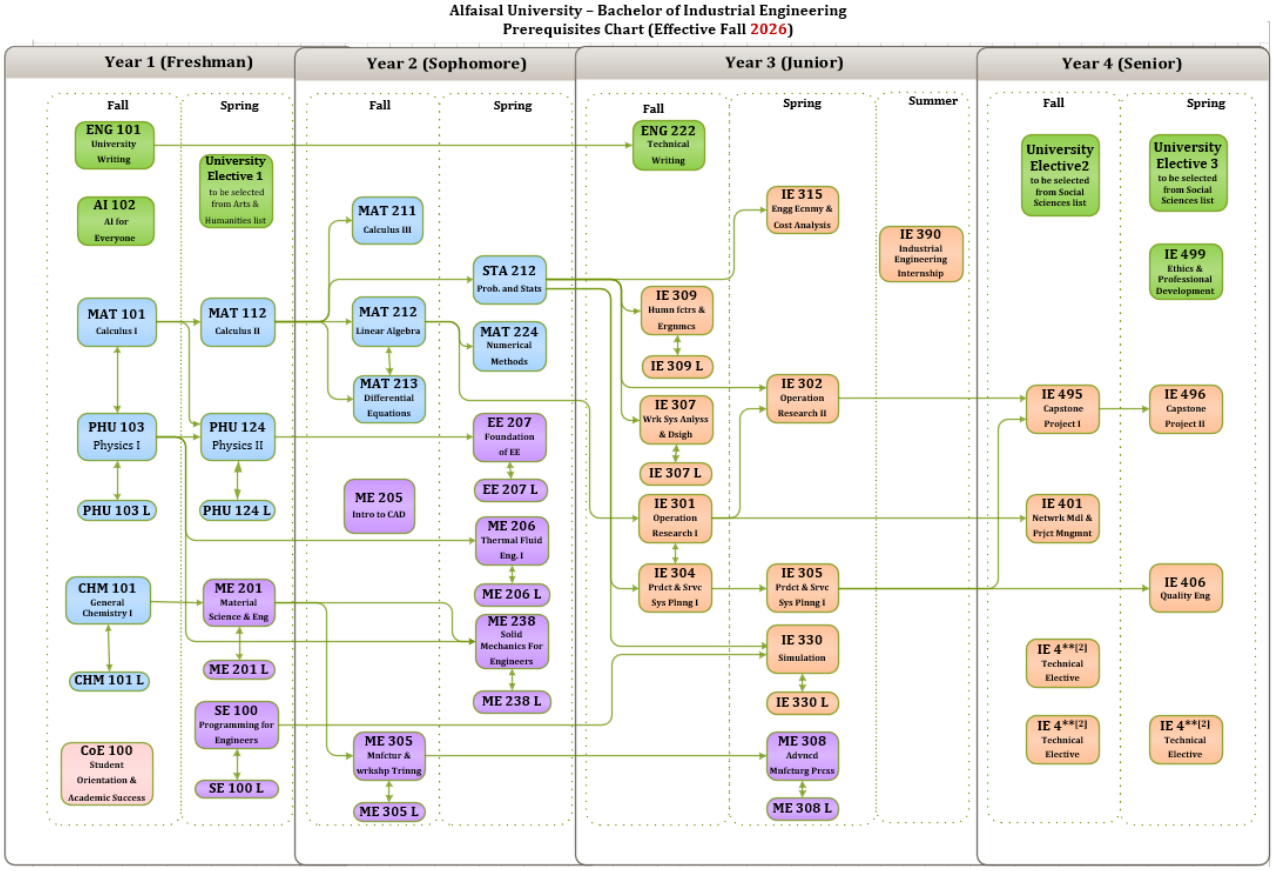
4th Year

	Course Code	Course-Title	CRHs
Fall	IE 401	Network Models and Project Management	3 (3-0-0)
	IE 4**	Technical Elective	3 (3-0-0)
	IE 4**	Technical Elective	3 (3-0-0)
	IE 495	Industrial Engineering Capstone Project I	3 (0-6-0)
	University Elective	Social Sciences Elective I	3
		Total	15

	Course Code	Course-Title	CRHs
Spring	IE 499	Ethics and Professional Development	1
	IE 406	Quality Engineering	3 (3-0-0)
	IE 4**	Technical Elective	3 (3-0-0)
	IE 496	Industrial Engineering Capstone Project II	3 (0-6-0)
	University Elective	Social Sciences Elective II	3 (2-0-0)
		Total	13

The Industrial Engineering Program

Alfaisal University – Bachelor of Industrial Engineering
Prerequisites Chart (Effective Fall 2026)



Course Descriptions

In this section we give the course descriptions of Industrial Engineering courses of the program.

Each course below follows the following format:
Course Code Course Title Course Credit Hours (Lecture contact hours–Lab contact hours–Tutorial contact hours)
Course Description
Pre-requisites
Co-requisites

COE 100-Student orientation and academic success-1 CRH-1st level
This is a formal zero-credit hour course on student orientation and academic success. This course introduces students in the College of Engineering (COE) to their rights and responsibilities as a student at the COE and develops their skills to foster academic success. Students will develop a thorough understanding of the academic policies and procedures applicable to the COE Students, including policies and procedures related to attendance vs participation, academic integrity, academic probations, outside studies programs and credit transfer, grade appeals, GPA calculations, repeating courses, make-up exams, sick-leave, student advising, etc. The course will also familiarize students with their study plans, including requirements for adding a minor or a double major; equip them with the skill required to access and utilize the rich library resources; introduce them to the set of extracurricular activities available at Alfaisal; and enhance their time management and study skills. The course will be delivered as a combination of online and face-to-face sessions. It will use online resources as well as guest speakers to educate students on the important aspect of their academic life.

IE 301 Operations Research I **3 (3-0-0)**
The course includes deterministic operations research modelling concepts; linear programming modelling, simplex theory, duality and sensitivity analysis with economic interpretation; transportation and assignment problems; integer programming; branch and bound techniques; nonlinear optimization problems; multi-criteria decision making.
Pre-requisites: MAT 212
Co-requisites: none

IE 302 Operations Research II **3 (3-0-0)**
This course introduces probability models used to investigate the behavior of industrial systems. It teaches decision making under uncertainty, elementary counting processes, Markov chains and Markov processes. Stochastic programming and applications. Stochastic models in queuing systems, inventories, and equipment reliability are also addressed.
Pre-requisites: IE 301, STA 212
Co-requisites: none

IE 304 Production and Service Systems Planning I **3 (3-0-0)**
The course teaches theory and concepts involved in model formulation for the analysis and control of production processes, including systems for planning and controlling production and service systems to achieve productivity and efficiency. The course addresses the basic issues in production planning, including aggregate production planning, master production schedule, materials requirement planning, and capacity planning. Flexible manufacturing systems, lean manufacturing, Just-in-time (JIT), and new concepts in manufacturing are addressed. Various production systems are described, including job shops, flow shop, cellular manufacturing covering scheduling and optimization.
Pre-requisites: STA 212
Co-requisites: IE 301

IE 305 Production and Service Systems Planning II **3 (3-0-0)**
The course teaches aspects of planning and design of logistics and inventory management in production and service systems. Optimization issues in supply chain management, distribution systems and routing, inventory control and warehousing, distributed networks, centralized and decentralized networks, facility location and layout, supply chain and strategic partnerships are addressed.
Pre-requisites: IE 304
Co-requisites: none

IE 307 Work Systems Analysis and Design **3 (3-0-0)**
The course teaches survey of methods for assessing and improving performance of individuals and groups in organizations. Techniques include various basic industrial engineering tools, work analysis, data acquisition and application, performance evaluation and appraisal, work measurement procedures and motion study. Layout design of work environments will include material handling systems and warehousing.
Pre-requisites: STA 212
Co-requisites: none

IE 307 L Work Systems Analysis and Design Lab **1 (0-2-0)**
Laboratory experiments dealing with work systems analysis and design.
Pre-requisites: none
Co-requisites: IE 307

IE 309 Human Factors and Ergonomics **3 (3-0-0)**
The course teaches analysis of tools, work spaces and activities to achieve efficiency in modern work environments are introduced. The effects of vibration, noise, illumination, control display design, age and shift work on the performance of workers are discussed. Physiological and psychological capabilities and limitations in human factors, ergonomic measurement methods and analytical techniques, design of tools and the working ergonomic environment are addressed.
Pre-requisites: STA 212
Co-requisites: IE 307

IE 309 L Human Factors and Ergonomics Lab **1 (0-2-0)**
Laboratory experiments dealing with human factors and ergonomics.
Pre-requisites: none
Co-requisites: IE 309

IE 315 Engineering Economy and Cost Analysis **3 (3-0-0)**
The course teaches economic analysis in an engineering environment considering the time value of money. Methods for evaluation of alternatives: present worth, annual equivalent worth, rate of return, payback method and benefit-cost ratio method. Replacement analysis, depreciation, inflation and cost estimation. Sensitivity and risk analysis are also considered.
Pre-requisites: STA 212
Co-requisites: none

IE 330 Simulation **3 (3-0-0)**
This course teaches simulation modelling and analysis of production and service systems, including simulation methodology, model building in a computer environment, analysing performance measures and assessment of different policies. It also teaches simulation languages, basic and advanced modules, and statistical aspects of simulation such as fitting of input and output distributions. Validation and verification of simulation models are also covered.
Pre-requisites: SE 100, STA 212
Co-requisites: none

IE 330 L Simulation Lab **1 (0-2-0)**
Laboratory experiments dealing with the implantation of discrete-event simulation models.
Pre-requisites: none
Co-requisites: IE 330

IE 400 Special Topics in Industrial Engineering **3 (3-0-0)**
This course provides instruction and experience in timely topics related to Industrial Engineering major.
Pre-requisites: IE 305
Co-requisites: none

IE 401 Network Models and Project Management **3 (3-0-0)**
The course teaches the terminology of graphs and networks, network flow problems, algorithms and solutions. Project management, defining the project, scheduling issues in projects, project duration optimization, resources planning, evaluation

and progress, estimating times and costs, critical processes in the projects, applications of project-planning and software in the strategy of projects, integration of organization with projects and probability issues in project planning are addressed.
Pre-requisites: IE 301
Co-requisites: none

IE 406 Quality Engineering **3 (3-0-0)**
The course teaches Quality Assurance in an industrial system and compares it with the existing standards and protocols, including an introduction to quality engineering, quality standards ISO 9000 and QS 9000, TQM, quality cost analysis, process modeling and hypothesis testing, statistical process control for long and short production runs, process capability analysis, capability indexes, Weibull analysis, Six sigma acceptance sampling and design of experiments.
Pre-requisites: IE 305
Co-requisites: none

IE 415 Production Information Systems **3 (3-0-0)**
The course teaches the design and analysis of production information systems, critical success factors for companies, effectiveness and efficiency through information systems usage in production and service systems, success cases in industry. Investigation of data modelling, storage, acquisition and utilization in Industrial Engineering via manual and computerized methods. Development of effective spreadsheet applications, design and implementation of relational databases via E-R modelling, relational schema, normalization, SQL (Standard Query Language), web-based database applications, interface design, the system development life cycle applied to data management applications, ERP (Enterprise Resource Planning) software and decision support systems are addressed.
Pre-requisites: IE 305
Co-requisites: none

IE 420 Reliability and Maintenance Engineering **3 (3-0-0)**
This course provides an introduction to the life-cycle costing concept for equipment maintenance and replacement. Emphasis will be on the development of mathematical and simulation models for determining optimal maintenance and replacement policies for both capital equipment and components.
Pre-requisites: IE 305
Co-requisites: none

IE 430 New Product Development **3 (3-0-0)**
This course presents state-of-the-art Product Development techniques focusing on the interdisciplinary nature of the product design activities.
Pre-requisites: IE 309
Co-requisites: none

IE 435 Undergraduate Research in Industrial Engineering **3 (0-6-0)**
Students participate in supervised research with a faculty member. Supervised research can be: 1) independent research undertaken by the student (thesis, independent study), or 2) assistance on a faculty member's research project. Students must find a faculty member who is willing to supervise him/her as an assistant on an existing project or as the author of an individual project. The student and the faculty supervisor will complete and sign a research contract which will be turned in to the chair of the Industrial and Mechanical Engineering Department. Drafting the contract will allow the student to develop ideas about what should be accomplished and what the faculty supervisor's expectations are. All academic requirements are at the discretion of the supervising faculty member. Students should agree on a plan for the semester with the faculty mentor before the research begins. The plan should include academic requirements, the basis for grading the experience, and a plan for student/professor meetings for the semester. It is the student's responsibility to report progress and seek guidance when needed. Students are expected to be active and reliable participants in the research experience.
Pre-requisites: GPA of at least 3.0/4.0, a signed research contract, and consent of the departmental chair.
Co-requisites: none

IE 450 Management for Engineers **3 (3-0-0)**
The course focuses on learning to see and understand the fundamental activities of businesses as practiced worldwide and how to manage them. Successfully performing these activities requires vision, passion, leadership, teamwork, and integrating the many functional disciplines of business.

Pre-requisites: IE 305
Co-requisites: none

IE 495 Industrial Engineering Capstone Project I **3 (0-6-0)**
Students work in teams as professional engineering consultants on an independent engineering project under the supervision of a project advisor. The design process is emphasized, encompassing project definition, feasibility analysis, evaluation of alternative designs, and design computations. For each project, the scope of work is developed and negotiated between client and student consultants. The scope of work may also include fabrication, device testing, and field-testing. Projects are arranged by the students with approval of the instructor. Progress reports and a final written report are submitted to the student's project advisor. Oral presentations of reports are made before the faculty and students. A student who selects a project suggested by industry has the opportunity of working with an industry sponsor in an actual engineering experience.
Pre-requisites: IE 302, IE 305
Co-requisites: none

IE 496 Industrial Engineering Capstone Project II **3 (0-6-0)**
Students work in teams as professional engineering consultants on an independent engineering project under the supervision of a project advisor. The design process is emphasized, encompassing project definition, feasibility analysis, evaluation of alternative designs, and design computations. For each project, the scope of work is developed and negotiated between client and student consultants. The scope of work may also include fabrication, device testing, and field-testing. Projects are arranged by the students with approval of the instructor. Progress reports and a final written report are submitted to the student's project advisor. Oral presentations of reports are made before the faculty and students. A student who selects a project suggested by industry has the opportunity of working with an industry sponsor in an actual engineering experience.
Pre-requisites: IE 495
Co-requisites: none

IE 403 Design of Experiments **3 (3–0–0)**
This course introduces the principles and methods of designing, conducting, and analyzing experiments for engineering applications. Topics include principles of experimental design, single-factor and multi-factor experiments, analysis of variance (ANOVA), factorial and fractional factorial designs, Taguchi methods, and an introduction to response surface methodology. Emphasis is placed on practical applications in manufacturing, quality improvement, and service systems using statistical software (Minitab).
Prerequisites:
STA 212 (Probability and Statistics)

IE 404 Quantitative Methods for Engineering Decision Making **3 (3–0–0)**
This course introduces industrial engineering students to data-driven decision-making using real-world industrial datasets. Emphasis is placed on data exploration, statistical modeling, visualization, and interpretation to support engineering and managerial decisions. Students will use R as the primary analytical tool to perform regression, forecasting, and basic predictive analytics, with applications in operations, quality, healthcare, and supply chains. The course focuses on applied analytics and insight generation rather than advanced programming.
Prerequisites:
STA 212 (Probability and Statistics)
IE 301 (Operations Research I) or equivalent

IE 405 Lean Manufacturing Systems **3 (3–0–0)**
This course introduces industrial engineering students to data-driven decision-making using real-world industrial datasets. Emphasis is placed on data exploration, statistical modeling, visualization, and interpretation to support engineering and managerial decisions. Students will use R as the primary analytical tool to perform regression, forecasting, and basic predictive analytics, with applications in operations, quality, healthcare, and supply chains. The course focuses on applied analytics and insight generation rather than advanced programming.
Prerequisites:
STA 212 (Probability and Statistics)
IE 301 (Operations Research I) or equivalent

ME 238 Solid Mechanics for Engineers 3 (3–0–0)

This course introduces the fundamentals of engineering mechanics and strength of materials required for engineering applications. Topics include statics of rigid bodies, force systems, equilibrium, internal forces, stress and strain, axial loading, torsion, bending, and basic deflection concepts. Emphasis is placed on understanding load behavior in industrial facilities, material handling systems, production equipment, and biomechanics.

Prerequisites:
PHU 103 (Physics I)
MAT 101 (Calculus I)

ME 238 L Solid Mechanics for Engineers Lab 1 (0-2-0)

Laboratory sessions include experimental demonstrations and hands-on activities related to engineering mechanics and strength of materials. Experiments focus on basic material and structural behavior, including stress–strain relationships, axial loading, beam bending, torsion, and buckling.

Pre-requisite: None
*Co-Requisite: ME*** Solid Mechanics for Engineers*

Department 499-Ethics and Professional Development-1CRH-8th level

The course will integrate modules covering ethics, career and professional development, along with preparations for taking the Jahiziyah/ Saudi Engineering Council Exams. The course will introduce the professional ethics and compare it with personal ethics and common morality. The professional ethics will be studied within the Engineering context where differentiation between Ethics, Morals and the Law will be discussed. Typical Ethical issues that engineers face such as safety, health, confidentiality and conflict of interest will be covered.

The course will also cover professional development lecture series for the students to introduce them to topics and application related to their fields, job market as well as trends in the local and international economies.

The students will also be prepared for the Jahiziyah and the Saudi Engineering Council Exams through lectures, discussions and mock up exams.