Associate Degree in Industrial Engineering Technology

1) Program Description

The associate degree in industrial engineering technology at the University of Bahrain is a two-year program which aims to provide a strong foundation in the essential areas of industrial technology, including electrical, mechanical, chemical, and digital systems with specialized industry-specific topics such as energy, petroleum, manufacturing, and materials technology. The program is distinguished through its interdisciplinary learning, encouraging students to engage with various disciplines like engineering, information technology, and business management. The major courses of the program focus on applied learning and hands-on experience development. Additionally, internships co-op placements, and projects are incorporated in the program.

The program's curriculum consists of 69 credit hours, distributed as follows:

- University Requirements (UR) - 5 Credit Hours
- College Requirements (CR) - 17 Credit Hours
- Major Requirement (MR) - 31 Credit Hours
- Training (Internship, Practicum) (TR) - 10 Credit Hours
- Major Elective (ME) 6 Credits Hours

2) Program Objectives

1. Be skilled technicians with practical knowledge in industrial technology, including electrical, mechanical, automation, chemical, and process control systems, capable of supporting their chosen industry and adapting to its evolving needs.
2. Be competent problem solvers, capable of applying basic analytical techniques and practical approaches to tackle routine industrial technology challenges.
3. Be equipped with essential written, oral, and interpersonal communication skills, enabling them to collaborate effectively within teams and convey technical concepts at a basic level to various stakeholders.
4. Be established with sense of professionalism and ethical responsibility, considering social, environmental, and economic implications of their decisions within the context of industrial technology.
5. Be committed to lifelong learning and adaptability, staying up to date with industry-relevant skills, and adapting to new challenges and opportunities throughout their careers.
6. Be qualified with workplace safety, environmental protection, and risk management in industrial settings, to follow industry regulations and best practices for a responsible and safe professional career.

3) Learning Outcomes

1. Define fundamental concepts, principles, and theories in industrial technology, mechanical, and chemical engineering.
2. Recognize industry standards such as ISO, safety regulations, and adhere to safety and environmental regulations, best practices, and risk management principles, including waste management and energy efficiency in industrial technology.
3. Apply critical thinking and problem-solving skills to analyze, design, and troubleshoot industrial technology systems and processes.
4. Discuss and evaluate the technical, economic, environmental, and social aspects of industrial technology problems, considering factors such as cost-benefit analysis, life cycle assessment, and corporate social responsibility.
5. Recognize and operate industry-standard tools and software to process and manage specific situations.
6. Summarize and analyze complex technical information clearly and concisely, using effective presentation techniques, visual aids, and technical documentation, both in writing and orally, to a variety of audiences.
7. Apply information technology tools and software, computer programming languages, and data analysis tools relevant to industrial technology.
8. Collaborate effectively in multidisciplinary teams, demonstrating strong interpersonal, communication, and cooperation skills, as well as leadership, conflict resolution, and negotiation abilities.
9. Show commitment to ethical decision-making, professional responsibility, and continuous learning, engaging in lifelong learning opportunities, professional development, and industry networking.

4) Admission Requirements

Applicants must meet the University of Bahrain's general admission requirements, which requires a minimum GPA of 70%. Candidates eligible for this program are graduates of the Science stream, the Technical Stream, the Advanced Technical stream, or the Technical Apprenticeship stream. Furthermore, students from the Nasser Vocational Training Center (NVTC) from the following specializations are eligible: Cloud Computing, Artificial Intelligence, Electrical Engineering, Mechanical Engineering.

5) Graduation Requirements

Meet the general requirement at the University of Bahrain. Degree awarding requirements:

- Successfully passing all the courses required for graduation (69 Credit Hours).
- Minimum 4 semesters.
- Maximum 8 semesters.
- Achieving not less than the minimum CGPA required for graduation (2 out of 4) for batches from 2023 and before. As for batches starting 2024, the minimum CGPA required for graduation (1.67 out of 4).

6) Program Duration

Two Academic Years (4 academic semesters).

7) Language of Instruction

The associate degree in industrial engineering technology program is offered in English.

8) Career Opportunities and Graduate Destinations

Potential job opportunities include jobs as operators, technicians, and supervisors in various industries such as manufacturing, petroleum, automation, and materials technology. Furthermore, some potential career paths include Production Supervisor, Quality Control Technician, Automation Specialist, Robotics Technician, Process Operator, and Maintenance Technician jobs. In addition, graduates can choose to continue their education in related fields to enhance their career opportunities and deepen their expertise.

Students will be able to work in private and public sectors.

9) Attendance and Learning Mode

Full time

10) Study Mechanism

The curriculum covers all core topics outlined in the academic specification form of each course, with student assessment conducted according to approved evaluation methods that align with the nature of each subject.

College of Applied Studies
Engineering Programs

List of Associate Degree Programs

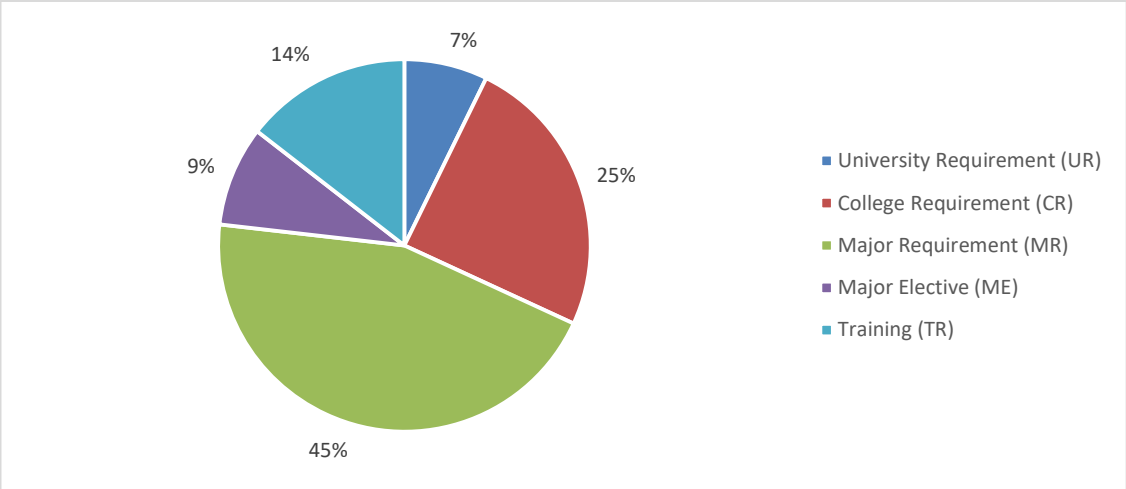
1- Associate Degree in Industrial Engineering Technology

List of College Requirement Courses

Course Code	Course Title	Course Hours			Course Type	Pre requisite
		LEC	PRAC	CRD		
ITED 112	Mathematics for industry	3	0	3	CR	
ITED 213	Digital system	2	4	4	CR	
ENGL 101	COMMUNICATION SKILLS I	3	0	3	CR	
ITED 223	Fundamentals of programming for industry	2	4	4	CR	ITED 213
ENGL242	Report writing and presentation	3	0	3	CR	ENGL 101

Associate Degree in Industrial Engineering Technology – 2025/2026

Program Components



University Requirement (UR)	**5**
College Requirement (CR)	**17**
Major Requirement (MR)	**31**
Major Elective (ME)[1]	**6**
Training (Internship) **Yes (TR)**	**10**
Total Credit (CRD)	**69**

[1] Student must select two (ITED 21X) courses from Major Elective (ME) List.

Detailed Study Plan

Year 1 - Semester 1

Course Code	Course Title	Course Hours			Course Type	Pre requisite	Major GPA
		LEC	PRAC	CRD			
ITED 210	Introduction to industrial management system	2	3	3	MR		
ITED 211	Fundamentals of technical Drawing	1	4	3	MR		
ITED 112	Mathematics for industry	3	0	3	CR		
ITED 213	Digital system	2	4	4	CR		
ENGL 101	COMMUNICATION SKILLS I	3	0	3	CR		
HIST 122	Modern History of Bahrain and Citizenship	3	0	3	UR		

Year 1 - Semester 2

Course Code	Course Title	Course Hours			Course Type	Pre requisite	Major GPA
		LEC	PRAC	CRD			
ITED 220	Health Safety and Environment	2	2	3	MR	ITED 210	
ITED 221	Electrical Technology and circuit Design	2	4	4	MR	ITED210 & ITED112	
ITED 222	Mechanical Principles and applications	1	4	3	MR	ITED210 & ITED112	
ITED 223	Fundamentals of programming for industry	2	4	4	CR	ITED 213	
ENGL 242	Report writing and presentation	3	0	3	CR	ENGL 101	
HRLC 107	HUMAN RIGHTS	2	0	2	UR		

Year 2 - Semester 3

Course Code	Course Title	Course Hours			Course Type	Pre requisite	Major GPA
		LEC	PRAC	CRD			
ITED 310	Artificial Intelligence and Industrial Automation	2	3	3	MR	ITED 223	
ITED 311	Unit and Plant Operation System	3	2	4	MR	ITED 210	
ITED 312	Manufacturing and material Technology and quality	1	4	3	MR	ITED 222	
ITED 313	Electronic applications in industry	1	4	3	MR	ITED 223	
ITED 21X	Elective 1	2	3	3	ME	According to the List	
ITED 21X	Elective 2	2	3	3	ME	According to the List	

Year 2 - Semester 4

Course Code	Course Title	Course Hours			Course Type	Pre requisite	Major GPA
		LEC	PRAC	CRD			
ITED 320	Industrial Training	0	20	10	MR	Completion of 45 CRD	
ITED 321	Professional development seminar	2	0	2	MR		

Major Elective Courses

Course Code	Course Title	Course Hours			Course Type	Pre requisite	Major GPA
		LEC	PRAC	CRD			
ITED 214	Principles of Petroleum industry	2	3	3	ME	ITED 210	
ITED 215	Fluid Mechanics Technology	2	3	3	ME	ITED 222	
ITED 216	Industrial Design	2	3	3	ME	ITED 222	
ITED 217	Machine and Motors	2	3	3	ME	ITED 221	
ITED 218	Robotics	2	3	3	ME	ITED 223	

Course Description

Major Courses Descriptions

Course Code: ITED 210 **Course Title:** Introduction to industrial management system
Students gain a comprehensive understanding of the principles and methodologies used in managing industrial operations. Students explore key concepts such as organizational structures, production planning, inventory management, quality assurance, and lean manufacturing and the role of management systems in enhancing operational efficiency and productivity. Students work with industrial equipment such as conveyor belts, assembly lines, and packaging machines to learn about the various components and processes involved in industrial production. By the end of the course, students will be able to apply management principles to real-world industrial problems, evaluate various strategies, and effectively communicate about industrial management concepts.

Course Code: ITED 211 **Course Title:** Fundamentals of Technical Drawing
Students learn the basics of both Manual and digital technical drawing, drafting, and visualizing. This includes skills such as sketching, dimensioning, and tolerancing. Students learn how to create basic technical drawings, and how to interpret and analyze existing drawings. Students work on projects related to creating and interpreting technical drawings using computer-aided design software. Projects include creating technical drawings for a specific industrial system, such as a conveyor belt or a control panel.

Course Code: ITED 220 **Course Title:** Health safety and environment
Students learn the principles of industrial safety, including hazard identification, risk assessment, and safety regulations. Students learn how to develop and implement safety programs, as well as how to respond to workplace accidents and emergencies.

Course Code: ITED 221 **Course Title:** Electrical technology and circuit design
Students learn the basic principles of electrical circuits and systems, including circuit analysis, laws and circuit design. Students learn how to design, build, and test basic electrical circuits, as well as how to troubleshoot common electrical problems. Students work with various electrical components such as resistors, capacitors, and diodes to understand how electrical circuits work and how they can be used in industrial applications. Projects may include designing and building a circuit to control a specific industrial process, such as a temperature control system.

Course Code: ITED 222 **Course Title:** Mechanical Principles and applications
Students are introduced to the fundamental principles of mechanics including motion, force, energy, and power. Students learn how these principles apply to real-world mechanical systems, such as in stationary and rotating machines, tools and vehicles. Students work with various mechanical systems such as gears, pulleys, and hydraulic systems to understand how these systems work and how they can be applied in real-world situations. Projects include designing, building and testing simple mechanical prototypes, such as a crane or a conveyor or system.

Course Code: ITED 310 **Course Title:** Artificial Intelligence and Industrial Automation
Students identify the principles of artificial intelligence and machine learning, in integration with automation and control systems including natural language processing, sensors, actuators, pattern recognition, data mining, predictive modelling and programmable logic controllers. Al is integrated in introducing concepts such as predictive maintenance using machine learning algorithms, or autonomous control systems that adapt to changing conditions. Students are required to design and build basic Al automated and control systems, such as a machine for assembling parts or a robot for performing a specific industrial process: such as a water treatment plant, temperature control or flow control.

Course Code: ITED 311 **Course Title:** Unit and Plant Operation System
Students identify unit and plant operation system, Fluid handling (hydrostatics, manometers, types of flow, friction factor, pressure drop, calculation in pipes, flow measurement), Distillation (vapor-liquid equilibrium, batch distillation, continuous distillation). Students compare Characteristics of plant equipment (pumps, compressors, drives, heat exchangers, boilers, furnaces, fired heaters, separations system, chemical reactors, solids conveying), Plant services and utilities (water, steam, compressed air, vacuum system, electricity, gas), fluid handling machinery and Environmental pollution and prevention methods. Students are introduced to real-world Unit and Plant systems though visits to gain understanding of chemical processes and operations.

Course Code: ITED 312 **Course Title:** Manufacturing and material technology and quality
Students investigate manufacturing processes and material technology along with their applications in industrial settings, such as casting processes, forging, and welding, as well as an understanding of materials science and engineering, such as material properties and selection.

Course Code: ITED 313 **Course Title:** Electronic applications in industry
Students practice the basics of electronic circuits and systems, including digital logic, microcontrollers, and sensors. Students learn how to design, build, and test electronic circuits and systems, as well as how to troubleshoot common electronic problems. Students work with electronic components such as transistors and diodes, to understand how electronic circuits work and how they can be used in industrial applications. Projects include designing and building a simple electronic device, such as an amplifier or a filter.

Course Code: ITED 320 **Course Title:** Industrial Training
In this industrial training course, students work on a project related to a specific industrial process or system, under the guidance of an industry mentor, integrating the skills and knowledge they have gained throughout the program with the opportunity to apply their skills and knowledge to a real-world industrial problem. Projects include designing and implementing a process improvement project, developing, and implementing a solution to a real-world industrial problem, or designing and/or building a prototype industrial system (such as a factory automation system or a water treatment plant) as well as to communicate their findings effectively.

Course Code: ITED 321 **Course Title:** Professional development seminar
Students investigate the advanced evolving related topics to industrial technology. This course also provides students with the skills and knowledge needed to succeed in the workplace, including teamwork, communication, and leadership portfolio, as well as how to prepare for job interviews and career advancement.

Major Elective Courses Descriptions

Course Code: ITED 214 **Course Title:** Principles of Petroleum industry
Students are introduced to the basics of the petroleum industry, including the exploration, extraction, transportation, and refining of oil and gas. Students learn about the geology and chemistry of petroleum, as well as the economic and environmental factors that impact the industry and about the equipment used in the related industry such as drilling rigs, pipelines, and refineries.

Course Code: ITED 215 **Course Title:** Fluid Mechanics Technology
Students practice the principles of fluid behavior and their applications in the design, operation, and maintenance of fluid-based systems. Topics include the nature of fluid and the study of fluid mechanics, Viscosity of fluids, Pressure measurement, Forces due to static fluids, Buoyancy and stability, Flow of fluids and Bernoulli's equation, General Energy Equation, Reynolds number, Laminar flow, Turbulent flow, Energy losses due to friction, Velocity profiles for circular sections and flow in noncircular sections, Minor losses, Series pipeline systems, Parallel pipeline systems, Pump selection and application, Flow measurement, Fans, Blowers, Compressors, the flow of gases.

Course Code: ITED 216 **Course Title:** Industrial Design
Students are introduced to principles and practices of industrial design in the engineering technology field. Students explore the creative process of designing products, systems, and services that optimize functionality, aesthetics, and user experience. Key topics include design thinking, sketching, 3D modeling, materials selection and prototyping. Through experiments, case studies, 3D printing technologies and collaborative projects, students develop the skills needed to generate solution.

Course Code: ITED 217 **Course Title:** Machine and Motors
In this course, students are introduced to direct current motors (including their construction, operating principles, mechanical power, torque, characteristics, armature reaction, starting and speed control, winding construction), direct current generators (including voltage generation and control, excitation systems and types, equivalent circuits and various characteristics), Synchronous Generators (including their construction, types, rotating field and voltage generation, excitation systems, equivalent circuit and performance, operation on infinite bus), Synchronization synchronous motors (starting method, power and torque, excitation and reactive power, V-curves. Servomotors and stepper motors).

Course Code: ITED 218 **Course Title:** Robotics
Introduces students to robotics in industrial settings with a focus on real-world applications, students learn to design, implement, and maintain robotic systems for various industrial processes. Key topics include robot components, programming techniques, collaborative robots, safety, and emerging trends. Through labs, workshops, and group projects, students gain experience in robot programming, system integration, and maintenance.

College Requirement Courses Descriptions

Course Code: ITED 112 **Course Title:** Mathematics for industry
Students practice algebra, geometry, trigonometry, calculus, and probability and statistics, recognize their applications in areas such as production, optimization and operation, and quality control, through problem-solving exercises, case studies, and collaborative projects to develop a strong understanding of the role of mathematics in various industrial processes. By the end of the course, students are equipped with the mathematical tools necessary to analyze, model, and solve problems encountered in the industrial technology field.

Course Code: ITED 213 **Course Title:** Digital system
Students are introduced to the basic logic functions, components and methodologies used in the design of digital systems. Students recognize the fundamentals of the electronic circuits that are used to build computers, and outline the software components that support their use.

Course Code: ITED 223 **Course Title:** Fundamentals of programming for industry
Students learn programming basics, including data types, control structures, and functions. Students learn how to write and debug code in various programming languages to solve real-world problems. Students work on coding projects that involve programming simple industrial systems using programming languages. Projects may include writing code for a simple industrial control system, such as a programmable logic controller or a microcontroller.

Course Code: ENGL101 **Course Title:** Communication Skills I
This course focuses on reading skills and strategies and language development. The reading section concentrates on high-interest contemporary topics and encourages students to increase speed and efficiency. The writing component, integrated to the reading materials, reviews grammatical structures, develops language accuracy and introduces paragraph writing. Students are required to upgrade their grammar, reading and listening skills on the internet.

Course Code: ENGL242 **Course Title:** Technical Report Writing and Presentation
This course offers theoretical and practical experience in technical report writing and presentation. It presents the steps involved in writing a report in detail and in presenting its findings. Presentation skills are also introduced. The emphasis throughout is upon tasks and assignments, the most important of which is the production of a full-length report and formally present it using power point.

University Requirements Courses Descriptions

Course Code: HIST 122 **Course Title:** Modern History of Bahrain and Citizenship

Spatial identity of Bahrain: Brief history of Bahrain until the 18th century; the historical roots of the formation of the national identity of Bahrain since the 18th century; the modern state and evolution of constitutional life in Bahrain; the Arabic and Islamic dimensions of the identity of Bahrain; the core values of Bahrain's society and citizenship rights (legal, political, civil and economic); duties; responsibilities and community participation; economic change and development in Bahrain; Bahrain's Gulf, Arab and international relations.

Course Code: HRLC 107 **Course Title:** Human Rights

This course deals with the principles of human rights in terms of the definition of human rights, scope, sources with a focus on the International Bill of Human Rights; The Charter of the United Nations; Universal Declaration of Human Rights; The International Covenant on Economics, Social and Culture rights; Convention against Torture and other Cruel, Inhuman or Degrading Treatment or Punishment; Mechanics and the Constitutional Protection of Rights and Public Freedoms in Kingdom of Bahrain.