

Bachelor of Engineering (Mechanical)

A customized programme for EASA Part-66 aircraft maintenance qualification holders

Programme Title (English)	Bachelor of Engineering (Mechanical)
Programme Title (Arabic)	البكالوريوس في الهندسة (تخصص الهندسة الميكانيكية)
Acronym / Abbreviation	BEng (Mechanical)
Owner	School of Engineering
ISCED Code	0715 - Mechanics and metal trades
Programme Level	Level 8
Award Category	Bachelors
Programme Code	ENT8021
Programme Credits	Total programme credits: 480, with 150 credits recognized
Programme Duration	Bridging semester Five academic semesters Two summer terms
Programme Delivery	Designed for working professionals and industry practitioners, the programme provides flexible delivery options, with classes scheduled on weekdays (Sunday to Thursday) after 4:00 pm and/or from 8:00 am to 8:00 pm on weekends (Friday and Saturday). This structure enables students to manage their studies alongside their professional and personal obligations while working towards a recognized engineering qualification.

Target Groups

For holders of an EASA Part-66 aircraft maintenance qualification (applicable to both Bahrainis and non-Bahrainis) from within (such as BAETC) and outside the Kingdom of Bahrain.

Qualification Completion Requirements Criteria	Awarded where candidates have met all of the requirements below: - Achieve the Bahrain Polytechnic General Qualification Requirements as found in Policy A/AB/004, Naming and Awarding Qualifications; - Completion of courses to accumulate a total of 480 credits (with 150 credits recognized) from any Bahrain Polytechnic qualification.
Management and Administration	School responsible for this programme: School of Engineering Management responsibilities: Each qualification will be managed by a Programme Manager under the supervision and guidance of the Head of the Engineering School. The quality of the qualifications will be monitored by the Quality Programme Manager of EDICT.
Programme Overview	The Mechanical engineering programme is designed to drive the fundamental technologies of today's connected world. Every application area, from medicine and healthcare to industrial applications, global trade, transport, communications, entertainment and security, is dependent on mechanical systems. As a result, mechanical engineering is now one of the fastest growing job fields in the world and skilled electronic engineers are very much in demand. At Bahrain Polytechnic, we will ensure that perspective students have a thorough grounding in a wide range of technologies. Our project-based learning approach will enable students to acquire valuable skills in teamwork, project

planning, time-management and presentation skills, applying their learning to design and build innovative solutions to unique problems. All of these will stand students in good stead as they progress into their career. We offer outstanding facilities in our labs and teaching is based on the latest research, ensuring that, at the end of the programme, the skills acquired will be highly regarded by leading employers. All our programmes have a wide range of courses and modules to choose from, enabling you to specialize in what really interests you and to work in depth.

The BEng Qualifications are designed and delivered in such a way, after extensive interaction with the Bahrain Engineering environment and society, to provide work-ready engineering technology graduates. The graduates will acquire advanced technical knowledge in their respective fields, specialized practical skills and valuable employability skills that will allow them to provide the drive for the transformation towards a knowledge-based economy in Bahrain.

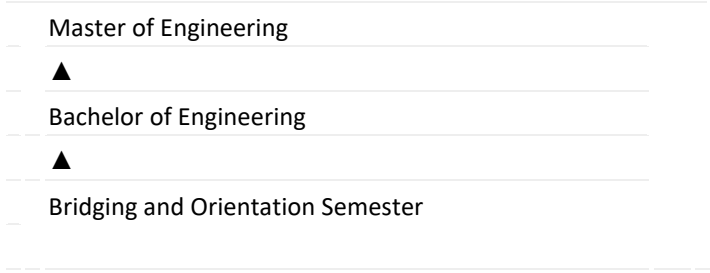
The Bachelor of Engineering (Mechanical Major) programme, customized for holders of an EASA Part-66 aircraft maintenance qualification, spans an initial bridging semester, five academic semesters and two summer terms. By the end of their studies, students should accumulate a total of 480 credits. Out of these 480 credits, 150 credits are recognized from a pre-qualification "an EASA Part-66 aircraft maintenance qualification". Bridging semester consists of four Level 6 courses, expected to contribute to the required theoretical and practical skills development of the learners. This semester also serves as a bridging programme for students who need to refresh their knowledge and acquaint themselves with the current educational and teaching approach. These courses count as electives (**45 credits**) in the total credit requirement for the Bachelor's qualification and are factored into the student's overall GPA. Moreover, bridging semester includes English and Mathematics preparation courses for entry tests. Upon successful completion of the bridging semester courses and passing the English and Mathematics entry tests at the required level, students can begin Year 1 with the first semester of the programme, consisting of **30 credits**. The second semester of Year 1 will have **45 credits**, and the summer term of Year 1 will include **30 credits** (with 15 credits dedicated to National Requirements courses). Year 2 will have **55 credits** in each semester, and the summer term of Year 2 will have **25 credits**. Finally, Semester 1 of Year 3 will consist of **45 credits**.

The uniqueness of the BEng qualifications at Bahrain Polytechnic is the strong commitment of the Institution to deliver these qualifications using student-centred learning and more specifically, the Problem-Based Learning (PBL) Methodology. Using this learning methodology, allows us to provide the required theoretical knowledge, practical skills and employability skills to our graduates and thus achieve our mission of producing enterprising and work-ready graduates for the Bahrain Society and Economy. The PBL methodology is implemented through the design of appropriate assignments that motivate the students to provide a solution to an Engineering design and/or analysis problem. Students are required to complete lab experiments, software practical assignments, design projects, controlled assignments such as theory tests and to provide rational justification for their work through the preparation of technical reports, presentations and posters. The theoretical knowledge given to the students is provided through a balanced combination of lectures, tutorials, experimental work, project work and one-to-one supervision with Faculty members.

Entry and Selection	General entry requirements as described in the Student Admission Policy A/AB/010. Specific entry requirements for this qualification, beyond those outlined in the Student Admission Policy, include criteria related to the customized pathway Bachelor of Engineering (Mechanical) programme for holders of an EASA Part-66 aircraft maintenance qualification: • Successful completion of the bridging semester courses (CE6101, CE6102, CE6103, and CE6104) at Bahrain Polytechnic within the eight-week period, demonstrating a commitment to study. • Passing the English and Mathematics selection tests at the required level or equivalent after completing bridging semester.
Selection and Criteria and Process	Where there are more applicants who meet the programme entry criteria than can be accepted, the following shall be used: • Selection Criteria Priority will be given to applicants who have completed the bridging semester courses with the highest scores; and/or applicants who achieved the highest scores in entry tests; and/or applicants able to demonstrate a high level of English language competency (e.g., IELTS or equivalent); and/or those applicants with an EASA Part-66 Aircraft Maintenance License; and/or those applicants with more years of Maintenance Experience Logbook; and/or applicants with relevant work experience; and/or prior educational achievements. • Selection Process Applicants may be required to attend a panel interview to determine whether or not they will be admitted into the programme.
Teaching and Learning Philosophy	The programme is delivered using a PBL philosophy through a mixture of classroom teaching, tutorials, online (web-based), laboratory work, workshops, supervised projects and workplace experience. Assessment of courses is both formative and summative, and typically includes a mix of tests, assignments, laboratory reports, project reports and examinations. The teaching and learning methods appropriate to this programme include a wide range of different strategies to meet the needs of students and depend on the class numbers and tasks involved. These may include, but are not limited to: • Instructive lectures • Facilitated Discussions • Group discussions • Demonstrations in the classroom, laboratory or workshop • Tutor-directed assignments • Tasks performed in the classroom, laboratory or workshop • Online exercises, tutorials and discussion • Projects • Case Studies • Videos • Tutorials • Visiting speakers The teaching methods include the provision of learning experiences and opportunities that enhance the transfer of information to aid understanding, and then enable practice to take place through related tasks and the provision of opportunities to apply skills and knowledge.
Accreditation / External Approval Requirements	The degree is accredited by the Institution of Engineering Technology (IET)

Attendance Requirements	Attendance requirements are described in the policy Student Attendance A/AB/010.
Qualification Monitoring, Evaluation and Review	Evaluation of courses and qualifications is required on a regular, prescribed basis. The primary purpose is to compare what is currently happening against stated qualification/ course criteria and to develop an action plan for improvement. Inputs are required from at least the following groups: current students, internal and external examiners, members of the Curriculum Advisory Group and/ or other industry/ professional resource people. In most cases, these evaluations are carried out through the use of a programme satisfaction survey, moderation and examiners' reports, course evaluations, feedback from Advisory Committees and Annual Programme Reports. The purpose of external monitoring is to assist in maintaining and enhancing the quality of the qualification. The External examiner is appointed to ensure that there is an independent external perspective on the qualification. The external examiner comments on how the institution/programme has addressed any concerns and recommendations made in previous monitoring reports, validation panel reports and programme review reports. Examiners are asked to act as critical friends to the programmes and through dialogue, critical feedback or professional development activities ensure the on-going improvement of Bahrain Polytechnic qualifications. The purpose of external examination is to assist the institution in maintaining and enhancing the quality of teaching and learning. External Examiners are appointed to ensure that the institution receives an independent external perspective on course assessment and moderation and the adherence to the principles and procedures set out in Bahrain Polytechnic Assessment and Moderation policies.
Review of Programme	The main purpose of a programme review is to obtain an overall picture of the effectiveness of the programme and to assess its ongoing viability. Reviews usually use previous evaluations as the starting point and they focus on a longer timeframe, usually since the date of the last review. Programme reviews are conducted on a prescribed basis, as determined by the Academic Board and in accordance with external requirements. The Academic Board sets the internal timeframe for the review of each programme as part of its programme approval processes (usually every 2-5 years depending on the length of the programme).
Qualification Overview	The Mechanical qualification is a technically strong qualification that aims to provide for the needs industry nationally, regionally and internationally. The qualification has a wide base of Mechanical Engineering knowledge and skills upon which graduates can build to reflect the wide range of fields and industries that are present locally and regionally. There is emphasis on solid mechanics, thermodynamics, sustainability and control to suit the petrochemical, aluminium and manufacturing industries. Students gain advanced theoretical knowledge and specialist practical skills in the areas of Mechanics (static and Dynamic), workshop practice, thermodynamics and fluid mechanics, material science, manufacturing process, heat transfer, vibration and noise, energy and sustainability, Computer Aided

	Design and control engineering. Students are introduced to software packages Matlab and LabView and 3Dimensional modelling software, SolidWorks, is integrated and used extensively throughout the programme. Students are given an option to explore specializations in their final year from a selection including Applied Control Engineering, Petroleum Engineering, Power Plant Engineering, CAD/CAM, Refrigeration and Air Conditioning, Process Engineering Principles, Energy and Environment.
Qualification Aim	The aim of this programme is to provide students with a comprehensive set of skills for employment as engineering technologists (an engineering technologist is defined by the Sydney Accord as being competent at analyzing, solving, managing and taking responsibility for broadly-defined engineering problems and activities). The programme will provide students with: - theoretical and practical skills to solve engineering problems and design engineering systems in the broad area of mechanical engineering, Mechanics, Thermodynamics, Fluid Mechanics and Control, - skills necessary for effective communication, analysis, team work, documentation and evaluation of systems through the inclusion of courses in English language, mathematics, project management, ethics and social responsibility.
Evidence of Need	Bahrain has a highly developed manufacturing sector and is home to numerous multinational manufacturing companies. Between now and 2015, the demand for employees in this sector is expected to double according to the Allen Consulting Group studies. Interviews carried out by the EDB with some of the major companies showed a need for technicians and applied mechanical, electrical and instrumentation engineers covering a wide range of technologies. Mechanical equipment and devices are found in an ever-increasing range of industries. The engineers and technologists responsible for the design, prototyping, installation, commissioning and servicing of this varied equipment are needed in increasing numbers. Consultation and research carried out during Phase 1 of the implementation of Bahrain Polytechnic found that there is a need for technician level and applied-professionally qualified people to respond to demand, particularly in the areas of manufacturing and trades. Specifically, the survey carried out by the Labour Fund concluded that its current focus should be on training for manufacturing, trades, tourism, transport and logistics, and health, social and personal services. Strong growth in the Gulf property market is creating demand for not only project engineers but also skilled technicians and engineering technologists in areas such as electrical, electronics, telecommunications and building services. The petrochemical and Aluminum industries continue to have a large demand for engineers and technician and are now recognizing the need for technologist to fill the gap between the professional engineer and the workshop technician. A survey of employment vacancies over a 3-month period in the English language Bahrain newspapers found that 17% of advertised vacancies were for the engineering and design technology area, a result that supported the choice of engineering as one of the first discipline areas for the roll-out of degree programmes at Bahrain Polytechnic. This survey also highlighted the need for technician level and applied professionally qualified people to respond to demand created by growth in the areas of construction and manufacturing.

	A Curriculum Advisory Committee (CAC) was formed specifically for the purpose of soliciting input from industry and other external stakeholders. The CAC has been consulted on the programme structure, graduate profile and teaching methods and verified the need for a Bachelors in Engineering focusing in the areas pneumatics and hydraulics, advanced thermodynamics, control engineering and petrochemical engineering. In 2017 the CAC was replaced with a revised advisory group – the Curriculum Advisory Group (CAG). Polytechnic staff travel to the workplace to interview experts and explore predetermined themes. The collective feedback from these meetings is collected and presented to an annual meeting of the CAG where consensus is sought on what is needed. During the last two CAG meetings (2017, 2018) it was identified that the market has a fundamental requirement for this major to meet their processes. In 2018 the CAG meeting mentioned that the Mechanical program is valuable for the students and that there is high demand in the local and regional market.
Graduate Pathways and Destination	This programme prepares students for the following further learning, careers and/or employment opportunities: Mechanical major: • Reliability and Maintenance engineering • Industrial process engineer • Building services Engineer • Construction • Power plants • Mechanical manufacturing • Project Management Engineer • Computer-aided design (CAD) • Computer-aided manufacturing (CAM) Graduates from the Bachelor of Engineering programme who wish to continue their studies may apply to any university for admission into their programme. For an engineering degree, it is common practice for a university to first enrol the student into a post-graduate diploma programme and based on progress made, transfer them to a full Masters programme. Pathways Diagram  <pre> graph BT A[Bridging and Orientation Semester] --> B[Bachelor of Engineering] B --> C[Master of Engineering] </pre>

Strategic Alignment

Vision

To positively disrupt future ways of living, learning & working, to build new partnerships that strengthen innovation and mobility, to create new and exciting opportunities for our students, industries, and communities.

Mission

The Polytechnic is an applied, learner centred institute that produces new knowledge, innovations, and is at the heart of local and regional communities to promote education, innovation, well-being, and enterprise. Our mission is to make the Polytechnic accessible to everyone, through our distributive campuses, in a physical, blended, and online form, in full-time and part-time modes.

The BEng Programme has been designed to develop key theoretical, practical and generic skills that bridge the gap between the needs of the labor market and current levels of education. The provision of the BEng Programme supports the realization of Bahrain Polytechnic's vision, "to positively disrupt future ways of living, learning and working, to build new partnerships that strengthen innovation and mobility, to create new and exciting opportunities for our students, industries and communities."

The table below outlines how the development of the proposed programme aligns to Bahrain Polytechnic's strategic priorities for 2023-2026.

Alignment to Strategic Goals 2023 – 2026

Strategic Priority	How it is Addressed in this Programme?
Theme 1. People Through Bahrain Polytechnic's people, we will commit to working collectively across the faculties and administration to deliver our 2026 objectives by leveraging technology, relationships, and resources. This theme will come to life by empowering people, creating a vibrant campus, developing our human capital, and creating pathways to sustainability.	This academic program ensures the continuous development of our faculty and students, presenting the robust structure of the courses based on new engineering technologies and market needs and supporting the pathways to further development and sustainability as per the related program's intended learning outcomes, the content of courses, and graduates' attributes. The delivery of the courses will provide the opportunity for the faculty members and students to interact with industries in Bahrain for consultancy, collaboration and training purposes to become more agile and responsive to industry. In this way, the Engineering School continuously creates, develops and empowers people to promote the core values of excellence and learning. and innovation.
Theme 2. Employability, Entrepreneurship, Enterprise, and Innovation (EEEI) We will positively impact the economy and society through our distributive campuses to ensure education, upskilling, and reskilling are accessible to everyone, whilst increasing career	Through the use of strong student-centred learning techniques like Problem-Based Learning, this programme guarantees that graduates will acquire not only the necessary theoretical and practical skills but also the important employability skills that will render them unique and valuable within the industry and the labor market. The program has been developed to provide opportunities for students to deal with real-life problems and develop their employability skills as it is addressed in the PILOs.

	readiness and applied research opportunities for our students and our industry partners. This theme will come to life through widening and broadening access, tackling up-skilling and re-skilling challenges, encouraging an entrepreneurial and innovation culture, and expanding offerings and experiential opportunities.	The programme will strengthen engagement with industry by cultivating multidisciplinary applied research to increase student career opportunities that fosters a culture of innovation and entrepreneurship. In the final semester course, the students have the opportunity to choose Engineering Research Project to conduct research and development work in collaboration with a Bahraini Engineering company in order to solve an industrial problem. Students can also have a strong interaction with local Engineering companies through its Cooperative Learning Project. These Projects provide valuable engineering solutions to the local industries as well as motivating the students to pursue any innovative ideas in the final year of studies.
	Theme 3. Partnership & Engagement We will strengthen and redefine existing partnerships whilst developing new strategic partnerships for the benefit of our students, industry partners, alumni, and the national economy with the aim of improving education, health, research, and innovation, and the economic well-being of our communities. This theme will come to life through valuing our alumni, redefining relationships, engaging with stakeholders, and future-proofing our relationships and resources.	The Engineering School is interacting and engaging with the local Bahraini Engineering Industries through its Curriculum Advisory Group composed of local industry experts who provide their guidance and consultation in order to help the programme to maintain the relevance and fit-for-purpose status of the qualification for the Bahraini society and economy. Additionally, the Engineering faculty members are presenting their research work in both technical and educational fields at international conferences and journals. The School of Engineering programmes have an external monitoring process in place and completed every year. Through the related report, an action plan is proposed towards the quality assurance of learning. Finally, an international accreditation body has been identified [The Institution of Engineering and Technology (IET), UK] and the management and faculty of the Engineering School have already applied for accreditation. The 1st initial review phase has been successfully completed while the final accreditation visit is expected to be arranged in the near future.
Other Information	Employability Skills Generic Definition:	
	Communication	Communicate in ways that contribute to productive and harmonious relationships across employees and customers.
	Teamwork	Work effectively independently and in collaboration with others.
	Problem solving	Think critically and respond appropriately to changing needs within a growing and diversifying economy.

	Initiative and enterprise	Apply resourcefulness, innovation and strategic thinking to a range of workplace situations.
	Planning and organization	Plan and manage their working lives.
	Self-management	Demonstrate self discipline and adaptability, and be able to plan and achieve personal and professional goals.
	Learning	Understand the need for and engage with continuous learning throughout the lifespan.
	Technology	Utilize information technology effectively and ethically in their personal and professional lives.

Programme Learning Outcomes

On successful completion of this programme the learner will be able to:

Aim/Outcome	Description
KT	Apply knowledge of mathematics, science, engineering fundamentals and an engineering specialization to deal with defined and applied engineering procedures, processes, systems or methodologies.
KT	Solve broadly-defined engineering problems reaching substantiated conclusions using analytical tools appropriate to their discipline or area of specialization.
KT	Demonstrate commitment to professional ethics, responsibilities and norms of engineering technology practice.
KT	Recognize the impact of engineering solutions in a societal context and demonstrate knowledge of the need for sustainable development.
KT	Critically analyze the societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to engineering technology practice.
KP	Design solutions for broadly-defined engineering technology problems and contribute to the design of systems, components or processes to meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental cons.
KP	Conduct investigations of broadly-defined problems; locate, search and select relevant data from codes, data bases and literature, design and conduct experiments to provide valid conclusions.
KP	Apply appropriate techniques, resources, and modern engineering tools, including prediction and modeling tools, to broadly-defined engineering activities, with an understanding of their limitations.
ES	Practice as a professional using 21 st century skills
EP	Demonstrate knowledge of management and business practices, such as risk and change management, and understand their limitations.
SP	Solve practical problems in specific mechanical engineering settings using sound analytical, industrial, laboratory, and time-management skills.
SP	Operate engineering instruments and machines and interpret their results and readings.
SP	Analyze mechanical engineering performance and diagnose faults.
SP	Work with computers and demonstrate an understanding of their place in an engineering environment.
SP	Design systems or processes for engineering projects that incorporate sustainability, cost factors, and engineering ethics principles.
PO Domains KT - Knowledge - Theoretical Understanding KP - Knowledge - Practical Application: subject/ discipline specific ES - Skills (Employability) EP - Enterprise SP - Specific Skills	

Semester Schedules	
Bridging Semester	
Course Code	Title
CE6101	Engineering Mathematics
CE6102	Engineering Drawing and Machining Processes
CE6103	Engineering Physics and Mechanics
CE6104	Presentation Skills and Engineering Report Writing
CE5115	English Entry Test Preparation
CE5116	Math Entry Test Preparation
Year 1 / Semester 1	
Course Code	Title
EN6902	Engineering Mechanics 2
EN7919	Thermodynamics
Year 1 / Semester 2	
Course Code	Title
EN6904	Engineering Graphics
EN7917	Fluid Mechanics
EN7908	Manufacturing, Control and Environmental Sustainability
Year 1 / Semester 3 (Summer Semester)	
Course Code	Title
ED7000	Applied Project
NR	National Requirements
NR-Arabic	National Requirements- Arabic
Year 2 / Semester 1	
Course Code	Title
EN7923	Mechanical Project 1 (Design and Analysis of Mechanical Components)
EN8918	Applied and Process Heat Transfer
EN8923	Engineering Project Management
Year 2 / Semester 2	
Course Code	Title
EN7924	Mechanical Project 2 (Fabrication and Manufacturing)
EN8906	Vibration, Noise and Mechanics of Machine
EN8908	Manufacturing Processes
Year 2 / Semester 3 (Summer Semester)	
Course Code	Title
EN8905	Energy, Environment and Sustainability
EN8913	Project Proposal
EN8924	Quality and Reliability Engineering
Year 3 / Semester 1	
Course Code	Title
EN8912	Applied Thermodynamics
EN8914	Co-operative Learning Project