

Faculty of Energy and Environmental Engineering Undergraduate Prospectus 2023/2024



The
BRITISH
UNIVERSITY
IN EGYPT

Call 19(BUE) 19283
El Sherouk City, Cairo, Egypt
www.bue.edu.eg



London
South Bank
University

1.0 The Faculty of Energy & Environmental Engineering

1.1 Undergraduate Programmes

The Energy and Environmental Engineering undergraduate programmes consist of a preparatory year followed by four years in one of three programmes each of which leads to a Bachelor of Science Degree validated by our UK partner. The three programmes are:

- BSc (Hons) Renewable Mechanical Energy
- BSc (Hons) Renewable Electrical Energy
- BSc (Hons) Biochemical Engineering
- BSc (Hons) Petroleum Engineering and Gas technology
- BSc (Hons) Environmental Sustainable Architecture

Upon successful completion of the preparatory year, students are admitted to a programme of their choice if they satisfy the programme's requirements. These include a maximum number of students per programme in addition to other requirements which are specified by the department.

The preparatory year curriculum provides a foundation for students entering Energy and Environmental Engineering Degree Programmes. It aims to develop students' knowledge so that by the end of the Programme students can choose their degree specialisation. The Preparatory Year Programme spans two semesters and covers the following modules: Engineering Mechanics, Engineering Drawing, Chemistry, Engineering Production, Mathematics and Physics. Additionally, a module in Engineering Ethics & Human Rights is offered as well as English language modules. The latter is designed to develop students' English Language and study skills and enable them to make a successful transition from school to university.

BIOCHEMICAL ENGINEERING

PETROLUUM ENGINEERING AND GAS TECHNOLOGY

ENVIRONMENTAL SUSTAINABLE ARCHITECTURE

RENEWABLE ENERGY & ELECTRICAL ENGINEERING

MECHANICAL ENERGY & ELECTRICAL ENGINEERING

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1.0 The Faculty of Energy & Environmental Engineering

1.2 Why study in the Faculty of Energy and Environmental Engineering?

The Faculty of Energy and Environmental Engineering at the British University in Egypt is an effective and modern faculty that offers the most diverse range of energy engineering specialisms in Egypt. The overall mission of the faculty is to provide a broad spectrum of education, research, and award locally and internationally accredited degrees in the fields of energy and environmental engineering that enable graduates to develop their knowledge and entrepreneurship skills, and to contribute to the development of the community.

The faculty undertakes high quality academic and applied research of relevance to energy, industry and the economy of Egypt and the Middle East. The curricula offered in the Faculty of Energy and Environmental Engineering programmes emphasis both theoretical and practical aspects including design and implementation. The faculty provides students with the theoretical and practical skills that industry and employers require. The Faculty of Energy and Environmental Engineering maintains close partnerships with the energy and industry sectors in Egypt and beyond which substantially benefit the students.

Students in the Faculty of Energy and Environmental Engineering study in an environment that encourages diversity and innovation. Staff are not just academic experts in their fields but often have 'real life' practical experience, which they bring to their subjects, as well as close contacts with the 'world of work'. Students in the Faculty of Energy and Environmental Engineering learn not just what to think but how to think.

1. The Faculty of Energy & Environmental

1.3 BSc (Hons) Renewable Mechanical Energy

1.3.1 Why study BSc (Hons) Renewable Mechanical Energy at the BUE?

The Renewable Mechanical Energy programme focuses on cutting-edge technologies and techniques of green energy that include energy generation, transportation, usage and storage. Such technologies include solar, wind, hydraulic, geothermal and bio energy as well as fuel cells and thermal storage. In the final year, there are four optional modules and two graduation research and design projects.

The Department of Renewable Energy Engineering offers students a distinct programme for the following reasons:

- It provides state-of-the-art equipment and resources necessary for studying Renewable Mechanical Energy.
- It exposes students to international experience through participation with international schools of energy and engineering in competitions and summer workshops.
- It exposes students to a diversity of professional expertise in energy.
- It is based on self-learning and research-based academic teaching.
- It is closely linked to the energy market needs.
- It establishes a close connection between students and professional practice.

1.3.2 What will I study?

Preparatory Year

Upon successful completion of the preparatory, students admitted to the Renewable Energy Engineering Department will be enrolled for four years.

Degree Year 1

Renewable Energy Engineering Programme (Mechanical Energy) students will enhance their basic knowledge of renewable energy and mechanical engineering fundamentals, and consolidate their skills through studying the following compulsory modules over two semesters: Introduction to Renewable Energy Systems, Introduction to Mechatronics & Measurements, Physical Chemistry, Thermodynamics (1), Electrical Circuits, Electrical Machines, Computer Programming, Materials Science, Physics (3), Calculus, Differential Equations, and Technical Report Writing and Communication.

Degree Year 2

Students will study modules over two semesters. Some of these modules are designed to consolidate students' understanding of mechanical concepts, principles, and skills while others cover simple industrial applications. These modules are: Thermodynamics, Engineering Probability & Statistics, Fluid Mechanics, Quality Control and Technical Report Writing. In addition, students study Machine Design, Dynamics of Machinery, Material Properties and characterisation, Electrical Machines & Control, Production Technology (3), and Numerical Methods.

Degree Year 3

Students study an optional module plus a set of nine compulsory modules over two semesters. Most modules focus on design of systems and/or components for real life engineering applications. Throughout this year, students will enhance their knowledge on how to apply mechanical engineering fundamentals in different industrial systems.

Degree Year 4

During the fourth year, the students are given the chance to choose 4 elective modules of interest from a wide range of practical modules, as well as, two graduation projects: a group capstone design project, and an individual research thesis. Students may choose to take modules in different fields or select one of the following focus areas: Mechatronics, Materials, Design & Production, Power & Energy, and Automotive & Aeronautics. Students will be guided to choose four optional modules and two graduation projects in these areas.

1.0 The Faculty of Energy & Environmental Engineering

1.3.3 How will I learn and be assessed?

Teaching involves a mix of lectures, tutorials, laboratory sessions, group work, private study and practical activities. Assessment involves submitting coursework and projects (reports and presentations), and sitting exams.

1.3.4 What career and further education opportunities are open to me when I graduate?

After graduation, students have job opportunities including the design, manufacture, operation and maintenance of energy systems and equipment in all industries as there is a continuous need for mechanical engineers. Furthermore, many national and international governmental and non-governmental organisations (NGOs) look for experts in the field of renewable energy, sustainability and the environment.

The multidisciplinary nature of The Renewable Mechanical Energy programme encourages graduates to launch startup companies that will be hosted in the business incubator in the faculty premises.

Students who are interested in pursuing their studies may register for MSc programmes at the BUE (Renewable Energy) or national / international university. Also, students can continue their postgraduate studies abroad.



1. The Faculty of Energy & Environmental

1.4 BSc (Hons) Renewable Electrical Energy

1.4.1 Why study BSc (Hons) Renewable Electrical Energy at the BUE?

The Department of Renewable Electrical Energy offers students a distinct programme for the following reasons:

- It provides state-of-the-art equipment and resources necessary to the study of renewable electrical energy.
- It exposes students to international experience through participation with international schools of energy and engineering in competitions and summer workshops.
- It exposes students to a diversity of professional expertise in energy.
- It is based on self-learning and research-based academic teaching.
- It is closely linked to the energy market needs.
- It establishes a close connection between students and professional practice.
- It offers field trips to very reputable companies in the field of electrical engineering.

1.4.2 What will I study?

Preparatory Year

Upon successful completion of the Preparatory Year students admitted to the Renewable Energy Engineering Department will be enrolled for four years.

Degree Year 1

In this year, students study the basic knowledge representing the core threads of the programme; mainly physics, calculus, differential equations, measurements, material sciences, physical chemistry, introduction to renewable energy systems and electrical circuits and electrical machines. In addition, students acquire essential skills in technical report writing and data presentation skills which will help them in later study years.

Degree Year 2

Students develop their knowledge, understanding and skills in probability and statistics, numerical methods, fluid mechanics, energy and environmental issues, basics of electronic circuits and storage technologies. In addition, students begin to learn the essential key issues of management and economics and its implementation in their study area.

Degree Year 3

Students develop their skills in electrical energy systems and are introduced to several energy systems in terms of energy transmission, data acquisition and system analysis and maintenance. They learn key information about energy network design and control of energy plants. They are introduced to the key issues of power generation and conservation systems. More skills are acquired through industrial training.

Degree Year 4

Students continue to develop their skills in electrical energy systems. They develop knowledge and skills in environmental risk analysis. They apply their knowledge, understanding and skills in two main pieces of work: a research project and a design project. In addition, they have a choice of three optional modules to strengthen their fields of interest. To enhance students skills, the programme offers special courses in high voltage engineering, power electronics, power system protection integration, transmission of energies and advanced electrical machine study.

1.0 The Faculty of Energy & Environmental Engineering

1.4.3 How will I learn and be assessed?

Teaching involves a mix of lectures, tutorials, group work, private study and research and design projects. Assessment involves submitting coursework, in class activities, presentations, projects and reports on field trips. Students are encouraged to participate in local and international competitions. Students are also encouraged to obtain internships.

In the second and third years, students are expected to do a summer training programme to ensure hands-on experiences and to gain greater professional skills and an understanding of engineering ethics. Training can be locally in Egypt or it can be done in an international setting.

1.4.4 What career and further education opportunities are open to me when I graduate?

The job market for graduates of the Renewable Energy Engineering Programme (Electrical Energy) is broad, diverse and is very rich. Electrical engineers can pursue a career in one of the following areas: power stations, process design, operation and production, research and development, management, control, or as an environmental advisor.

The multidisciplinary nature of The Renewable Electrical Energy programme encourages graduates to launch startup companies that will be hosted in the business incubator in the faculty premises.

Students who are interested in pursuing their studies may register for MSc programmes at the BUE (Renewable Energy) or a national / international university. Also, students can continue their postgraduate studies abroad.



1. The Faculty of Energy & Environmental

1.5 BSc (Hons) Biochemical Engineering

1.5.1 Why study Biochemical Engineering at the BUE?

Biochemical engineers apply the principles of biology, chemistry, and engineering to produce useful energy related products such as biofuels, biopolymers, and industrial enzymes. Biochemical engineering includes biofuels and biological waste treatment. A biochemical engineer is responsible for the development of new chemical products that can be used by a multitude of companies and individuals. The job includes researching, developing, documenting, and producing products that are derived from a combination of organic and lab-made materials that can benefit people and society at large.

Graduates from the Biochemical Engineering Programme are ideally prepared to enter emerging industries in the biotechnology, biofuels and energy industrial fields. Graduates are also well prepared to make contributions to renewable energy, food processing and environmental remediation. The department has fully equipped laboratories, petrochemicals, and facilities to support learning and the development of knowledge and professional skills.

1.5.2 What will I study?

Preparatory Year

Upon successful completion of the preparatory year students admitted to this department will be enrolled for four years.

Degree Year 1

Students study basic modules including advanced mathematics, physics, organic and analytical chemistry and energy sources to gain a foundation for future problem analysis. In addition, they cover modules related to the basics of biochemical engineering, fundamentals of microbiology, fundamentals of biochemistry and biomass for biochemical engineering, material engineering and structure and stress analysis; these modules help widen the knowledge of students to support their future development as Biochemical Engineers. The modules provide the capabilities to acquire the underpinning knowledge and analytical skills for process design and engineering.

Degree Year 2

The modules studied provide the focus to enable students to become biochemical engineers. Modules include concepts of mass and energy balances, biophysics, unit operation which are the core of biochemical engineering applications, as well as fluid mechanics, thermodynamics, fundamentals of heat and mass transfer and modeling and simulation.

Degree Year 3

Students focus on the bioreactor design, process plant design, bioremediation of environmental pollution, green fuel, biofuel, bio product, nanotechnology for biochemical engineering experimentations and methods of calculations and analysis of chemical industries. They learn how to design a bioreactor plant in terms of overall performance and petroleum bioprocessing. Additional modules focus on legislation and regulations, foundation of marketing and economics of bioenergy.

Degree Year 4

Students continue to develop their skills in biochemical energy systems. They develop knowledge and skills in environmental risk analysis. They apply their knowledge, understanding and skills in two main pieces of work: a research project and a design project. In addition, they have a choice of four optional modules to strengthen their fields of interest in: process design and simulation, engineering economics, evaluating sustainability, process plant operation, advanced control systems, occupational, health, safety engineering and environmental management systems. Also, students have the opportunity to complete a research project and design projects to apply their knowledge and acquired skills to tackle national and international energy problems.

1.0 The Faculty of Energy & Environmental Engineering

1.5.3 How will I learn and be assessed?

Teaching is given in combinations of lectures, tutorials, experiments, group and individual work. Students are often given time for private studies to allow greater analysis and application of learning. Presentations are also required to give students the confidence in expressing themselves in a professional way and to ensure the successful delivery of ideas.

Assessments are performed according to module specifications; assessments will include submitted coursework, in class activities, exams, presentations, and design and research projects.

In the second and third years, students are expected to do a summer training programme to ensure hands-on knowledge and to gain greater professional skills and an understanding of engineering ethics. Training can be locally in Egypt or it can be done in an international setting.

1.5.4 What career and further education opportunities are open to me when I graduate?

The job market for biochemical engineers is very rich. Chemical engineers can pursue a career in one of the following areas: process design, operation and production, research and development, management, control, or as an environmental advisor.

The multidisciplinary nature of the Biochemical Engineering Energy programme encourages graduates to launch startup companies that will be hosted in the business incubator in the faculty premises.

Students who are interested in pursuing their studies may register for MSc programmes at the BUE (Renewable Energy) or a national / international university. Also, students can continue their postgraduate studies abroad.



1. The Faculty of Energy & Environmental

1.6 BSc (Hons) Petroleum Engineering and Gas technology

1.6.1 Why study BSc (Hons) Petroleum Engineering and Gas technology at the BUE?

The Petroleum Engineering and Gas Technology Department provides an honours degree in the field of petroleum engineering and natural gas technology. Students graduating from the British University in Egypt are highly skilled in the E&P industry locally and internationally. BUE's graduates typically work in various disciplines in industry including drilling engineering, reservoir engineering, production engineering, production technology, and formation evaluation engineering. The Petroleum Engineering and Gas Technology Departments are fully equipped with range of well-equipped laboratories.

1.6.2 What will I study?

Preparatory Year

Upon successful completion of the preparatory year students admitted to this department will be enrolled for four years.

Degree Year 1

In this year students will develop knowledge, understanding and problem solving skills in basic science modules (Mathematics, Physics and Chemistry) that are essential for their study in the PEGT Programme. In addition, they will study the basic engineering sciences (Materials Science, Thermodynamics, Fluid Mechanics Structural and Stress Analysis) which are pre-requisite for understanding petroleum engineering modules. Furthermore, they will study the basic concepts of petroleum engineering and geological principles of petroleum exploration. Students also acquire essential required skills in computer programming and technical report writing.

Degree Year 2

Students continue to consolidate their knowledge, understanding and problem solving skills in basic engineering sciences by studying the following modules: engineering probability and statistics, numerical methods, organic and analytical chemistry, fundamentals of heat and mass transfer, and machine design. Students also acquire an understanding of surveying instrumentation together with observation techniques and limitations. In addition, students study the basic concepts representing the core threads of the programme, namely drilling engineering and drilling fluids, reservoir rock and fluid properties and laboratory work.

Degree Year 3

Students focus on the most important aspects of well logging, petroleum and natural gas exploration, reservoir engineering, reservoir modelling and simulation, well testing, petroleum production engineering, and equipment. Corrosion in the oil and gas industry. In addition, students are introduced to key concepts of petroleum economics and legislation. Students begin to learn the essential key issues of engineering project management and its implementation in their study area. Furthermore, through field course practical modules, students acquire essential skills required to produce topographical, geological and structural maps.

Degree Year 4

Students focus on advanced reservoir engineering, reservoir management surface production facilities, enhanced hydrocarbon recovery, and gas condensate reservoir engineering. Students are required to accumulate all their gained knowledge through a graduation project in one of the main areas of petroleum engineering, exploration, drilling, production, storage and transportation, operation and processing, or enhanced hydrocarbon recovery. The project comprises a research component in addition to a design component with the main aim to provide students the opportunity to implement the acquired skills in research, analysis and design. In addition, two optional modules are required in order to establish the necessary theoretical background required for the project.

1.0 The Faculty of Energy & Environmental Engineering

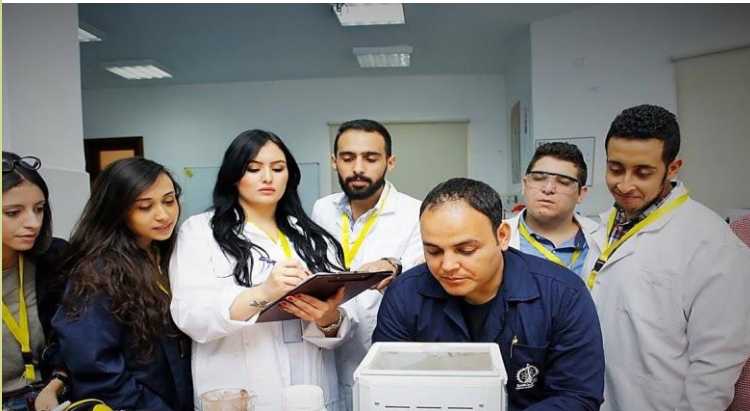
1.6.3 How will I learn and be assessed?

Teaching involves a mix of lectures, tutorials, group work, self-study, practical and field activities. A variety of assessment methods involves submission of coursework, problem sets, in-class group assessments, sitting exams, presentations, and projects. The programme emphasises hands-on practical and field work to enhance the student's appreciation and understanding of technical and theoretical concepts. Students are also encouraged to engage in two industrial internships in the summer of years two and three which expose them to environments of real petroleum projects. The programme also enhances research and communication skills of its graduates through a variety of research assignments.

1.6.4 What career and further education opportunities are open to me when I graduate?

Petroleum Engineering provides career opportunities in the following fields in national and international companies:

- Petroleum exploration and drilling of oil, gas and water wells in service, joint ventures, and operating companies
- Petroleum (oil and gas) production operations
- Petroleum Reservoir Engineering
- Petroleum research exploration and production disciplines in private, government agencies, universities and national or international companies
- Well services activities in oil services companies.



1. The Faculty of Energy & Environmental

1.7 BSc (Hons) Environmental Sustainable Architecture

1.7.1 Why study BSc (Hons) Environmental Sustainable Architecture at the BUE?

Environmental Sustainable Architecture is a strong interdisciplinary curriculum that covers mechanical, electrical, and environmental design while providing engineers with excellent knowledge of cutting -edge technologies in building design, analysis, and simulations. The aim of the programme is to produce graduates who can manage the energy efficiency, environmental, and human aspects of sustainable building design. Students will identify the crucial role of sustainability in architectural practices and design.

1.7.2 What will I study?

Preparatory Year

Upon successful completion of the preparatory year students admitted to this department will be enrolled for four years.

Degree Year 1

In this year, students study the basic concepts representing the core threads of the programme: Engineering Thermo-Fluids, Structural and Stress Analysis, Introduction to Environmental and Sustainable Design, Sustainable Construction Technologies and Materials, Architecture Surveying and Drawing, Eco Design, and History.

In addition, students acquire essential skills in technical report writing, data presentation, visual design, and graphics, which will help them in later study years.

Degree Year 2

In this year, the courses consolidate students' understanding of statistics, numerical methods and computers, environmental control systems, air-conditioning, heat pump engineering, geotechnics, and building regulations and rating systems. In addition, students develop their knowledge, understanding, and skills in sustainable construction technologies and materials, eco design, history & theory.

Degree Year 3

In this year, students will excel in modelling and simulation for sustainable architecture, building information modelling, daylighting, integrated building design. they are introduced to the key issues of sustainable project management and costing. To enhance students' skills, the programme offers special courses as elective courses in electrical and renewable energy.

Degree Year 4

Students apply their knowledge, understanding and skills in two main pieces of work: a research project and a design project. In addition, they have a choice of three optional modules to strengthen their fields of interest.



1.0 The Faculty of Energy & Environmental Engineering

1.7.3 How will I learn and be assessed?

The programme applies a student-centred learning approach and is delivered by a blend of scheduled whole group and small group classes, as well as guided independent study and assessment. Student learning is directed and supported principally via contact in-class with tutors and peers and the use of internally and externally produced print and online materials and exercises.

Throughout the programme, students are encouraged to undertake independent reading to both supplement and consolidate what is being taught and to broaden their individual knowledge and understanding of the subject. Cognitive, practical and keyskills are acquired, developed and reinforced continually throughout the programme.

What career and further education opportunities are open to me when I graduate?

INDUSTRY SECTORS

- Energy efficiency and architectural engineering firms
- Energy consultancy and audit firms
- Private or public research institutions in the fields of energy, construction and sustainable design

POSITIONS TARGETED

- Environmental Architectural Engineer.
- Technical Officer - BEE (building energy efficiency) and materials
- Technical Officer - BEQ (building environmental quality control) and materials
- Project Officer – BIM (Building Information Modelling)
- Project Officer - SPC (scheduling, planning and coordination)



1.0 The Faculty of Energy & Environmental Engineering

1.8 How to apply for a programme in the The Faculty of Energy & Environmental Engineering

- Read the admissions section in our general booklet. This can also be downloaded at www.bue.edu.eg
- Submit an application online at www.bue.edu.eg
- Call the BUE Hotline and speak to a member of staff in the Student Affairs Department if you require further information - 19(BUE) 19283

1.9 When to apply:

- The early admissions period begins in January of each academic year.
- Applicants are encouraged to apply early to secure a place in their chosen programme of study.
- Once programmes are full the applicants will be placed on a waiting list.

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spotlight

ON
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