

Faculty of Engineering Undergraduate Prospectus 2022/2023



1.0 THE FACULTY OF ENGINEERING

1.1 Undergraduate Programmes

The Engineering undergraduate programmes consist of a Preparatory Year followed by four years in one of eight programmes, each leads to a Bachelor of Science Degree.

- BSc (Hons) Architectural Engineering.
- BSc (Hons) Chemical Engineering.
- BSc (Hons) Civil Engineering.
- BSc (Hons) Construction Engineering and Management.
- BSc (Hons) Electrical & Communications Engineering.
- BSc (Hons) Computer Engineering.
- BSc (Hons) Mechanical Engineering.
- BSc (Hons) Mechatronics Engineering.
- BSc (Hons) Robotics Engineering.

Students are admitted in a programme of their choice after the successful complete of the preparatory year provided that they satisfy any additional programme requirements. These include a maximum number of students per programme in addition to any other requirements which are specified by the relevant department.

The Preparatory Year curriculum provides a foundation for students entering Engineering Degree Programmes. It aims to develop students' knowledge of Engineering so that by the end of the Programme students are able to 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 and a module in computer programming are offered as well as modules in English.

The latter are designed to develop students' English Language and study skills and enable them to make a successful transition from school to university studies.



1.0 THE FACULTY OF ENGINEERING

1.2 Why study in the Faculty of Engineering?

The Faculty of Engineering at the British University in Egypt is an effective and modern Faculty and offers the most diverse range of specialisms in Egypt. The overall mission of the Faculty is to provide Egypt, and the Middle East, with a British style of education of the highest quality, and to supply graduates that feed and stimulate industry and commercial activities.

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

Engineering students 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'. In this way students in the Faculty of Engineering learn not just what to think but how to think.

The Faculty of Engineering at BUE prepares its students to be competitive on the Industrial front, by giving them the opportunity to gain practical experiences, at an early stage, through the Summer Internship programme (Section 1.2.1) in addition to investigating and proposing innovative solutions for real life industrial problems and challenges through their final year graduation projects (section 1.2.2)

1.2.1 Summer Internships Programme

Engineering students at BUE are required to perform "Summer Training Internships" during the summer of degree YR 2&3 of their programme. BUE is committed to secure opportunities for its students, however, individual students can secure opportunities for themselves provided that the company nature is appropriate to the student's specialization and after the approval of relevant department.

Summer Training Internships shall be conducted over two phases according to the level of knowledge gained by the students, in the summer of degree YR 2, students are required to be trained in Engineering sites and/or factories while in the summer of degree YR 3, they are required to be trained in design offices and/or withing research groups.

At the end of the training period, students are required to submit a report, conduct a presentation in front of a panel at BUE and present a training completion certificate to their relevant engineering department.

It is worth mentioning that "Summer Training Internships" are considered as Pass/fail modules and are compulsory graduation requirements.

1.2.2 Final Year Graduation Projects

Graduation Projects are considered an important component of any engineering programme. The Faculty of Engineering at BUE requires its students to submit two graduation projects, the first is a research project while the second is a design project. Research projects are the product of creative and innovative ideas of the engineers of tomorrow. Research graduation projects at the Faculty of Engineering are aligned with the industry requirements and the national strategic interests which inform the topics offered for students to work on.

Design graduation projects aim to present the students with the experience of the integral design process from preparation of the brief through to detailed design drawings, if applicable. It is expected that students are able to draw on results of their individual research projects that relate to parts of the design project and integrate all individual components into a comprehensive viable design.



1.0 THE FACULTY OF ENGINEERING

1.3 BSc (Hons) Architectural Engineering

1.3.1 Why study Architectural Engineering at the BUE?

The Department of Architectural Engineering offers students a distinct programme because:

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

1.3.2 What will I study?

Preparatory Year

Upon successful completion of the Preparatory Year, and satisfying entry requirements of the Architectural Engineering programme*, students admitted to this department will be enrolled for four years.

** Entry Exam To The Architectural Engineering Department:*

Similar to other Architectural Engineering programmes worldwide, the BUE Entry Exam for Architectural Engineering Programme is based on a set of unique learning objectives. These were developed by a committee of Architectural Education Experts to identify the target students as appropriate and relevant to Architectural Engineering studies.

Achieving a passing score on this exam will indicate that the student has demonstrated basic skills and knowledge of fundamental principles of the Architectural discipline, 3D visualization, design and creative thinking potential.

The Entry Exam evaluates student's creativity and intuition. The actual test is to complete geometric drawing, freehand drawing, coloring, creativity, logical reasoning and problem solving.

Students' successful completion of the Entry Exam is indicative of what is expected of them (i.e. the ability to think creatively, critically and practically, as well as to communicate their ideas succinctly in various media).

Degree Year 1

In this year, students study the basic concepts representing the core threads of the programme; mainly Architectural Graphics, Design, Construction Technology, Introduction to History and Theory of Architectural Design, and Basics of Visual Design. Students learn basic knowledge regarding Structural Engineering including Structural Design, Surveying, Construction Materials and Reinforced Concrete and Steel Design. In addition, students acquire essential skills in technical report writing and data presentation skills, which will help students in later study years.

Degree Year 2

Students develop their knowledge, understanding and skills in Architectural Design and Building Construction, Visual Design and History of Architecture. They are introduced to Urban Development, Building Services, CAD Applications and Contract Administration. In addition, students begin to learn the essential key issues of management and its implementation in their study area. By the end of this year, students should have acquired the necessary knowledge and understanding of basic architecture engineering topics.

Degree Year 3

Students develop their skills in Architectural Design and are introduced to Working Drawing, Theory of Architecture, and Building Services. They learn key information about Urban Planning and Interior Design. They are introduced to the key issues of Project Management and Construction Economics. More skills in 3D Computer Graphics are acquired. By the end of this year, students have developed their skills ready to undertake their graduation project in the final year.

Degree Year 4

Students continue to develop their skills in Architecture Design and are introduced to Urban Design. They develop knowledge and skills about Sustainability of the Built Environment. 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 in: Construction Management, Lean Construction, Management Information Systems, Geographic Information Systems, Landscape Architecture, Climatic Design or Interior Design. By the end of this year, students are ready to join the professional practice in the Architectural Engineering field.

1.0 THE FACULTY OF ENGINEERING

1.3 BSc (Hons) ArchitecturalEngineering

1.3.3 How will I learn and be assessed?

Teaching involves a mix of lectures, tutorials, group work, private study and design projects. Assessment involves submitting course work, presentations and projects. Students are encouraged to participate in local and international competitions. Students are also encouraged to obtain internships.

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

Graduates of the programme can join one of the following professional fields:

- Architecture Design.
- Interior Design.
- Urban Design.
- Landscape Architecture.
- Project Management.
- Construction Supervision and Management.



1.0 THE FACULTY OF ENGINEERING

1.4 BSc (Hons) Chemical Engineering

1.4.1 Why study Chemical Engineering at the BUE?

Chemical Engineering (ChE) at BUE is a world class discipline that will bring you a cutting edge career to compete with international counterparts. ChE occupies a unique position at the interface between science and engineering. It deals with conception and process design for production and transformation of materials and energy into useful and valuable products to modern societies and human welfare. You find its applications and input all around including in food industry, cosmetics, vehicle fuels, polymers and plastics, water, detergents, medicine, paper, chemicals, agricultural fertilisers and energy.

Students have the opportunity to study ChE as three different specialisms, Environmental Engineering, Pharmaceutical Engineering, and Petrochemicals, which will be offered based on a minimum number of students. Our academic staff have international expertise and proven research experience.

The Department has fully equipped laboratories, petrochemicals, and facilities to support learning and the development of knowledge and professional skills.

1.4.2 What will I study?

Preparatory Year

Upon successful completion of the Preparatory Year, and satisfying entry requirements of the Chemical Engineering programme, students admitted to this department will be enrolled for four years.

Degree Year 1

Students study basic modules including Maths, Physics and Chemistry to gain a foundation for future problem analysis. In addition, they cover modules related to the basics of Chemical Engineering, Material Engineering and Thermodynamics; these modules help widen the knowledge of students to support their future development as Chemical 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 a Chemical Engineer. Modules include concepts of Mass and Energy Balance which are the core of Chemical Engineering applications, as well as Polymer Basics and Fluid and Momentum Transfer to deal with transportation of liquids and gasses. At the end of this year, students will be able to analyse basic Chemical Engineering problems and applications and complete calculations for materials and energy. In addition they will be prepared for modules on Process Design and Economics.

Degree Year 3

Students focus on the fundamentals of process design, experimentations and methods of calculations and analysis of chemical industries. Students study methods of the design of mass transfer operation and equipment, heat transfer equipment and general unit operations. They learn how to design a complete chemical plant in terms of overall performance and a whole system. Additional modules focus on, chemical reactor design, design of equipment, the chemical function of the process, vessel design for material and mechanical design, applications of organic technologies, safety, and process simulation.

Degree Year 4

The final year aims to provide students with a solid background, knowledge and practical skills in one of three specialisms, Petrochemicals, Environmental Engineering or Pharmaceutical Engineering. Students select a specialism according to the students' future career plans:

- (i) Environmental Engineering.
- (ii) Petrochemical Engineering.
- (iii) Pharmaceutical Engineering.

A specialism will be offered in Year 4 only if the number of students reaches a critical mass.

In each specialism students focus on modules which provide them with the required in-depth knowledge and skills. Also, students have the opportunity to complete a research project and design project to apply their knowledge and acquired skills to achieve a certain objective for a given local problem. At the end of this year students are expected to be well qualified chemical engineers with a strong background in one area of specialism.

1.0 THE FACULTY OF ENGINEERING

1.4 BSc (Hons) Chemical Engineering

1.4.3 How will I learn and be assessed?

Teaching is given in combinations of lectures, tutorials, lab 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 manner and to ensure the successful delivery of ideas.

Assessments are performed according to module specifications; assessments will include submitted course work, exams, presentations, lab reports 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.

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

The job market for Chemical Engineers is very rich. Chemical Engineers can pursue a career in one of the following areas: Industry, Academia, Consulting, Process Design, Operation and Production, Research and Development, Management, Control, or as an Environmental Advisor.

Industries in the job market are varied, including chemical industries, water treatment plants, power stations, pharmaceutical companies, petroleum refining and gas technologies, cement industries, polymer and plastics industries, painting industries, petrochemical industries, fertilizer industry, paper industries, renewable energy industries, food industries.



1.0 THE FACULTY OF ENGINEERING

1.5 BSc (Hons) Civil Engineering

1.5.1 Why study Civil Engineering at the BUE?

The Civil Engineering Department, at BUE, graduates general Civil Engineers with a specialisation in one of six major specialisms. Specialisation is created through three parallel paths.

The first comprises two industrial placements in the summer of Years Two and Three. The second is 40 credits worth of project effort divided into 20 credits of an individual research project and 20 credits of a group design project. Finally, students are offered 20 credits of optional modules that support the projects s/he has selected.

The employed specialisation scheme allows students to gain a multifaceted expertise and knowledge. The knowledge gained is practical since their industrial training is in the selected specialism; it is theoretical with two modules enhancing the theoretical background; it is research informed since the design project is informed by findings resulting from the research project; and finally it is applied since students employ all their knowledge in an integrated design project.

1.5.2 What will I study?

Preparatory Year

Upon successful completion of the Preparatory Year, and satisfying entry requirements of the Civil Engineering programme, students admitted to this department will be enrolled for four years.

Degree Year 1

Students acquire guidance and practice in the basic skills of drawing, especially those needed for professional construction and civil engineering work. An introduction to the technological aspects, construction sequence, health and safety issues, and management procedures of simple buildings is also provided. Material science relevant to civil engineers and properties of construction materials are also introduced. Students also acquire an understanding of surveying instrumentation together with observation techniques and limitations. This is accompanied by taking the basic concepts of soil mechanics, the fundamental principles of engineering geology, and fluid mechanics. Finally, the year one civil engineering student is introduced to basic research and communications skills.

Degree Year 2

Students start to investigate structural responses with respect to stresses and strains. Consequently, programming techniques and computer applications in civil engineering are provided in addition to basic knowledge required to employ CAD tools in the design. Construction management is also studied to provide students with necessary knowledge of construction equipment, productivity, and impact on the construction planning schemes. Students continue to explore basics of water engineering, behaviour of construction materials, geotechnical engineering and geomatics. Finally, students start acquiring basic design skills of steel and concrete elements.

Degree Year 3

Students will learn the most important aspects of design, construction and maintenance of water distribution networks, drainage and sewerage systems with particular attention to hydraulic structures and hydraulic equipment. Students also get the chance to use the knowledge gained in surveying and geotechnical engineering in field based practical applications. Advanced design of steel and concrete structures is covered in addition to water and wastewater treatment, transportation systems. Analytical techniques required for the analysis of elastic indeterminate structures, are also provided. Finally, different types of construction contracts are introduced.

Degree Year 4

Students are required to accumulate all their gained knowledge through a graduation project in one of the main areas of civil engineering, i.e. structural engineering, water engineering, construction management, environmental civil engineering and transportation engineering. The project comprises a research component in addition to a design component.

The main idea is to provide means of concentration within civil engineering by implementing 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 projects.

Other advanced modules are also considered in geoinformatics, foundations, water structures and advanced concrete design.

1.0 THE FACULTY OF ENGINEERING

1.5 BSc (Hons) Civil Engineering

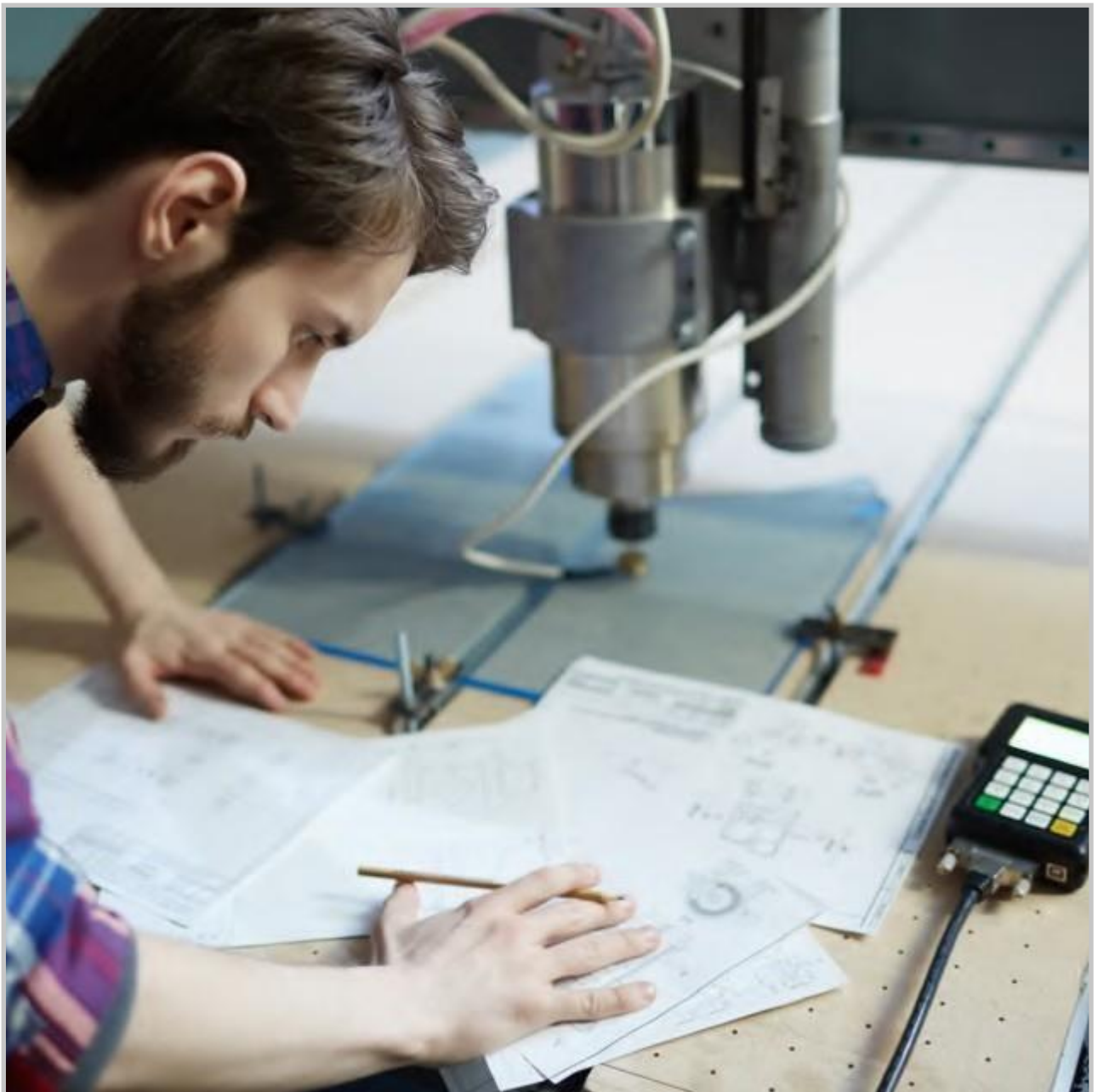
1.5.3 How will I learn and be assessed?

The Programme of Civil Engineering has implemented, since its start in 2006, a variety of assessment methods such as problem solving, in-class group assessments, group lab work, in-class computer developments and detailing and group design projects. The programme emphasises hands-on practical and field work to enhance the students' appreciation and understanding of technical and theoretical concepts. Students are required to engage in two industrial internships in the summer of Years Two and Three which expose them to environments of real construction projects and design office settings and procedures.

The programme also enhances research and communication skills of its graduates through a variety of research assignments.

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

Civil Engineering provides a career in structural design, construction and project management and control, bridge design and construction, roadway and runway design and construction, irrigation works and structures design and construction.



1.0 THE FACULTY OF ENGINEERING

1.6 BSc (Hons) Construction Engineering and Management

1.6.1 Why Study Construction Engineering and Management at The BUE

The Programme of Construction Engineering and Management in Civil Engineering has been approved by the Egyptian Supreme Council for Higher Education for engineering degrees starting September 2014. The programme aims to offer a broad curriculum that provides state-of-the-art knowledge and practical skills in Construction Engineering and Project Management. Additionally it aims to provide students with a systematic understanding of the knowledge-base of Civil Engineering, Construction Engineering and Project Management and the ability to analyse complex issues both systematically and creatively and to make sound judgment in the absence of complete data and communicate their conclusions clearly. This with the ability to be self-directed and innovative in tackling and solving problems and to enhance the student ability necessary for continuing professional development. Mainly the programme is designed to enable students of high innate ability to reach their full potential, personally and academically, so that on graduation they are capable of and free to choose from many different careers, and have the understanding, knowledge and personal maturity to make a rapid contribution to their chosen employment or research area. The main benefit of the programme is to provide one that meets the educational requirements of all appropriate professional institutions, both national and in the UK, for Membership / Chartered Engineer status, respectively. It provides also a learning environment that enhances research and communication skills of its graduates through a variety of research assignments.

1.6.2 What will I study?

Upon successful completion of the Preparatory Year, and satisfying entry requirements of the Construction Engineering and Management programme, students admitted to this programme will be enrolled for four years. The CEM programme mainly offers a civil engineering degree with an emphasis on “construction engineering and project management”. The programme comprises five major threads within construction engineering and project management namely; Construction, Management, Contracts and Finance, Sustainability and Health Safety Each student undergoes two industrial placements in the summer of year two and year three, which are a pass or fail requirement for graduation.

Preparatory Year

Upon successful completion of the Preparatory Year, and satisfying entry requirements of the CEM programme, students admitted to this department will be enrolled for four years.

Degree Year 1

Students acquire guidance and practice in the basic skills of drawing, especially those needed for professional construction and civil engineering work. An introduction to the technological aspects, construction sequence, health and safety issues, and management procedures of simple buildings is also provided. Material science relevant to civil engineers and properties of construction materials are also introduced. Students also acquire an understanding of surveying instrumentation together with observation techniques and limitations. Additional module in building services will be taught to enhance student capability to understand how building can be planned and function for better services. This is accompanied by taking the basic concepts of soil mechanics, the fundamental principles of engineering geology, and fluid mechanics. Finally, the year one civil engineering student is introduced to basic research and communications skills.

Degree Year 2

Students start to investigate some aspects of construction engineering and management mainly studying law in construction, principles of management and statistics for engineers. Construction management is also studied to provide students with the necessary knowledge of construction equipment, productivity, and impact on the construction planning schemes. This is also coupled by important civil engineering topics including structural analysis and mechanics and structural design. Consequently, programming techniques and computer applications in civil engineering are provided in addition to basic knowledge required to employ BIM tools in the design. Students continue to explore basics of water engineering, behaviour of construction materials, Finally, students start acquiring basic design skills of steel and concrete elements.

Degree Year 3

Students will learn the most important aspects of construction planning and scheduling and management information systems. They will also will learn how to study the economics of the project and its construction phases with the necessary financial management modules. Project management and contract procedures will also be taught to enhance student ability to manage projects successfully and professionally. Additional civil engineering aspects will be taught as well. This include design of foundations, reinforced concrete in addition to water and wastewater treatment, transportation systems. Analytical techniques required for the analysis of elastic indeterminate structures, are also provided. water resources engineering design will also be taught to complement the whole spectrum of civil engineering and construction management in different civil fields of application.

1.0 THE FACULTY OF ENGINEERING

Degree Year 4

Students are required to accumulate all their gained knowledge through a graduation project in one of the main areas of construction engineering and management where a research project that emphasizes the understanding of the students to apply techniques, procedures and methods of managing a construction project successfully will be offered. The project comprises a research component in addition to a design component. The main idea is to provide means of concentration within construction engineering and management by implementing acquired skills in research, analysis and design mainly related to construction and project management. In addition, two optional modules are required in order to establish the necessary theoretical background required for the projects.

Additional human resource, sustainability and built environment, strategic management in construction and lean construction are taught to prepare the graduating student to the market with good background of the required managerial skills to run, manage teams, and execute a construction project professionally. This will also require teaching risk management in construction to enhance students' abilities to anticipate, calculate and overcome risks in the construction of a project. This also coupled with civil engineering projects, i.e. structural engineering, water engineering, environmental civil engineering and transportation engineering.

1.6.3 How will I learn and be assessed?

The Programme of Construction Engineering and Management has started, employing a variety of assessment methods such as problem solving, in-class group assessments, group lab work, in-class computer developments and detailing and group design projects and poster presentations. The programme emphasises hands-on practical and field work to enhance the students' appreciation and understanding of technical and theoretical concepts of construction and management of a project from concept to control. Students are required to engage in two industrial internships in the summer of Years Two and Three which expose them to environments of real construction projects and design office settings and procedures. 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?

Students attending this programme will be able to use construction management techniques for estimation, planning, scheduling, quantity surveying, environmental assessment, risk analysis, conduct feasibility studies and to prepare technical and financial studies in construction projects. Hence, this will enable them to work in the careers related to Construction and Project Management as they can easily and professionally, plan, budget, schedule, execute, monitor and control projects of different sizes efficiently and effectively to achieve the main goals of completing projects on time, within cost and with high degree of quality and good performance.



1.0 THE FACULTY OF ENGINEERING

1.7 BSc (Hons) Electrical and Communications Engineering

1.7.1 Why study Electrical and Communications Engineering

Technological advances in Communications Engineering have allowed highly sophisticated devices to become commonplace. Wired and wireless communications, digital communications, integrated electronics, microwave systems, healthcare systems, cellular phones, and internet-based information technology have fundamentally transformed all aspects of human daily life. Mobile phones, portable computers, complete telephone networks, internet, and CD players are found everywhere. Major challenges include the development of terabit optical and gigabit wireless communications. Few people understand how these devices work, are in a position to improve them or develop completely new technologies. By joining the Electrical and Communications Engineering programme you will be one of the few who can.

The discipline of Electrical and Communications Engineering provides graduates with the knowledge and skills required for a successful career in today's world. The innovative programme in Electrical and Communications Engineering allows students to achieve their educational objectives rapidly, confident that the information they are mastering is up to date and relevant to the realities of the world today.

1.7.2 What will I study?

Preparatory Year

Each of the four years in the curriculum followed by a typical electrical and computer engineering undergraduate student has a distinct flavor in terms of the types of modules taken, academic goals, and milestones achieved. The following sections present an overall picture of these four years.

Degree Year 1

Besides completing a number of credits to fulfil parts of the general education requirements such as Report Writing and Data Presentation, Year 1 prepares students for foundation subjects in the major by taking mathematics, physics, and computer programming modules. These are essential skills for future careers and life-long learning.

Students also study the basic concepts of the core themes of the EE programme: Electric Circuits, Electronics, Electromagnetic Fields, and Signals and Systems. These modules provide tools that render specialized modules taken by students in later years both accessible and enjoyable.

Degree Year 2

Students will complete most of the core modules in Electrical Engineering: Electrical Power, Electronics, Digital Design, Computer Architecture, Digital Control, and Numerical Techniques and Probability. Students gain first-hand experience in the activities of a professional electrical/communications engineer. Year 2 is also a pivotal point in the curriculum where students begin to recognize the structure of communications systems.

Degree Year 3

The third year of education in the Electrical Communications Programme offers students a chance for greater understanding of Digital Communications Systems, Electromagnetic waves, Electronic Instrumentation, and Semiconductor Devices. Students will be more motivated and excited as they will find out the applications of what they have learnt through practical examples, case studies and miniprojects.

Year 3 also offers outstanding preparation for professions in Engineering Economics and Electrical and Communications Law, Standards and Practice. Given that EE students branch out into different speciality areas, this common core knowledge is important for students to begin to identify an elective internship programme to suit their interests.

Degree Year 4

The focus of Year 4 is on a set of electives in the students' chosen area of specialization or interest, as well as possible participation in a student design project, and undergraduate research project.

The elective requirement gives each student freedom to define a technical course of study in Electrical Communications Engineering of considerable breadth and focus.

The elective modules are introductory to major speciality areas of Electrical Communications Engineering: Optical Systems, Embedded Systems, Wireless Communications Technology, Opto-Electronics and Digital Signal Processing. Choices should be made with care, planning, and consultation with an adviser. The Design Project viewed as an academic career highlight by most students, provides an opportunity to complete a team project, starting from problem definition and ending with the demonstration of a fully functional and tested software/hardware product.

1.0 THE FACULTY OF ENGINEERING

1.7 BSc (Hons) Electrical and Communications Engineering

1.7.3 How will I learn and be assessed?

Teaching involves a mix of lectures, tutorials, group work, private study and practical activities. We particularly favour Problem-Based Learning where students are presented with a “problem”. It is the responsibility of the student or group to question colleagues, friends, family, Teaching Assistants, and academic staff, and search the Library for academic references, to obtain assistance and an appropriate “solution”.

Assessment involves submitting course work, making presentations, working on mini-projects and sitting (unseen) examinations. The criteria for expected outcomes of these assessments are provided. We particularly emphasise feedback to the student for future guidance about past performance by personal interaction, model answers and personal written advice about shortcomings.

We have an open-door policy where students are encouraged to come and interact about their technical and personal problems. Students are also required to obtain internships so they may gain experience about professional and personal expectations in a non academic environment.

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

On graduation, you will have up-to-date knowledge of the latest developments in Electronics and Communication and there are many career opportunities open to you. You may have the choice of a paid job career in industry or you may have an appetite for further education at Master or PhD level.



1.0 THE FACULTY OF ENGINEERING

1.8 BSc (Hons) Computer Engineering (CE)

1.8.1 Why study Computer Engineering (CE) at the BUE?

The Computer Engineering (CE) Programme has a focus on the design of computer systems. To a computer engineer, the word “computer” means a lot more than just a desktop or portable computer. It also includes microprocessors and microcontrollers that are part of almost every modern device we use; examples are cell phones, media players, remote control units, the electronic circuits in your car, and many more. It would be difficult for you to imagine what your life would be like without the internet and without your cell phone.

Students in the CE Programme learn a mixture of hardware design and software concepts. They gain experience on both sides of the traditional hardware/software “fence” and have unique capabilities in the creation and interfacing of computer systems with the real-world. The programme covers everything you will need to be a Computer Engineer. This includes all related mathematical skills and fundamentals. You will study concepts of new emerging technologies: cloud computing, mobile computing, Computer networks, Internet of Things (IoT), Information systems security, Big Data Analytics, Game Computing, Robotics, Wireless Sensor Networks, Human-Computer Interaction (HCI).

1.8.2 What will I study?

Preparatory Year

Each of the four years in the curriculum followed by a typical electrical and **computer engineering** undergraduate student has a distinct flavor in terms of the types of modules taken, academic goals, and milestones achieved. The following sections present an overall picture of these four years.

Degree Year 1

Year 1 prepares students for foundation subjects in the major by taking mathematics, Electronics and Electrical Circuits, Electronic Measurements and Computer Programming modules. Students also study the basic concepts of the core themes of the CE programme: Data Structures, and Computer Organization. In addition to completing a number of credits to fulfill parts of the general education requirements such as Report Writing and Data Presentation and Project Management. These are essential skills for future careers and life-long learning.

Degree Year 2

Year 2 helps students to gain first-hand experience in the activities of a professional computer engineer: Digital Design, Computer Architecture, Database Systems, and Software Engineering (1). In addition to completing a number of credits to fulfill parts of the Basic Engineering Requirements: Control System, Electrical Energy Systems, Discrete Mathematics, Signals and Systems, and Economics.

Degree Year 3

Students in Year 3 will be more motivated and excited as they will find out the applications of what they have learnt through practical examples, case studies and mini-projects. It offers outstanding preparation for professions in Communications Systems, Modelling and Simulation Techniques, Probability and Statistics, Digital Control Systems, Digital Signal Processing and Operations Research. Computer engineers are responsible for design and operation of Computer Graphics, Internet Programming, Analysis and Design of Algorithms, Data Communications and Computer Networks. Given that CE students branch out into different speciality areas, this common core knowledge is important for students to begin to identify an elective internship programme to suit their interests.

Degree Year 4

The focus of Year 4 is on a set of optional modules in the students’ chosen area of specialization or interest, as well as participation in a student design project, and undergraduate research project. Two optional modules give each student freedom to define a technical course of study in Computer Engineering. The optional modules are introductory to major speciality areas of Computer Engineering: Wireless Sensor Networks, Software Engineering (2), Systems Security, Design of Web-Based Systems, Neural Networks and Multimedia Systems. Choices should be made with care, planning, and consultation with an adviser. The Design Project is viewed as an academic career highlight by most students. Students are required to accumulate all their gained knowledge in one of the main areas of computer engineering and to provide an opportunity to complete a team project, starting from problem definition and ending with the demonstration of a fully functional and tested software/hardware product. The research project emphasizes the understanding of the students to apply techniques, procedures and algorithms. The project comprises a research component in addition to a design component. The main idea is to provide means of concentration within computer engineering by implementing acquired skills in research, analysis and design.

1.0 THE FACULTY OF ENGINEERING

1.8 BSc (Hons) Computer Engineering (CE)

1.8.3 How will I learn and be assessed?

The Programme of Computer Engineering (CE) has started in September 2016. Teaching involves a mix of lectures, tutorials, group work, private study and practical activities. A variety of assessment methods such as problem sets, in-class group assessments, group lab work, in-class computer developments and detailing and group design projects and poster presentations for the projects.

The programme emphasise hands-on practical work to enhance the students' appreciation and understanding of technical and theoretical concepts.

Students are required to engage in two industrial internships in the summer of Years Two and Three so they may gain experience about professional and personal expectations in a non academic environment. The programme also enhances research and communication skills of its graduates through a variety of research assignments.

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

Computer engineering graduates find employment within our region and in other parts of the country. Employers of our graduates include governmental agencies, large companies in the computer sector, computer networking companies and departments, small and mid-size consulting firms and small and mid-size manufacturing companies that produce computerized devices and components, and medical equipment. Some of our graduates continue their education at the master's and doctoral levels.



1.0 THE FACULTY OF ENGINEERING

1.9 BSc (Hons) Mechanical Engineering

1.9.1 Why study Mechanical Engineering at the BUE?

The Mechanical Engineering Department graduates general Mechanical Engineers with possible concentration in one of the following specializations: Production & Design, Power & Energy, and Mechatronics. The concentration is achieved in the last year through 5 optional modules and two graduation projects. However, the student may decide to take a mix of optional modules in different areas.

The strong academic background is supported by seven modern laboratories and two machine shops containing state-of-the-art equipment and resources necessary to gain hands-on experience in mechanical engineering. Moreover, students gain practical experience through two industrial training sessions during the summers of second and third years.

The Mechanical Engineering Department has two student organizations in which students participate in social, sports, and other extra-curricular activities. Mechanical Engineering students participate in international competitions in robotics and hybrid cars.

1.9.2 What will I study?

Preparatory Year

Upon successful completion of the **Preparatory Year**, and satisfying entry requirements of the **Mechanical Engineering** programme, students admitted to this department will be enrolled for four years.

Degree Year 1

Mechanical Engineering Students will enhance their basic knowledge of Mechanical Engineering Fundamentals, and consolidate their skills through studying 10 compulsory modules distributed over two semesters, namely, Calculus, Modern Physics, Rigid Body Mechanics, Introduction to Materials Science & Engineering, Mechanical Graphic and Metrology, Foundations of Electrical Engineering, Production Technology(2), Thermo-Fluid Mechanics, Stress Analysis, and Differential Equations.

Degree Year 2

Students will study 10 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, Mechanics of Machinery, Material Properties & Characterization, Electrical Machines & Control, Production Technology (3), and Applied Numerical Methods.

Degree Year 3

Students study an optional module plus a set of nine compulsory modules distributed over two semesters. These modules are: Structure Mechanics, Heat and Mass Transfer, Vibration and Control, Engineering Economics, Internal Combustion Engines, Plant Layout and Material Handling, Mechatronics Systems, Industrial Safety and Environmental Engineering, Product Design, and an optional module.

Most modules concentrate 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 into different industrial systems.

Degree Year 4

In the fourth year, the Mechanical Engineering Programme emphasizes industrial applications as well as the development of research skills. In addition to two year-long graduation projects and four optional modules, students study four core modules (Design and Analysis of Experiments, Advanced Materials and Manufacturing, Energy Conversion and Operation Research and Management).

Students may choose to take the optional modules in different fields or select one of the following focus areas: Design & Production, Power & Energy, and Mechatronics. Students will be guided to choose the optional modules and graduation projects in these areas.

1.0 THE FACULTY OF ENGINEERING

1.9 BSc (Hons) Mechanical Engineering

1.9.3 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.

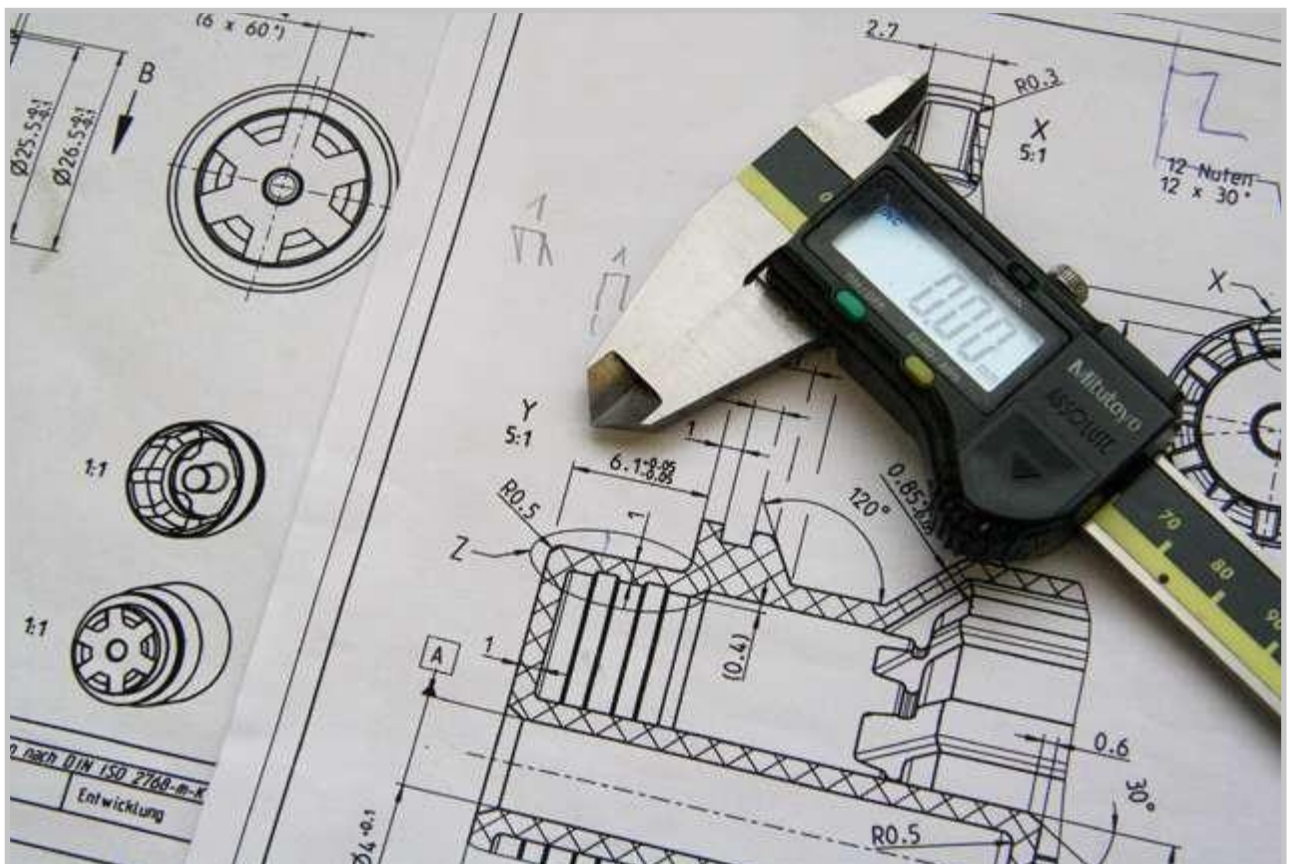
Students are also required to conduct two industrial internships during the summers of Degree Years 2 and 3.

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

After graduation, students have job opportunities including the design, manufacture, and maintenance of systems and equipment in many fields including:

Oil & Gas Industry, Petrochemicals Industry, Power Plants, Water Desalination Plants, Metal Forming Industry, Heavy Machinery, Air Conditioning, Refrigeration, Aerospace Industry, Automotive Industry, Packaging (Computer & Electronics), Food Industry, Textile Industry, Building Materials Industry, Government, Armed Forces, Management and Sales, and Research & Development.

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



1.0 THE FACULTY OF ENGINEERING

1.10 BSc (Hons) Mechatronics Engineering

1.10.1 Why study Mechatronics Engineering at the BUE?

The Mechatronics Engineering Programme is a multidisciplinary programme integrating mechanical design, electronics, control and programming. It provides students with the interdisciplinary approach necessary to achieve the coherent integration of these traditionally divided disciplines.

By studying Mechatronics Engineering, you are taught the basics of electrical and mechanical systems. Through modules such as Thermodynamics, Material engineering and Electric circuit, you develop a knowledge of the existing thermodynamic cycles and electric circuits. You are also taught the basics of renewable energy, and the potential it holds in the future. You are also taught about Production & Design, Materials & Manufacturing.

Within this specialisation, you are focused on methods and tools of manufacturing. You develop an understanding of how products are designed, how suitable materials for production are selected, and the series of processes needed to produce it. You will also learn how electrical and mechanical components may be integrated to yield a comprehensive product.

1.10.2 What will I study?

Preparatory Year

Upon successful completion of the Preparatory Year, and satisfying entry requirements of the Mechatronics Engineering programme, students admitted will be enrolled for four years.

Degree Year 1

Year 1 prepares students for foundation subjects in the major by taking Mathematics, Physics, Mechanics, Electronics and Electrical Circuits, and Programming modules. Students also study the basic concepts of the Mechanical Engineering: Material Engineering, Manufacturing Engineering, Strength of Material, and Graphics and Modelling. These are essential skills for future careers and life-long learning.

Degree Year 2

Year 2 provides students with the fundamentals of Mechatronics Engineering. These includes modules covering: Digital Circuits, Sensors and Instrumentation, Measurements and Analysis, Digital System Design and Introduction to Robotics. These are supplemented by fundamental courses of Mechanical Engineering including: Machine Design, Thermo-Fluids, Design of Machinery, Numerical Methods and Project Management and Report Writing.

Degree Year 3

Students in Year 3 will be more motivated and excited as they will find out the applications of what they have learnt so far. Modules in this year offer outstanding preparation for hands-on practical work.

The modules offered cover: Modelling and Simulation, Electric Drives, Pneumatic and Hydraulic Actuators, Industrial Process Control, Advanced Programming Languages, Applied Microcontroller Programming, Microprocessor Systems, Industrial Internet of Things, Dynamic Systems, Digital Control and Optimisation, Artificial Intelligence for Engineering, and Automatic Control.

Degree Year 4

The focus of Year 4 is on deep specialisation in the area of Mechatronics Engineering. This is achieved through two compulsory graduation projects in line with all programmes within the Faculty of Engineering at the BUE. The first is the individual research project and the other is the group design project.

Deep specialisation is also achieved by each student selecting 7 optional courses out of 9 optional courses offered in degree year 4 (subject to availability). These are: Bio-Mechatronics, Mechatronics in Renewable Energy, Digital Manufacturing, Embedded Systems, Data Acquisition and Signal Processing, Flexible Manufacturing Systems, Power Electronics and Generation, Mechatronics System Design, and Autonomous Vehicle Guidance Systems.

To emphasise the importance of sustainable development, a compulsory core module is also offered in degree year 4. This covers the Sustainable Product Design and Manufacturing of Mechatronics systems.

1.0 THE FACULTY OF ENGINEERING

1.10 BSc (Hons) Mechatronics Engineering

1.10.3 How will I learn and be assessed?

Teaching involves a mix of lectures, tutorials, group work, private study and practical activities. A variety of assessment methods such as problem sets, in-class group assessments, individual and group lab work, in-class computer developments and detailing and group design projects and presentations for the projects.

The programme emphasise hands-on practical work to enhance the students' appreciation and understanding of technical and theoretical concepts. Students are required to engage in two industrial internships in the summer of Years Two and Three so they may gain experience about professional and personal expectations in a non-academic environment.

The programme also enhances research and communication skills of its graduates through a variety of research assignments.

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

Mechatronics Engineers are analogous to jokers in a deck of cards. Whatever the industry you are interested, they will find jobs. Upon graduation, you will have all the basic tools you need to proceed in the specialisation you are interested in.

You will have a superb skill set that enables you to think critically, approach problems efficiently and have the capacity to acquire knowledge according to your needs.

Mechatronics engineers find themselves constantly challenged in the workplace. They usually have jobs that require constant development of one's skills and updating one's knowledge.

Mechatronics engineering graduates find employment within our region and in other parts of the world. Potential employment sectors include: Automation Engineer, Control System Design, Embedded Systems Engineer, Renewable Energy Engineer, Automotive Engineer, Oil and Gas Engineer, and Construction site Engineer. Some of our graduates continue their education at the masters and doctoral levels.



1.0 THE FACULTY OF ENGINEERING

1.11 BSc (Hons) Robotics Engineering

1.11.1 Why study Robotics Engineering at the BUE ?

The Robotics Engineering Programme is a multidisciplinary programme integrating mechanical design, electronics, control and programming. It provides students with the interdisciplinary approach necessary to achieve the coherent integration of these traditionally divided disciplines.

By studying Robotics Engineering, you are taught the basics of electrical and mechanical systems. Through modules such as Thermodynamics, Material engineering and Electric circuit, you develop a knowledge of the existing thermodynamic cycles and electric circuits. You are also taught the basics of renewable energy, and the potential it holds in the future. You are also taught about Production & Design, Materials & Manufacturing. Within this specialisation, you are focused on methods and tools of manufacturing. You develop an understanding of how products are designed, how suitable materials for production are selected, and the series of processes needed to produce it. You will also learn how electrical and mechanical components may be integrated to yield a comprehensive product.

1.11.2 What will I study?

Preparatory Year

Upon successful completion of the Preparatory Year, and satisfying entry requirements of the Robotics Engineering programme, students admitted will be enrolled for four years.

Degree Year 1

Year 1 prepares students for foundation subjects in the major by taking Mathematics, Physics, Mechanics, Electronics and Electrical Circuits, and Programming modules.

Students also study the basic concepts of the Mechanical Engineering: Material Engineering, Manufacturing Engineering, Strength of Material, and Graphics and Modelling. These are essential skills for future careers and life-long learning.

Degree Year 2

Year 2 provides students with the fundamentals of Robotics Engineering. These includes modules covering: Digital Circuits, Sensors and Instrumentation, Measurements and Analysis, Digital System Design and Introduction to Robotics. These are supplemented by fundamental courses of Mechanical Engineering including: Machine Design, Thermo-Fluids, Design of Machinery, Numerical Methods and Project Management and Report Writing.

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Degree Year 4

The focus of Year 4 is on deep specialisation in the area of Robotics Engineering. This is achieved through two compulsory graduation projects in line with all programmes within the Faculty of Engineering at the BUE. The first is the individual research project and the other is the group design project.

Deep specialisation is also achieved by each student selecting 7 optional courses out of 9 optional courses offered in degree year 4 (subject to availability). These are: Machine Vision, Behavioural Robotics, Mobile Robotics, Aerial Robotics, Submersible Robotics, Soft Robotics, Tele-Robotics, Bio-Inspired Robotics, and Autonomous Vehicle Guidance Systems.

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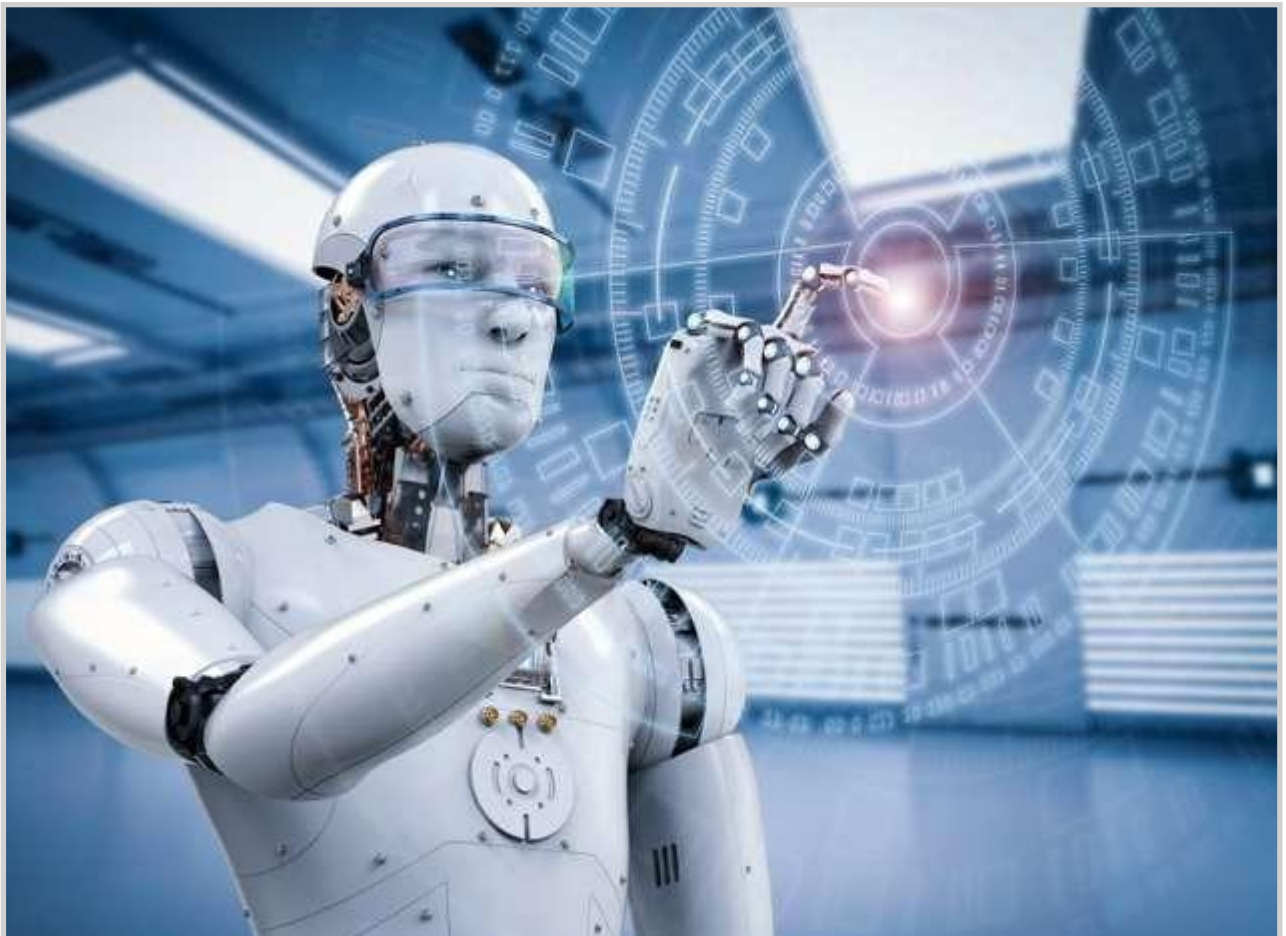
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Robotics engineering graduates find employment within our region and in other parts of the world. Potential employment sectors include: Manufacturing companies, Food industries, Power Plants, Packaging Industries, Automotive companies, Aerospace industries, Construction sites, and Military and Security establishments.

Students who are interested in pursuing their postgraduate studies may register for MSc and PhD programmes both nationally and internationally.





CAD CAM



Applied Energy Lab



Materials Lab



Applied Energy Lab 2



Environmental Lab



CAD CAM



Thermo and Fluids Lab



Surveying Lab

