Our Bachelor of Science in Engineering or BSc(Eng) is fully accredited by the Engineering Council of South Africa (ECSA) and meets all academic requirements for you to register as an engineer in training. Further practical experience is necessary, however, before you can get professional recognition.

Under the 2000 Washington Accord, the BSc(Eng) has been officially recognised by professional engineering accrediting bodies in the US, Canada, Australia, New Zealand, the UK, Ireland, Japan, and Hong Kong.
Schools in Engineering

School of Chemical and Metallurgical Engineering

The School of Chemical and Metallurgical Engineering offers expertise in various fields of engineering and is involved in cutting-edge research activities spanning chemical, metallurgical, and materials engineering.

The four-year BSc(Eng) degree in Chemical or Metallurgical and Materials Engineering is continually reviewed, modified, and re-aligned to reflect best practices within the industry and the wider profession.

School of Civil and Environmental Engineering

The School of Civil and Environmental Engineering offers a four-year BSc(Eng) degree in Civil Engineering. In the first two years, you will develop your competency in mathematics, science, computing, communication, and engineering design and problem-solving.

In the third and fourth years, you will focus on geotechnical engineering, hydrology, hydraulics, infrastructure planning and management, structural engineering, and construction materials.

School of Electrical and Information Engineering

The School of Electrical and Information Engineering has extensive research laboratory facilities, including those for machines and drives, electronics, high voltage, lightning and EMC, telecommunications, information engineering, biomedical engineering, computational electromagnetics, and systems and control. Bioinformatics has also been added as a competency.

The School is a partner of the Johannesburg Centre for Software Engineering and is involved in a renewable energy research initiative at Masters and PhD Level, with particular focus on wind, solar, and smart grids. The School has also incubated two high-tech companies and our staff are active academic research and industrial consultants.

School of Mechanical, Industrial, and Aeronautical Engineering

The Departments within the School of Mechanical, Industrial, and Aeronautical Engineering have produced world-class engineers and have remained at the forefront of engineering in South Africa for over 100 years.

Mechanical Engineering

Mechanical engineers design, develop, construct, and use the machines and systems found in all areas of industry.

Industrial Engineering

Industrial engineers study complex systems, processes, and technology in order to devise efficient systems.

Aeronautical Engineering

Aeronautical engineers design, develop, and modify aircraft components and systems.

In addition, there are two further options available:

Nuclear Engineering

After completing a three-year BSc following a fixed curriculum (including courses from the first two years of Mechanical Engineering), you may enter the Mechanical Engineering stream in the third year. After five years, you will graduate with both a BSc and a BSc(Eng), specialising in Nuclear Engineering.

Industrial Engineering

After you have completed two years of study in any engineering stream, you may enter the Industrial Engineering stream in third year. You will graduate as an industrial engineer, but with a background in another engineering discipline, such as chemical or electrical engineering.

School of Mining Engineering

The School of Mining Engineering is one of the world’s leading mining engineering schools.

The School, in consultation with the South African mining industry, gives you the engineering knowledge that you will need as a practising mining engineer. This includes technical subjects for specialist skills in mining, mineral resource management and evaluation, and rock engineering, as well as management skills in evaluation techniques and fundamental mineral economic principles.
A common first year programme was introduced from 2019 across all professional engineering disciplines.

Common first year programme

A common first year programme was introduced from 2019 across all professional engineering disciplines.

The academic curriculum is regularly modernised in order to ensure that it meets the highest professional and academic standards and that it simultaneously remains locally relevant and applicable.

Many engineering students entering the engineering programmes have a limited knowledge of the different branches of engineering and only gain the knowledge to make an informed choice of programme during their first year. A first year curriculum that is identical for all programmes allows students to amend their choice at the end of the first year.
Chemical Engineering

Bachelor of Science in Engineering in Chemical Engineering

EFA00

Duration 4 years

NSC Requirements

APS 42+

English Home Language OR First Additional Language
Mathematics Level 5
Physical Sciences Level 5

Wait-listing

Students with English, Mathematics and Physics at Level 5 will be wait-listed, subject to place availability.

Generally, applicants who achieve 70% in English, Maths and Physical Science stand a greater chance of being accepted.

International Qualifications on page 29

Closing Date: 30 September

Careers

• Biochemical Engineer
• Environmental Engineer
• Food Processing Engineer
• Process Control Engineer
• Process Design Engineer
• Process Plant Manager
• Systems Engineer
• Technical Sales Engineer

Programme Description

Design, operate, and manage large-scale industrial conversion processes.

Chemical Engineering involves large-scale industrial processes that convert raw materials – by physical or chemical change – into products with higher economic and social value. For example, coal, petroleum, natural gas, vegetation, and microorganisms are converted into fuels and chemicals.

Chemical engineers are needed in fields such as plastics, oil refinery, explosives, fertilisers, detergents, and food and mineral processing.

Chemical engineering plays an important role in society by minimising and controlling the impact of modern industry on the environment, society, and businesses.

The curriculum therefore includes courses on environmental engineering, management principles, and professional practice and ethics.

Courses such as Chemical Engineering Thermodynamics, Chemical Reactor Theory, Process Control, Solid Fluid Systems, Transport Phenomena, Mass-Transfer Operations, and Chemical Plant Design are studied after first year.

In final year, you will study elective subjects in advanced chemical engineering topics.

You need a thorough understanding of Mathematics, Physics and Chemistry, and must be computer literate.

Curriculum

First year

Engineering Chemistry
Introduction to the Engineering Profession
Engineering Analysis and Design IA and IB

Second year

Chemistry II
Mathematics II
Computing for Process Engineering
Process Engineering Fundamentals A and B
Energy Balances and Applications
Electrical Engineering

Third year

Applied Thermodynamics
Chemical Engineering Thermodynamics
Chemical Engineering Laboratory
Mass Transport and Operations
Chemical Reaction Engineering A and B
Process Design Principles A and B
Numerical Methods
Environmental Process Engineering
Momentum and Heat Transport

Fourth year

Management for Process Engineers
Solid Fluid Systems
Chemical Engineering Design
Process Control
Chemical Engineering Research Project
Biochemical Engineering and three of the following:

Hydrometallurgy
Fundamentals of Mineral Processing
Advanced Chemical Reaction Engineering
Waste Water Engineering
Synthetic fuels

Engineering Mathematics IA and IB
Engineering Physics IA and IB
Applied Mechanics for Engineering
Elective from Faculty of Humanities

International Qualifications on page 29

Closing Date: 30 September

Bachelor of Science in Engineering in Chemical Engineering
Bachelor of Science in Engineering in Metallurgy and Materials Engineering

**Curriculum**

**First year**
- Engineering Chemistry
- Introduction to the Engineering Profession
- Engineering Analysis and Design IA and IB
- Engineering Mathematics IA and IB
- Engineering Physics IA and IB
- Applied Mechanics for Engineering
- Elective from Faculty of Humanities

**Second year**
- Chemistry II (Metallurgy)
- Mathematics II
- Introductory Mineralogy and Earth Sciences
- Computing for Process Engineering
- Introduction to Extractive Metallurgy
- Practical Metallurgy
- Material Science and Engineering
- Process Engineering Fundamentals
- Electrical Engineering
- Economic Concepts IA

**Third year**
- Numerical Methods (Metallurgy)
- Metallurgical Thermodynamics I and II
- Engineering Failure Analysis
- Kinetics and Transport Processes in Metallurgical Engineering
- Solidification, Heat Treatment and Microstructure
- Environmental Process Engineering
- Crystal Structure and Analysis
- Process and Materials Design I and II
- Corrosion and Wear
- Non-Ferrous Pyrometallurgy
- Engineering statistics

**Fourth year**
- Physical Chemistry of Iron and Steel
- Manufacturing Metallurgical Design
- Research Project Management for Process Engineers
- Particulate Systems
- Process Control
- Welding and Forming Processes
- Structure and Properties of Engineering Materials
- Hydrometallurgical Processes

**Programme Description**

Design, operate, and manage industrial plants that convert minerals and metals into valuable products.

Metallurgy and Materials Engineering involves the engineering principles required to concentrate, extract, and refine metals, materials, and carbon (coal) materials, as well as to develop new alloys and materials, including ceramics and composites.

Core subjects in Materials Engineering focus on the structure and behaviour of materials and their conversion into usable forms (through heat treatment, welding and forming processes, and powder metallurgy). As in Chemical Engineering, the Materials Engineering curriculum also focuses on the issues of environmental engineering, management, and professional ethics.

There is a strong emphasis on design and project work, with the programme culminating in an extensive laboratory project and a large design project. The degree programme provides a sound foundation for future postgraduate study, as well as a career in technical management.

**NSC Requirements**

**APS** 42+

- English Home Language OR First Additional Language Level 5
- Mathematics Level 5
- Physical Sciences Level 5

**Wait-listing**

Students with English, Mathematics and Physics at Level 5 will be wait-listed, subject to place availability.

Generally, applicants who achieve 70% in English, Maths and Physical Science stand a greater chance of being accepted.

**International Qualifications on page 29**

**Closing Date: 30 September**

**Careers**

- Corrosion Engineer
- Extractive Metallurgist
- Failure Analysis Consultant
- Foundry Engineer
- Heat Treatment Engineer
- Metallurgical Plant Design Engineer
- Process Control Engineer
- Tribologist Materials Consultant

**Metallurgy and Materials Engineering**

www.wits.ac.za/course-finder/undergraduate/ebe/metallurgy-and-materials-engineering/
Civil Engineering

Bachelor of Science in Engineering in Civil Engineering

EFA01

Duration 4 years

NSC Requirements

APS 42+

English Home Language OR First Additional Language Level 5

Mathematics Level 5

Physical Sciences Level 5

Wait-listing

Students with English, Mathematics and Physics at Level 5 will be wait-listed, subject to place availability.

Generally, applicants who achieve 70% in English, Maths and Physical Science stand a greater chance of being accepted.

International Qualifications on page 29

Closing Date: 30 September

Careers

• Bridge Engineer
• Earthquake Design Engineer
• Consulting Engineer
• Construction Manager
• Environmental Engineer
• Geotechnical Engineer
• Hydrologist
• Structural Engineer
• Water Resource Manager

Programme Description

Plan, design, and manage physical infrastructure.

Civil Engineering is the practice of improving and maintaining the built environment to enhance the quality of life for present and future generations.

Civil engineers primarily plan, design, construct, operate, and maintain physical infrastructure, including water and waste management facilities, transportation and communications infrastructure, and structures and public buildings. This all-important infrastructure supports people's basic needs, while enabling and driving economic development.

In the first two years of study, you will focus on developing competencies in mathematics, science, computing, communication, and engineering design/problem-solving. In third and fourth years, you will take courses in Geotechnical Engineering, Hydrology, Hydraulics, Infrastructure Planning and Management, Structural Engineering, and Construction Materials.

Curriculum

First year

Engineering Chemistry
Introduction to the Engineering Profession
Engineering Analysis and Design IA and IB
Engineering Mathematics IA and IB
Engineering Physics IA and IB
Applied Mechanics for Engineering
Elective from Faculty of Humanities

Second year

Mathematics II
Geology for Civil Engineers
Engineering Computing
Introduction to Environmental Engineering
Engineering Economics and Infrastructure Planning
Materials and Structures I and II
Numerical Methods
Probability Theory and Mathematical Statistics for Engineers
Engineering Surveying
Practical Training
Vacation Work I

Third year

Construction Materials I
Geotechnical Engineering I
Structural Steel Design
Reinforced Concrete Design
Hydrology
Fluid Mechanics and Hydraulics
Structural Analysis I and II
Transport Engineering
Systems Analysis and Optimisation
Vacation Work II

Fourth year

Construction Materials II
Structural Engineering
Civil Engineering Design
Geotechnical Engineering II
Investigational Project
Integrated Resource Management
Hydraulic Engineering
Electrical Engineering

Bachelor of Science in Engineering in Electrical Engineering
EF03
Duration 4 years

NSC Requirements
APS 42+
English Home Language OR First Additional Language Level 5
Mathematics Level 5
Physical Sciences Level 5

Wait-listing
Students with English, Mathematics and Physics at Level 5 will be wait-listed, subject to place availability.

Generally, applicants who achieve 70% in English, Maths and Physical Science stand a greater chance of being accepted.

International Qualifications on page 29
Closing Date: 30 September

Careers
• Antennas Engineer
• Computer Engineer
• Control and Automation Engineer
• High Voltage Engineer
• Machines and Drives Engineer
• Power Engineer
• Power Systems Manager
• Telecommunications Engineer

Programme Description
Design, operate, and manage communications, IT, electric power, and automation technology.

Electrical Engineering covers a broad range of activities involving the generation and use of electrical energy, including the planning and operation of large power-generating stations, computing and information transfer, and telecommunication systems. An Information Engineering option is also offered within the programme.

In the first two years, all Electrical Engineering students focus on enhancing their capabilities in mathematics, physics, and chemistry. In the third year, you will study Electrical Engineering Science subjects and take more advanced courses in mathematics, such as Electronics, Power Engineering, Electro-magnetic Engineering, and Mathematical Methods.

In the final year, you will study five complementary courses, including Engineering Design, Engineering Laboratory, and Systems Management. You will also choose three elective courses to specialise in either Electrical or Information Engineering. Engineering Design and Engineering Laboratory are project-based subjects in which you are required to submit a report for examination.

Curriculum
First year
Engineering Chemistry
Introduction to the Engineering Profession
Engineering Analysis and Design IA and IB
Engineering Mathematics IA and IB
Engineering Physics IA and IB
Applied Mechanics for Engineering
Elective from Faculty of Humanities

Second year
Mathematics II
Physics II (Electrical)
Data Structures and Algorithms
Electric Circuits
Electronics I
Electrical and Magnetic Systems
Software Development I
Signals and Systems I
Microprocessors
Vacation Work I

Third year
Mathematical Methods
Electromagnetic Engineering
Electronics II
Power Engineering
Probabilistic Systems Analysis
Software Development II
Signals and Systems IIA and IIB
Control I
Electrical Engineering Design
Economics of Design
Vacation Work II

Fourth year
Electrical Engineering Design II
Electrical Engineering Laboratory
Measurement Systems
Selected Topics in Sociology Systems Management and Integration
AND, any three courses from the following:
• High Frequency Techniques
• High Voltage Engineering
• Software Engineering
• Software Development III
• Electromechanical Conversion
• Control II
• Power Systems
• Data Intensive Computing in Data Science
Bachelor of Science in Engineering in Information Engineering

EFA03

Duration
4 years

NSC Requirements

<table>
<thead>
<tr>
<th>Subject</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>APS</td>
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<td>English Home Language OR First Additional Language</td>
<td>Level 5</td>
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<tr>
<td>Mathematics</td>
<td>Level 5</td>
</tr>
<tr>
<td>Physical Sciences</td>
<td>Level 5</td>
</tr>
</tbody>
</table>

Wait-listing

Students with English, Mathematics and Physics at Level 5 will be wait-listed, subject to place availability.

Generally, applicants who achieve 70% in English, Maths and Physical Science stand a greater chance of being accepted.

International Qualifications on page 29

Closing Date: 30 September

Careers

- Computer Engineer
- Information Engineer
- Software Developer
- Software Engineer
- Software Project Manager
- Software Systems Architect
- Network Engineer
- Telecommunications Engineer
- Information Technology Consultant

Programme Description

Plan, design, and manage complex software systems.

The Information Engineering degree focuses on Software Engineering, Telecommunications, and Computer Networking.

In the first two years, you will focus on enhancing your capabilities in mathematics, physics, and chemistry. At the beginning of the third year, you can choose to continue with the Electrical Engineering degree or register for the Information Engineering degree.

In the final year, you will study five complementary courses, including Engineering Design, Engineering Laboratory, and Systems Management. You will also choose three elective courses, to specialise in either Electrical or Information Engineering. Engineering Design and Engineering Laboratory are project-based subjects in which you are required to submit a report for examination.

Curriculum

First year

Engineering Chemistry
Introduction to the Engineering Profession
Engineering Analysis and Design IA and IB
Engineering Mathematics IA and IB
Engineering Physics IA and IB
Applied Mechanics for Engineering
Elective from Faculty of Humanities

Second year

Mathematics II
Physics II (Electrical)
Data Structures and Algorithms
Electric Circuits
Electronics I
Electrical and Magnetic Systems
Software Development I
Signals and Systems I
Microprocessors
Vacation Work I

Third year

Computational Mathematics
Electronics II
Probabilistic Systems Analysis
Software Development II
Signals and Systems IIA and IIB
Data and Information Management
Control I
Electrical Engineering Design
Economics of Design
Communication Fundamentals
Vacation Work II

Fourth year

Measurement Systems
Information Engineering Design
Information Engineering Laboratory
Selected Topics in Sociology
Systems Management and Integration
and, any three courses from the following:

- Software Engineering
- Software Development III
- Control II
- Network Fundamentals
- Data Intensive Computing in Data Science
Specialisation in Biomedical Engineering

Bachelor of Engineering Science in Biomedical Engineering

EBA00

Duration
3 years

NSC Requirements

APS 42+

English Home Language OR First Additional Language
Level 5

Mathematics
Level 5

Physical Sciences
Level 5

Wait-listing
Students with English, Mathematics and Physics at Level 5 will be wait-listed, subject to place availability.

Generally, applicants who achieve 70% in English, Maths and Physical Science stand a greater chance of being accepted.

International Qualifications on page 29

Closing Date: 30 September

Careers

Physicist or Electrical Engineer or Medical Professional working in the development of:
• Artificial Organs
• Information Technology for Healthcare
• Medical Imaging System Design (e.g. ultrasound or CT scanning)
• Modelling and simulation of physiological states and disease
• Therapeutic Equipment Design

Programme Description

Work at the cutting edge of research and development in healthcare systems.

Biomedical Engineering, which falls within the School of Electrical and Information Engineering, applies engineering and other quantitative sciences to solving medical and biological problems, for example, developing sophisticated X-ray imaging systems, artificial organs, image recognition systems, and medical devices, and provides a quantitative understanding of disease processes.

The three-year Bachelor of Engineering Science in Biomedical Engineering BEngSc (BME) undergraduate degree combines subjects in science, engineering, medicine, and biology, as well as specific Biomedical Engineering courses.

Because this is a pre-professional qualification, you will not be eligible for professional registration with this degree alone. After you graduate, there are various routes you can take to obtain a professional qualification, such as Medicine (MBBCh), BSc(Eng) in Electrical or Information Engineering, and BSc(Hons) in Physics.

You can apply for admission into the third year of BSc(Eng) in Electrical / Information Engineering. However, the entry requirements for MBBCh and BSc(Hons) in Physics are competitive and may vary.

Curriculum

First year
Introductory Molecular and Cell Biology I
Introductory Physiology and Environmental Sciences I
Chemistry I
Engineering Mathematics IA and IB
Engineering Physics IA and IB
Applied Mechanics for Engineering

Second year
Biomedical Statistics and Numerical Methods
Electronics I
Electric and Magnetic Systems
Software Development I
Signals and Systems I
Microprocessors
Electric Circuits
Molecular and Cell Biology
Mathematics II

Third year
Anatomy
Biomedical Transport Phenomena
Biomedical Measurement, Instrumentation and Imaging
Signals and Systems IIA
Biomedical Signals
Systems and Control
Physiology and Medical Biochemistry I
Specialisation in Digital Arts

Bachelor of Engineering Science in Digital Arts

EBA01
Duration
3 years

NSC Requirements

APS
42+

English Home Language OR First Additional Language
Level 5

Mathematics
Level 5

Physical Sciences
Level 5

Wait-listing
Students with English, Mathematics and Physics at Level 5 will be wait-listed, subject to place availability.

Generally, applicants who achieve 70% in English, Maths and Physical Science stand a greater chance of being accepted.

International Qualifications on page 29
Closing Date: 30 September

Programme Description

Work at the cutting edge of software development in gaming.

Digital Arts is a specialised programme combining Electrical Engineering and Digital Arts courses to prepare you for a career in game design and development. The game design programme is a collaboration between the Wits School of Arts and the School of Electrical and Information Engineering.

Once you've completed the BEngSc in Digital Arts, you may continue into the third year of the BSc(Eng) (Electrical) or (Information Engineering) option, or into the Honours course in Digital Arts.

Curriculum

First year
Engineering Analysis and Design IA and IB
Engineering Mathematics IA and IB
Engineering Physics IA and IB
Applied Physics
Key Concepts in Game Design IA and IB

Second year
Data structures and algorithms
Electronics I
Electric and magnetic systems
Software development I
Microprocessors
Electric Circuits
Mathematics II
Digital Art Design Project
Introduction to Game Creation IIA and IIB

Third year
Electrical and Magnetic Systems
Signals and Systems I
Professional Practice and Software Development
Introduction to the World Wide Web as Creative Medium III
Game Design II A

Careers

- Animation
- Game Design
- Software Engineer
- Software Development
Mechanical Engineering

Bachelor of Science in Engineering in Mechanical Engineering

EFA05
Duration
4 years

NSC Requirements

APS
42+
English Home Language OR
First Additional Language
Level 5
Mathematics
Level 5
Physical Sciences
Level 5
Wait-listing
Students with English, Mathematics and Physics at Level 5 will be wait-listed, subject to place availability.
Generally, applicants who achieve 70% in English, Maths and Physical Science stand a greater chance of being accepted.
International Qualifications on page 29
Closing Date: 30 September

Careers

• Energy Engineer
• Mechanical Design and Development Engineer
• Manufacturing Engineer
• Systems Engineer
• Production Engineer
• Technical Marketing Manager
• Transport Engineer

Programme Description

Design, develop, and manufacture aerospace vehicles and component systems.

Mechanical Engineering applies scientific principles to design, develop, construct, install, operate, and maintain engines, energy harnessing equipment, and machines in all industries.

Mechanical engineers work in the most important sectors of the economy, including manufacturing, mining, power generation, and transportation.

Curriculum

First year
Engineering Chemistry
Introduction to the Engineering Profession
Engineering Analysis and Design IA and IB
Engineering Mathematics IA and IB
Applied Mechanics for Engineering
Elective from Faculty of Humanities

Second year
Mathematics II
Electrical Engineering
Fluid Mechanics I
Mechanical Engineering Laboratory I
Engineering Thermodynamics I
Introduction to Materials Science and Engineering
Applied Mechanics A and B
Computer Skills and Software Development
Mechanical Engineering Design I

Third year
Mathematical Methods
Incompressible Flows
Mechanical Engineering Laboratory II
Mechanics of Solids I
Mechatronics I
Business Management
Fundamentals of Heat Transfer
Mechanical Engineering Design and Production
Mechanical Vibrations
Engineering in its Social Context
Numerical Methods and Statistics
Vacation Work I

Fourth year
Design Project
Research Project
Energy Conversion and Utilisation Systems
Systems Management and Integration
Compressible Flows
Mechanics of Solids II
Mechatronics II
Engineering Professional Activity
Vacation Work II
Industrial Engineering

Bachelor of Science in Engineering in Industrial Engineering

EFA07

Duration
4 years

NSC Requirements

APS
42+

English Home Language OR
First Additional Language
Level 5

Mathematics
Level 5

Physical Sciences
Level 5

Wait-listing
Students with English, Mathematics and Physics at Level 5 will be wait-listed, subject to place availability.

Generally, applicants who achieve 70% in English, Maths and Physical Science stand a greater chance of being accepted.

International Qualifications on page 29

Closing Date: 30 September

Careers

• Enterprise Resource Planning Consultant
• Inventory Engineer
• IT Consultant
• Logistics Engineer
• Management Consultant
• Production and Operations Manager
• Process Engineer

• Quality Control Engineer
• Supply Chain Consultant
• Technical Manager

Programme Description

Improve and optimise productivity and quality in manufacturing and service companies.

Industrial Engineering studies the systems, processes, technology, and people that make up organisations. Industrial engineers are often involved ‘behind the scenes’, answering questions like:

• How do vehicle manufacturers economically produce hundreds of variations of the same vehicle?
• How can South Africa streamline its public healthcare delivery to ensure quality care for all?
• How can you safely and quickly send money to your family in another country, if they don’t have a bank account?

Curriculum

First year
Engineering Chemistry
Introduction to the Engineering Profession
Engineering Analysis and Design IA and IB
Engineering Mathematics IA and IB
Engineering Physics IA and IB
Applied Mechanics for Engineering
Elective from Faculty of Humanities

Second year
Mathematics II

Electrical Engineering
Fluid Mechanics I
Mechanical Engineering Laboratory I
Engineering Thermodynamics I
Introduction to Materials Science and Engineering
Applied Mechanics A and B
Computer Skills and Software Development
Mechanical Engineering Design I

Third year
Industrial Engineering Design
Industrial Engineering Laboratory
Mechatronics I
Business Management
Operations Management: Techniques
Manufacturing Technology: Processes
Principles of Organisational Behaviour
Engineering in its Social Context
Operations Research
Mathematical Topics (Industrial)
Mathematical Methods (Industrial)
Vacation Work I

Fourth year
Design Project
Research Project
Manufacturing Technology: Systems
Business Studies
Systems Management and Integration
Decision Support and Intelligence Systems
Operations Management: Systems Integration
Engineering Professional Activity
Vacation Work II
Aeronautical Engineering

Bachelor of Science in Engineering in Aeronautical Engineering

EFA06

Duration
4 years

NSC Requirements

APS
42+

English Home Language OR First Additional Language
Level 5

Mathematics
Level 5

Physical Sciences
Level 5

Wait-listing
Students with English, Mathematics and Physics at Level 5 will be wait-listed, subject to place availability.

Generally, applicants who achieve 70% in English, Maths and Physical Science stand a greater chance of being accepted.

International Qualifications on page 29

Closing Date: 30 September

Careers

• Aircraft Design Engineer
• Aircraft Systems Design Engineer
• Airline Manager
• Automotive Aerodynamics Engineer

• Research
• Production Manager
• Propulsion Engineer
• Technical Director

Programme Description

Design, develop, and manufacture vehicles and component systems.

Aeronautical Engineering is concerned with the design, development, and modification of the components and systems of all types of flight vehicles, including fixed wing aircraft, helicopters, sailplanes, missiles, and non-flying aerodynamic devices.

Curriculum

First year
Engineering Chemistry
Introduction to the Engineering Profession
Engineering Analysis and Design IA and IB
Engineering Mathematics IA and IB
Engineering Physics IA and IB
Applied Mechanics for Engineering
Elective from Faculty of Humanities

Second year
Electrical Engineering
Fluid Mechanics I
Mechanical Engineering Laboratory I
Engineering Thermodynamics
Introduction to Materials Science and Engineering

Applied Mechanics A
Computer Skills and Software Development
Applied Mechanics B
Mechanical Engineering I

Third year
Mathematical Methods
Incompressible Flows
Aeronautical Engineering Laboratory
Aircraft Design
Introduction to Aeronautics
Mechatronics I
Business Management
Numerical Methods and Statistics
Mechanical Vibrations
Engineering in its Social Context
Vacation Work I

Fourth year
Design Project
Research Project
Systems Management and Integration
Gas Dynamics and Propulsion
Aerodynamics
Flight Dynamics
Aircraft Structures II
Mechatronics II
Engineering Professional Activity
Vacation Work II
Bachelor of Science in Engineering in Mining Engineering

Programme Description
Plan, organise, and manage safe and efficient ways to extract raw materials from the earth.

Mining engineers play a key role in the planning, exploitation, and excavation of mineral resources.

In the first two years, you will learn the skills, technology, and basic sciences common to all areas of engineering, including courses in civil, electrical, and mechanical engineering, geology and surveying. In the third and fourth years, you will study mining engineering subjects, including courses in technical valuation, ventilation, environmental engineering, mine transportation, and rock mechanics.

In the final stage of the undergraduate programme, you’ll complete a mine design exercise in which you’ll apply your knowledge to designing a mine and assessing its economic feasibility and profit potential.

The programme will provide you with the engineering expertise you’ll need as a mining engineer or mine manager.

Curriculum

First year
Engineering Chemistry
Introduction to the Engineering Profession
Engineering Analysis and Design IA and IB
Engineering Mathematics IA and IB
Engineering Physics IA and IB
Applied Mechanics for Engineering
Elective from Faculty of Humanities

Second year
Mathematics II
Applied Mathematics IIA
Engineering Services for Mining
Introduction to Underground and Surface Mining Methods
Geology IA and IB
Computer Applications in Mining
Explosives Engineering
Mechanical Excavation of Rock
Digital Technologies and Mine Data Analytics
Computer Programming for Mining Engineering Surveying
Computer Programming Bootcamp
Practical Workshop Training (Mining)

Third year
Ore Dressing and Extractive Metallurgy
Ore Body Modelling
Mine Transportation, Automation and Robotics
Mineral Resources Evaluation
Computerised Mine Design
Rock Mechanics
Mine Ventilation and Climate Control
Water, Energy and the Environment
Mine Surveying and Geospatial Techniques
Underground Mining Systems
Surface Mining Systems

Fourth year
Mine Management Principles
Financial Valuation
Mine Design
Project Report
Rock Engineering
Mining Optimisation Techniques and Systems Engineering
Health, Safety and Mining Law
Mine Technical Visits
Vacation Work I
Vacation Work II
Each of the Built Environment degrees deals with a different aspect of our physical environment. Wits Built Environment qualifications address the social, spatial, cultural, and infrastructural needs of a transforming South Africa.

The delivery of affordable housing, the development of rural and urban environments, and solving other social and physical challenges form the basis of the degrees offered.

Working in the built environment requires a keen environmental and social awareness, as well as mathematical, analytical, and organisational ability.

When designing a building, architects need to consider many factors. These include the building’s intended purpose; how to place the building in harmony with its surroundings; site restrictions; and creative expression.

Urban and regional planners help to shape better places for people to live, work, and relax. Good planning considers population changes, community life, economic development, environmental questions, and design.

The Property Studies specialist requires a combination of legal, financial, and engineering skills to implement property solutions in line with corporate or government strategy. As such, s/he must be up-to-date with the latest thinking in property investment and development.

Construction managers are experts in effective and efficient construction and property development. As such, they oversee projects that include planning the layout of sites, overseeing contractors, and ensuring that building regulations are adhered to.

Quantity surveyors are the financial specialists of the building industry. They contribute their skills and knowledge of costs and revenues to the planning of all building and engineering projects to ensure they are cost-effective.

Built Environment programmes provide an entry qualification into professional degrees, such as:
- Bachelor of Architecture Studies into BAS(Honours), which leads to the MArch (Prof) in Architecture. The Bachelor of Architectural Studies degree is internationally validated.
- Bachelor of Science in Urban and Regional Planning into BSc(URP) (Honours) in Urban and Regional Planning. The BSc(URP) Honours programme is accredited by the South African Council of Planners (SACPLAN).
- Bachelor of Science in Construction Studies into Honours in Quantity Surveying and Construction Management. The BSc(Hons) (Construction Management) and the BSc(Hons) (Quantity Surveying) are both internationally accredited.
- Bachelor of Science in Property Studies. Provisional conditional accreditation status by the South African Council for Property Valuers Profession (SACPVP).

School of Architecture and Planning
The School of Architecture and Planning provides an excellent learning environment towards accredited professional degrees in:
- Architecture
- Planning
- Postgraduate qualifications in related fields such as housing, urban design, sustainable and energy efficient cities, and wider urban studies.

Many of our graduates have become esteemed professionals and leading academics at universities across the globe.

School of Construction Economics and Management
The School of Construction Economics and Management comprises a vibrant community of approximately 700 students and 32 academic and administrative staff. We strive to attract the best students, who will contribute to the development of the national economy and the real estate and construction industry.

The School currently produces South Africa’s highest number of graduates in the field of construction economics and management.
Bachelor of Architectural Studies

FBA00
Duration
3 years

NSC Requirements

APS
34+
English Home Language OR First Additional Language Level 4
Mathematics Level 4

Wait-listing
Acceptance depends on departmental selection. Applicants must complete a written and graphic exercise, and may be required to attend an interview. Applicants with a Wits APS of 29-33 may be accepted on the basis of exceptional scores, following an interview.

The BAS selection process is conducted by a panel of senior academics from the School of Architecture and Planning, which is monitored by the Assistant Dean. Selection is based predominantly on performance in the selection exercise, interview, and academics.

Demographic balance is taken into consideration where a choice needs to be made between applicants scoring within the same range.

International Qualifications on page 29
Closing Date: 30 June

Careers

• Architect
• Architectural Technologist
• Draughtsperson
• Landscape Designer
• Interior Designer
• Lecturer
• Researcher
• Urban Planner/studies

Programme Description

*Enhance human lives and experiences through space and structure design.*

Architects design buildings and spaces that enhance human lives and experiences, and leave culturally and socially rich environments for future generations.

The Bachelor of Architecture Studies (BAS) curriculum extends over three years. Once you have completed the BAS programme, you will be required to work in an architectural practice for one year. You can then apply for the one-year, full-time BAS(Hons) qualification, and then the one-year, full-time MArch (Professional) qualification. If you meet the minimum BAS qualification requirements, you will be granted automatic admission to the BAS(Hons) programme, while remaining places are subject to additional selection criteria.

With a BAS qualification, you can register with the South African Council for the Architectural Professions as an architectural technologist. With a Master of Architecture (Professional) qualification, you can register as a candidate professional architect. After two years working as a registered candidate professional architect, you may qualify to register as an architect.

Wits architecture degrees are accredited by the South African Council of Architects and validated by the Commonwealth Association of Architects.

Curriculum

First year
Architectural Design and Theory I
Theory and Practice of Construction I
Histories and Theories of Architecture I
Architectural Representation I
Introduction to Structures
Applied Mathematics

Second year
Architectural Design and Theory II
Theory and Practice of Construction II
Architectural Representation II
Histories and Theories of Architecture
Civil Engineering Theory I

Third year
Architectural Design and Theory III
Theory and Practice of Construction III
Histories and Theories of Architecture III
Civil Engineering Theory II
Small Office Practice
Urban and Regional Planning

Bachelor of Science in Urban and Regional Planning

FBA05

Duration 3 years

NSC Requirements

APS 36+
English Home Language OR First Additional Language Level 5
Mathematics Level 5

Wait-listing
Students with English and Mathematics at Level 5 will be wait-listed, subject to place availability.

International Qualifications

on page 29

Closing Date: 30 September

Careers

• Built Environment Analyst
• Consulting
• Damage Assessor
• Development and Corporate Real Estate
• Local, Provincial or National Government Planner
• Policy Analyst
• Property Management

Programme Description

Sustain the environment and develop economic and social wellbeing.

The Bachelor of Science Urban and Regional Planning BSc(URP) programme, offered by the School of Architecture and Planning, is concerned with sustaining the environment and developing economic and social wellbeing. In a context of increased technological change, rapid urbanisation, social transformation, and a changing natural environment, planning is about efficient and effective space management and creating places with meaning and quality.

The programme covers a range of fields, including geography, economics, sociology, and mathematics.

Core planning subjects range from the design of urban spaces and principles of place-making in a culturally diverse context, to policies for the planning and management of entire spatial regions. The classes involve mostly small group teaching, and expose you to real-life issues during practical field trips.

Planners often work in local, provincial, or national government, as well as in large companies with property portfolios, like insurance firms, and in communities, NGOs, and independent consultancies.

If you achieve the minimum requirements at the end of the three-year BSc(URP) programme, you may register for the professional BSc(URP) Honours programme, which enables you to register with the South African Council of Planners (SACPLAN) after you have gained necessary practical experience.

Curriculum

First year

Mathematical Technique for Planners
Settlements through History
Introduction to Environmental Interpretation
Introduction to Settlement Form and Design

Geography for Planners
Identity and Society I

Second year

Two and three Dimensional Computer Aided Design
GIS Planning
Housing Services
Infrastructure and Transport
Introduction to Land Management
Contemporary Design and Environmental Issues in South Africa Histories, Theories and Futures of Planning
Introduction to Environmental Planning
Introduction to Civil Engineering
Infrastructure
Economic Concepts IA and IB

Third year

Quantitative Methods for Planners
Comparative African Cities
Integrated Development Planning
Regional Planning and Local Economic Development
Development Policy and Processes in South Africa
Applications in Graphic and Spatial Communication in Planning
Urban Economics

AND, one of the following specialisations in Urban Environmental Design or Housing:

• Comparative Approaches to Urban Design
• Spatial and Design Principles
• Housing Theory, Law and Policy

AND, one of the following specialisations in Urban Politics and Governance:

• Politics, Governance and the City
• Liberty, Justice and the Politics of Difference
Construction Studies

Bachelor of Science in Construction Studies

FBA04

Duration
3 years

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NSC Requirements

APS
36+

English Home Language OR First Additional Language
Level 5

Mathematics
Level 5

Wait-listing
Students with English and Mathematics at Level 5 will be
wait-listed, subject to place availability.

International Qualifications on page 29

Closing Date: 30 September

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Careers

• Careers within Local Authorities and Government
• Commercial Trading as a Materials or Equipment Supplier
• Construction Management
• Project Management
• Quantity Surveying Practice
• Subcontractor in the Construction Industry

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Programme Description

Plan, organise, and control construction projects.

The School of Construction Economics and Management
offers professionally recognised qualifications in construc-
tion management, property studies, and quantity surveying.
The three-year Bachelor of Science (BSc) in Construction
Studies forms the foundation of these professional fields
and gives you insights into how they interact. This will help
you decide which professional field to pursue at Honours
level.

Construction managers plan, organise, and control all
aspects of large and complex construction projects. They
have highly developed managerial skills and advanced
technical knowledge of construction processes. They work
in construction companies, insurance organisations,
manufacturing organisations, and government depart-
ments, as property developers and project management
consultants.

The BSc Construction Studies is accredited by the South
African Institute of Building; the Chartered Institute of
Building, UK (CIOB); the Royal Institution of Chartered
Surveyors, UK (RICS); the South African Council of Quantity
Surveysing Profession; and the South African Council for
Project and Construction Management Professions.

Curriculum

First year

Introductory Statistics for Construction
Construction Drawings
Construction Materials and Environment
Construction Technology I
Communication Skills
Quantities and Specifications I
Commercial Law I
Mathematics
Physics
Practical Experience I

Second year

Building Science I
Construction Technology II
Quantities and Specifications II
Site Management
Accounting Principles in Construction
Civil Engineering Theory I
Economics IA - Microeconomics
Economics IB - Macroeconomics
Engineering Surveying
Practical Experience II

Third year

Professional and Research Skills
Quantities and Specifications III
Construction Technology III
Estimating and Analysis of Prices
Management Principles in Construction
Building Science II
Introduction to Construction Management
Property Studies
Civil Engineering II
Business Enterprise Law
Practical Experience III
Property Studies

Bachelor of Science in Property Studies

FF004

Duration

4 years

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NSC Requirements

APS

36+

English Home Language OR First Additional Language

Level 5

Mathematics

Level 5

Wait-listing

Students with English and Mathematics at Level 5 will be wait-listed, subject to place availability.

International Qualifications on page 29

Closing Date: 30 September

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Careers

• Banking, Investment and Finance
• Built Environment Analyst
• Consulting
• Damage Assessor
• Development and Corporate Real Estate
• Policy Analyst
• Property Management
• Property Valuation

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Programme Description

Provide spaces that sufficiently meet organisational requirements.

Property is a high-demand finite resource that supports economic activity and influences the cost of goods and services. It forms the major asset value in corporate balance sheets, with most corporate debt secured against it. The challenge for the property practitioner is to provide spaces that efficiently meet organisational requirements. This requires a combination of legal, financial, and engineering skills.

The four-year Bachelor of Science (BSc) in Property Studies programme provides comprehensive training in most aspects of the property business, including finance, investment, development, and valuation. You can also specialise in corporate real estate and facilities management.

You will get a strong understanding of the fundamentals, including introduction to property, business and property, applications of mathematics, statistics, law, and planning. You will also receive training in finance, market analysis, investment finance, and property valuation, as well as professional skills training, including oral and written communication, the ability to work in teams, financial statement analysis, valuation, and financial modelling. In the fourth year, you will get additional training in entrepreneurship and leadership.

This gives you the practical experience you need to start working in finance, property asset management, letting and leasing, banking, property development, and valuations, in the public and private sectors.

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Curriculum

First year

Planning for Property Developers
Communication Skills

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Real Estate Principles
Economics IA - Microeconomics
Economics IB - Macroeconomics
Commercial Law
Mathematics for Property Studies
Business Statistics

Second year

Construction Technology
Accounting Principles for Construction
Econometrics for Property Studies
Real Estate Market Analysis
Real Estate Law
Urban Economics
Real Estate Corporate Finance
Building Technology I

Third year

Building Science I
Construction Technology II
Real Estate Valuation
Professional and Research Skills
Real Estate Finance
Real Estate Management
Environmental Impact Assessment
Building Services
Building Technology II

Fourth year

Entrepreneurship and Innovation
Advanced Real Estate Evaluation
Management and Leadership in the Property Sector
Commercial Real Estate Investments
Corporate Real Estate
Real Estate Development
Facilities Management
Advanced Real Estate
Market Analysis
Research Report

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