

# Mechanical and Mechatronic Engineering FAQ

Q: What is mechanical engineering?

A: Mechanical engineering is characterised by movement and energy transfer, such as vehicles, aeroplanes, vessels, missiles, cooling systems, power stations and engines. It includes machines used in all branches of the economy, such as process plants and manufacturing industries.

Q: What is mechatronic engineering?

A: Mechatronic engineering is a combination of precision mechanical engineering, electronics and computer systems. A typical mechatronic system closely integrates mechanical components, electronic sensors, mechanical and electrical actuators and computer controllers, such as electronic engine control systems, robot systems and automated assembly lines.

Q: What do mechanical engineers do?

A: Mechanical engineers deal with the development and use of components, machines, systems, processes – anything that needs to be manufactured and anything that moves!

Q: What do mechatronic engineers do?

A: Practical skills in electronic design and control systems, combined with a strong understanding of mechanical design, allow a mechatronic engineer to design mechanical and electrical components that function together.

Q: What knowledge and skills will I gain when studying Mechanical Engineering?

A: Mechanical engineers' most essential knowledge is built on a foundation of mathematics, physics and chemistry. Knowledge areas include heat transfer, fluid mechanics, structural mechanics, dynamics and mechanical design. Students can choose one of three elective modules in their final year, namely finite element structural analysis, computational fluid dynamics or maintenance management. Students are also exposed to some of the core elements of mechatronic engineering.

Q: What knowledge and skills will I gain from studying Mechatronic Engineering?

A: Mechatronic Engineering consists of modules from the BEng (Mechanical) and BEng (Electrical and Electronic) programmes, built on a foundation of mathematics, physics and chemistry. The programme's emphasis is on mechatronics, control systems, machine design, electronics and computer systems.

Q: What non-technical skills can I expect to learn?

A: Mechanical and Mechatronic Engineering students work on many projects designed to build the ever more essential communication and planning skills required of a modern engineer. Our graduates can work under pressure, solve complex problems, communicate and present information clearly, and work well in small teams.

Q: What are the opportunities for graduates in Mechanical Engineering?

A: The multifaceted training of mechanical engineers leads to various professional careers that usually include the development, manufacturing and/or operation of products and systems. Mechanical engineers work in the whole range of companies, from large multinationals to smaller consulting partnerships.

Q: What are the opportunities for graduates in Mechatronic Engineering?

A: Some mechatronic engineers work for large multinational corporations, but the diverse education of mechatronic engineers is highly sought after in smaller engineering concerns and serves as an excellent base for entrepreneurs. Mechatronic engineers are usually closely involved in the development or operation of systems that contain mechanical, electronic and/or electrical subsystems.

Q: What is the future of mechanical and mechatronic engineering in South Africa?

A: Mechanical and mechatronic engineers are the people who solve real-world problems. We take abstract science and use it to create tangible solutions. We participate in all sectors of the economy, from mining and agriculture, product development and manufacturing to sales and services. With the recent addition of Data Science to our programmes, Mechanical and Mechatronic Engineering is well aligned to engineers' future needs in the global market, such as working in the ever-changing world of Industry 4.0.

Q: What are the top companies for Mechanical Engineering graduates in South Africa?

A: The list of top companies for Mechanical Engineering graduates in South Africa includes the following renowned names: VW, Ford, Toyota, Nissan, Zutari, BHP, Transnet, Sasol, Megchem, John Thompson, TF Design, Pressure Die Castings, SEW Eurodrive, Kelvion, ABSA, Amazon, Microsoft and FNB. All these companies are looking for innovative problem-solvers who are willing to shoulder responsibility.

Q: I want to study biomedical engineering. Should I enrol for Mechanical or Mechatronic Engineering?

A: Biomedical engineering problems benefit from a wide range of skills. Many topics in biomedical engineering can be tackled by both mechanical and mechatronic engineers. If you come from mechanical engineering, you may focus on aspects such as biomechanics (e.g. knee implants) and high-performance sports-related applications, while mechatronic engineering will prepare you for aspects such as diagnostic devices or mechatronic aids.

Q: I am not sure whether Mechanical or Mechatronic Engineering will fit me best. Can I change between Mechanical and Mechatronic Engineering?

A: Mechanical and Mechatronic Engineering cover the same courses for the first two years. So, you can change between Mechanical and Mechatronic Engineering at any point up to the end of your second year.

Q: What is the difference between Mechanical and Mechatronic Engineering?

A: At Stellenbosch University, many of the courses overlap, but the differences determine the focus of the two programmes. In the third-year, Mechanical Engineering students will continue with the classical fields of structural mechanics, fluid dynamics and thermodynamics, culminating in a choice of specialisation in structural mechanics or fluid

dynamics in the final year. Mechatronic Engineering students do not specialise in the last two years, but take additional foundational courses in Electronic Engineering, including Computer Systems and Electronic Design.

#### **(A) MINIMUM ADMISSION REQUIREMENTS FOR ALL FOUR YEAR ENGINEERING PROGRAMMES**

- a) A National Senior Certificate with admission to bachelor's studies, or an exemption certificate issued by the Matriculation Board, and
- b) A minimum average of at least 70% using the six best matric subjects (excluding Life Orientation and Mathematical Literacy), and
- c) A minimum average of at least 70% for Mathematics, and
- d) A minimum average of at least 60% for Physical Sciences, and
- e) Language minima:
  - English Home Language: At least 50%, with no Afrikaans requirement; or
  - English First Additional Language: At least 60%, with no Afrikaans requirement; or
  - English First Additional Language: At least 50%, together with Afrikaans Home Language of at least 50%; or
  - English First Additional Language: At least 50%, together with Afrikaans 2nd Additional Language of at least 60%

#### **(B) SELECTION PROCESS FOR ALL FOUR YEAR ENGINEERING PROGRAMMES**

The selection score is the most important measure used by the Faculty for selecting students for BEng programmes. This score is calculated as follows:

Selection score = Mathematics mark + Physical Sciences mark + 6 x Matric average

- i. The percentages you obtained in Mathematics and Physical Sciences, plus the average percentage of your six best matric subjects (excluding Life Orientation and Mathematical Literacy), are used for calculating the selection score.
- ii. This means that the selection score takes a broad group of matric subjects into account, and that, in effect, Mathematics and Physical Sciences usually each contribute twice.
- iii. The maximum score obtainable is therefore 800 if you achieve 100% for all your matric subjects ( $100 + 100 + (6 \times 100) = 800$ )
- iv. The Faculty sets an admission threshold and a minimum selection score for each BEng programme. The admission threshold is a selection score based on:
  - 1. the number of applicants who meet the admission requirements, and
  - 2. the number of places available in the particular degree programme.
- v. The minimum selection score is the lowest score that indicates that a student will be reasonably likely to complete the particular programme. This score is based on the Faculty's experience with previous students.
- vi. You will be selected if you:
  - 1. meet the admission requirements and
  - 2. your selection score is equal to, or larger than, the admission threshold score for the particular degree programme that you want to follow.

vii. Please note that:

- Being selected for one BEng programme does not mean that you have been selected for another BEng programme.
- You may apply for more than one BEng programme and you will be considered for each programme independently. If you are selected for more than one BEng programme, you will receive more than one offer to choose from.
- If your selection score is below the admission threshold, but above the minimum admission requirements for your preferred BEng programme(s), the following happens:
  - you are placed on a waiting list, which means that you may still be admitted to a particular programme if places become available later; or
  - you can apply to be admitted to another BEng programme if you meet the selection requirements for that particular programme. You must contact the Faculty Officer or the Faculty Administrator if you consider changing the programmes you applied for.