Stellenbosch UNIVERSITY IYUNIVESITHI UNIVERSITEIT

Engineering
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Ingenieurswese

Frequently Asked Questions:
Department of Industrial Engineering

What does industrial engineering entail?

Industrial Engineering is a discipline of engineering dealing with the optimisation of complex processes or systems. It is concerned with the development, improvement, implementation, and evaluation of integrated systems of people, money, knowledge, information, equipment, energy, materials, analysis and synthesis, as well as the mathematical, physical and social sciences, which — together with the principles and methods of engineering design — can be used to specify, predict, and evaluate the results to be obtained from such systems or processes. Its underlying concepts overlap considerably with certain business-oriented disciplines such as operations management and financial management, but the engineering side tends to emphasise extensive mathematical proficiency and usage of quantitative methods.

Industrial engineering's main branches are manufacturing technology and operational systems design. Industrial engineering involves facets of industry that are important in the modern industrial and service environments, such as quality assurance, robotics, engineering economics, operations research, data science, industrial ergonomics, and information technology.

What are common practical examples of tasks performed by industrial engineers?

- Reconfigure airport check-in services to shorten queues and improve passenger satisfaction.
- Streamline an operating room so that it is safer, faster, and easier to use.
- Analyse retail customer order history to predict future behavior and develop targeted marketing strategies.
- Investigate how mineral-rich countries can leverage their mineral endowments optimally for sustainable development.
- Routing and scheduling decisions for fleets of delivery vehicles.
- Employee duty roster or timetabling decisions for the manufacturing and health sectors.
- Manufacture customized products like a maxillofacial implant that is surgically inserted into patients who have lost significant portions of their facial bone structure due to disease.
- Shelf-space allocation and inventory decisions for retailers.
- Crop irrigation and agricultural pest-control.
- Facility location decisions for effective supply chain logistics

What are the main research areas within our department?

- Engineering management: Includes fields such as project-, risk-, innovation-, quality- and performance management, and feasibility studies in the wider sense.
- Manufacturing: Focusses on development of resource efficient process chains to ensure sustainable manufacturing as value creation system of products, but also for wider application in the services sector.
- Operations & supply chain management: Focusses on process excellence from both intra- organizational and inter-organizational points of view.
- Systems modelling, operations research and decision support: Focusses on the development of mathematical models and their incorporation into computerized systems aimed at supporting scientifically justifiable and effective decisions in industry.
- Data science: The scientific investigation that employs innovative approaches and algorithms, most notably machine learning algorithms, for processing and analyzing data. Data science technologies can be applied to both small and big data, of various types such as relational, images, video, audio, and text.
- Logistics and Supply Chain Systems: The logistics and supply chain systems programme focuses on enabling students to develop forward-thinking strategies to enhance the global competitiveness of supply chains, making significant contributions to logistical frameworks and ensuring these systems are resilient and future ready.

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In what industries/sectors do industrial engineers work?

Manufacturing, consulting, retail, logistics, information technology, financial technology, and services.

Which companies employ industrial engineers in South Africa?

- Manufacturing: Volkswagen, South African Breweries, Sasol, Tiger Brands, Tetra Pak
- Consulting: PWC, Deloitte, Accenture, Pragma, LTS, McKinsey & Company
- Retail: Takealot, Checkers, Shoprite, Woolworths, Pep
- Logistics: Value Logistics, Imperial Logistics, Barloworld Logistics, Transnet
- FinTech & services: Capitec, Mediclinic, FNB, Standard Bank, Discovery, Allan Gray

What knowledge and skills can you gain from studying industrial engineering at Stellenbosch University?

The industrial engineering programme is an interdisciplinary programme in which training in several applied sciences, for instance mechanical, mechatronic, electrical, and electronic engineering, together with economic management, natural sciences, information technology and operational research, are combined as a unit for the design and operation of various operational systems. This programme also particularly trains you to use computers in decision-making for enterprise management.

How is the industrial engineering undergraduate course structured?

In the first year, all engineering students follow the same courses to acquire suitable mathematical and scientific skills. From the second year onward, the pure mathematical content starts to make way for engineering course modules where mathematics is applied to engineering problems and also sometimes developed further, as required. Thus, in the second year, the different engineering degree courses start to diverge.

In the first two years of study the student takes modules mainly in engineering mathematics, applied mathematics, chemistry, electro-techniques, and engineering drawings. Specialised industrial engineering fields include modules from production management, quality assurance and management, operations research, information systems, data science, engineering economy and manufacturing. Students also follow modules in complementary fields like project management, philosophy and ethics and environmental engineering. All students follow a common first year programme and it is possible to change the main study programme if specified conditions are met.

What are the admission requirements and selection criteria for BEng programmes for 2026?

Please click here for detailed information on the minimum admission requirements for all four-year engineering programs.

Where can I find more information?

Visit the following links:

- www.ie.sun.ac.za
- Facebook
- LinkedIn

For further information please contact our administration office at ksmith@sun.ac.za.