Engineering
(Common Entry Programme)

B.A., M.A.I Masters Degree in Engineering (NFQ Level 9)

Optional (exit after fourth year):
B.A., B.A.I. Honours Bachelors Degree in Engineering (NFQ Level 8)

Course Code | CAO Points 2022 | Places 2022 | Duration
--- | --- | --- | ---
TR032 | 554 | 185 | 4 years (5 years with a master's)

What is Engineering?
Engineering is about being creative in technical problem solving. Engineers make things possible by using mathematical and scientific principles together with analytical and design skills. They tackle existing problems by developing new solutions through innovative technologies.

They also expand the frontiers of society by developing advanced materials, sustainable energy systems, construction technologies, transport systems, biomedical devices and telecommunications infrastructure.

Engineering: The course for you?
We have been teaching Engineering at Trinity since 1841. There have been immense developments since that time, but the continuity of excellence in teaching and learning is a source of pride for us and our graduates. A distinctive feature of Engineering at Trinity is the two-year common programme, in which all students learn the fundamentals of engineering science and also engage in substantial elements of project work prior to choosing a specific engineering discipline. Trinity is the top-ranked university in Ireland, and our engineering graduates use this to their advantage all over the world as well as in Ireland.

Engineering is a constantly evolving profession. As an engineer, you will need to be adaptable both to the rapid development of new ideas and technology and to the shifting requirements of industry and society. You will need to be a good communicator and be capable of working as part of a team. Above all, you must be a problem solver. You must be creative and able to synthesise and analyse information from different sources to arrive at efficient and practical solutions.

Engineering at Trinity
Trinity is ranked in the top 142 universities worldwide for Engineering (QS World University Rankings by Subject 2021) and offers outstanding teaching by engineers who are at the forefront of their field worldwide. It has a strong philosophy of research-led teaching and continuously benchmarks itself against the top international engineering schools.

The engineering course offers the opportunity to carry out research as part of your course with the aim of producing graduates capable of participating to research projects at the highest national and international levels. There are opportunities for work placements in Ireland and abroad as well as study abroad opportunities as part of the degree programme. The engineering programme is fully accredited by Engineers Ireland up to master's level (M.A.I.) and offers excellent career prospects in Ireland and abroad.

Graduate skills and career opportunities
Engineering graduates from Trinity have the capacity to think independently but also to work in teams. They can use technical understanding to problem solve in a wide range of technical areas. They are able to communicate their technical and creative ideas to other professionals and to society at large. They are able to take responsibility, deal with complexity and ambiguity and successfully face open-ended challenges.

Your degree and what you’ll study
The B.A.I./M.A.I. (engineering) degree programme is based on two years of general engineering, providing students with a firm grounding in the principles common to all disciplines, followed by two/three years of specialisation. Graduates are professionally accredited engineers with both a broad-based understanding of the whole discipline and a detailed knowledge of their chosen specialist area. The aim is that graduates will be able to continuously train themselves, to adapt and move into related or newly emerging areas as their careers develop after graduation.

GET IN TOUCH!
www.tcd.ie/engineering
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**Special Entry Requirements**

<table>
<thead>
<tr>
<th>Certificate Type</th>
<th>Requirement</th>
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<tbody>
<tr>
<td>Leaving Certificate</td>
<td>H4 Mathematics</td>
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<tr>
<td>Advanced GCE (A Level)</td>
<td>Grade C Mathematics</td>
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<tr>
<td>International Baccalaureate</td>
<td>HL Grade 5 Mathematics</td>
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**Engineering Course Structure**

**Year 1 and Year 2**
Common to all Engineering streams

**Year 3**
Select one of:
- Biomedical Engineering
- Civil, Structural and Environmental Engineering
- Computer Engineering
- Electronic Engineering
- Electronic and Computer Engineering
- Mechanical and Manufacturing Engineering

**Year 4 – B.A.I. Programme**
- Capstone Project
- Year at Trinity
  - or
  - Semester 1 – Trinity
  - Semester 2 – Internship
  - or
  - International Exchange

Graduate with B.A., B.A.I. degrees

**Year 5 – M.A.I. Programme**
- Capstone Project

Graduate with B.A., M.A.I. degrees
Biomedical Engineering

Students who wish to study biomedical engineering apply to the engineering degree (TR032).

The first two years are common to all engineering students and at the end of the second year students select biomedical engineering as their specialist area.

See page 138 for details of the first two years.

What is Biomedical Engineering?

Biomedical engineering is at the intersection of engineering, the life sciences and healthcare. Biomedical engineers take principles from applied science (including mechanical, electrical, chemical and computer engineering) and physical sciences (including physics, chemistry and mathematics) and apply them to biology and medicine. Although the human body is a more complex system than even the most sophisticated machine, many of the same concepts that go into building and programming a machine can be applied to biological structures and systems leading to new diagnostic and therapeutic tools. The goal is to better understand, replace or fix a target system to ultimately improve the quality of healthcare.

Biomedical engineers become involved in research and development, spanning a broad array of subfields: biofabrication, bioprinting, biomechanics, biomaterials, tissue engineering, neural engineering, medical devices, clinical engineering, medical imaging. Prominent biomedical engineering applications include the development of biocompatible prostheses, various diagnostic and therapeutic medical devices ranging from clinical equipment and laboratories.

Your degree and what you’ll study

Course topics include areas of mechanical, manufacturing, and electronic engineering, specialised topics in biomedical engineering and courses in basic medical and biological sciences. Example biomedical courses include:

- Biomechanics, Biomaterials, Anatomy and Physiology
- Medical Device Design, Tissue Engineering, Neural Engineering, Medical Imaging

In the third year you will study technical courses in both mechanical/manufacturing engineering and electronic engineering, along with courses in anatomy and physiology. In the fourth year and (optional) master’s (fifth) year you will study a range of technical subjects, including the specialised subject of biomedical engineering (see above).

Project work is an important aspect of this degree and there is an extensive research facility available to students. You will carry out several projects, including a major Capstone research project in your final year. Examples of final-year projects include:

- Design of a branch stent for abdominal aortic aneurysm
- Finite element modelling of 3D printed scaffolds for bone tissue engineering
- Next Generation Hearing Prostheses: Improved decoding of attentional selection in a cocktail party environment
- Determination of the effect of freezing on the mechanical properties of decellularised arteries
- Head kinematics in contact sports

Graduate skills and career opportunities

Biomedical engineering is the fastest-growing career and this trend is expected to continue over the next decade. Ireland’s medical technology sector has evolved into a global leader for medical device and diagnostic products, with exports annually exceeding €12bn. Ireland has over 450 companies involved in developing, manufacturing and marketing medical devices. These include Abbott, Bayer, Becton Dickinson, Boston Scientific, Johnson & Johnson, Guidant, Medtronic and Stryker. These companies have a strong demand for high quality graduates at the master’s and Ph.D. level because of the high technical level of their products.

Biomedical engineers also find employment in clinics and hospitals where they work as clinical engineers, responsible for complex, expensive diagnostic equipment and laboratories.

DO YOU ENJOY...

Finding out how living things work?
Analysing problems and formulating solutions?
Working with mathematics and numbers?

GET IN TOUCH!

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