

Planning a Career in High-Technology Engineering or Science?

Our society's growing reliance on sophisticated technology requires highly trained engineers and scientists. A University degree in science or engineering provides the starting-point for a wide range of careers in new and emerging technologies. Many students preparing to enter university find that the qualifications they have achieved do not provide them with the preparation they need to embark on the university courses leading to these careers.

The Foundation Year Programme at the University of Sheffield is designed for students who wish to study engineering or pure science at a high level but who do not have all the required A Level subjects or other suitable qualifications. You may have been away from education for some years, you may have alternative qualifications to A Levels or your A Level subjects may not fully qualify you for entry to engineering or pure science degree programmes at a top university.

The Foundation Year Programme provides a one-year intensive course which will give you the necessary background to enable you to follow the undergraduate degree programmes in the Faculties of Engineering and Pure Science at the University of Sheffield.

About the Course

When you enter the foundation year, you will be asked to declare which degree programme you plan to follow. However, since students entering all degree programmes in both engineering and pure science follow a common foundation year course of study, it is possible to change your degree programme. Many students will have a definite idea about which degree programme they will follow. Others will want to explore the choices further during the year, before making up their minds. During the foundation year, you can take part in organised information sessions which give you the chance to learn more about the different degree courses and associated careers.

The course is taught in a university setting which encourages development of academic study skills. Students attend lectures in each subject and perform experimental work in laboratory classes associated with the fundamental science subjects. They develop their understanding and knowledge in each subject by studying the lecture and laboratory material and working through a range of tutorial assignments. Weekly tutorial sessions give students the opportunity for individual consultation with the lecturer. As a full time student you will have full access to the extensive University IT and library facilities. The objective of the year is for each student to develop a high level of knowledge in mathematics and fundamental science at the equivalent of A Level.

Programme of Study

Students take physics, chemistry and mathematics, each of which is followed throughout the year. This combination of the basic sciences and mathematics provides the foundation for university studies in either science or engineering. Each of the three subjects carries an equal weighting of 40 credits, giving a total of 120 credits for the Foundation Year. You must pass all three subjects to progress onto the degree programmes. The subjects are assessed by a combination of examinations in the middle and at the end of the year, laboratory work and submitted tutorial assignments.

Physics

Students are introduced to the principal disciplines and concepts in physics:

- Kinematics and dynamics and the relation between forces and the resulting motion of matter.
- Thermal physics and the study of heat and temperature, equilibrium, heat transfer and phase change.
- Properties of matter: atoms, molecules, crystal structure, metals and semiconductors.
- Light and sound, refraction, interference and diffraction, optics and optical instruments, e.g. microscopes and telescopes.
- Atomic and nuclear physics: atomic structure, nuclear forces, wave-particle duality, photons, radioactivity, nuclear fission and fusion.
- Electricity and magnetism: charge and electric force, electric and magnetic fields, electric circuits.

Chemistry

The course covers fundamental topics from inorganic, organic and physical chemistry:

- The periodic table and chemistry of the elements, acids, atomic size, metallic behaviour, transition metals and electronic structure.
- Bonding and the structure of the atom, elementary quantum theory, quantum numbers and orbitals, ionic and covalent bonding.
- Bonding in carbon compounds, alkanes and cyclohexanes, alkenes, carbonyl compounds, carboxylic acids, amino acids and peptides and aromatic chemistry.
- States and transformation of matter: gases, liquids and solids; thermodynamics; chemical equilibria and kinetics.
- Spectroscopy, absorbance, transmittance, polarised light, energy levels, rotation and vibration.

Mathematics

Students develop proficiency with the mathematical skills and concepts needed for later studies of mathematics, science and engineering:

- Algebra and algebraic manipulation: equations, exponents, factorisation and simplification.
- Functions and graphs, domain and range, simple transformations.
- Co-ordinate geometry, parallel and perpendicular lines, circles, parametric equations, Cartesian and polar co-ordinates.
- Calculus: differentiation of functions; product, quotient and chain rules; definite and indefinite integration of a function, integration by substitution and by parts.
- Trigonometry: radian measure, sine, cosine, tangent and related functions; trigonometric relations and equations.
- Sequences and series: arithmetic and geometric series; binomial expansion.
- Exponential and logarithmic functions.
- Vectors: addition, subtraction, scalar and vector product; vector equations.
- Complex numbers.
- Differential equations and numerical methods.

Degree Programmes

The Foundation Year is part of the degree programmes in the Faculties of Pure Science and Engineering at the University. Further information on the courses available can found on the University Web pages at the address listed on the back of this brochure.

Admission Requirements

Application to the Foundation Year degree programmes is made through UCAS. Offers for entry to the foundation year will be flexible according to individual circumstances, but you will normally be expected to achieve a standard in A level or other examinations approaching that required for students directly entering the first year of the degree course. In addition, GCSE Level or equivalent qualifications in mathematics and science, generally to grade B, are required. Please contact our Admissions Office for further details.



The
University
Of
Sheffield.

Contact Information

Foundation Year in the Faculties of
Engineering and Pure Science

Student Recruitment & Admissions
University of Sheffield
8 Palmerston Road
Sheffield S10 2TE
United Kingdom
Tel: 0114 222 8027
Fax: 0114 222 8032
Web: www.shef.ac.uk/foundation/

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Leading to degree courses in the
Faculties of Engineering
and Pure Science