University of Birmingham

Mechanical Engineering BEng

Undergraduate degree course/programme Mechanical Engineering BEng H300:

Mechanical Engineering is a professional discipline as important as medicine - for which it supplies many solutions in terms of life saving equipment, life enhancing artificial limbs, pacemakers, micro-scale pumps, incubators, etc. Mechanical Engineers design, analyse and manufacture machines that move using gears: giant earth moving machines, huge turbines in power stations, all types of road and rail vehicles and space rockets and satellites. We design tiny micro gears that power medical equipment, handheld computers and mobile 'phones. We also make industrial robots; the machines that make other products.

Mechanical Engineering at Birmingham produces graduates who are creative, highly numerate and skilled at solving problems and delivering results. We are a friendly community of self-assured professionals, determined to guide you to wherever your engineering talents will thrive. All our programmes are accredited and reflect the strength and longevity of our industrial partnerships.

Study here and find out why the University of Birmingham was awarded The Times and The Sunday Times University of the Year 2013-14 (http://www.birmingham.ac.uk/news/latest/2013/09/20-sep-Birmingham-announced-as-University-of-the-Year.aspx)

Course fact file

UCAS code: H300

Duration: 3 years

Places Available: 80 all Mechanical Engineering programmes

Applications in 2014: 699

Typical Offer: AAB (**More detailed entry requirements and the international qualifications accepted can be found in the course details (?OpenSection=EntryRequirements)**)

Start date: September

Related courses

Undergraduate degree courses - School of Mechanical Engineering (/schools/mechanical-engineering/undergraduate/index.aspx)

Contact

Admissions Tutor: Dr Carl J Anthony
Tel: +44 (0)121 414 4230
Email: **mfg-mech-admissions@bham.ac.uk (mailto:mfg-mech-admissions@bham.ac.uk)**

School of Mechanical Engineering (/schools/mechanical-engineering/index.aspx)

Details

This three-year, accredited, course has a student satisfaction rating of 94%.

It has been designed to be relevant to the needs of modern industry and to produce graduates who have the personal and intellectual qualities to be successful in their chosen careers. By the end of the course, you will be equipped to play leading roles in a professional capacity in both industry and academia, and thus able to deal with issues at the forefront of our discipline.

The programme is organised into integrated modules covering core mechanical engineering subjects that are designed to develop your learning progressively. You will consider the movement of mechanisms, the strength of the individual parts, the efficiency and environmental impact of your designs, and the methods that can be employed to make your product profitably.

The opportunity is also open to you to get involved in work on UBRacing – our own Formula Student racing team, which competes throughout the world.

First and second years

All Mechanical Engineering programmes share the first two years, which are designed to help students orientate themselves towards professional engineering. A wide range of lectures, laboratories and projects consolidate relevant areas of A level Mathematics and Physics in relation to mechanical design, mechanical power, manufacturing and analytical methods. It also aims to develop laboratory and practical skills and to encourage the formation of a professional outlook. The breadth of this background permits students to change Mechanical Engineering specialism at the end of the second year, should they wish to do so.

Final year

In the final year these fundamentals of engineering are used to explore advanced engineering topic areas, with a more problem solving based focus, within the context of a broadly based programme of study. For all programmes, in your final year you work with engineers based in one of the Mechanical Engineering research centres on a major individual project linked to your chosen field of specialisation. You will also undertake a group design study project exploring the associated commercial, legal and safety aspects of developing a new product.

For all programmes

In your final year you work with engineers based in one of the Mechanical Engineering research centres on a major individual project linked to your chosen field of specialisation.

For the first two years of the degree, all of our undergraduates follow an integrated BEng or MEng route. Once you've finished your second year, you'll then choose

whether to complete a BEng or MEng degree. Progression onto an MEng degree is dependent upon excellent end of year examination results.

The option exists, at the end of your second year, to take a year off to work in industry before returning to complete your final year. If you decide to follow the MEng route, the work in industry option can be taken in your third year. For a list of modules and their credit values, see 'Modules' below.

Related links

- **Undergraduate degree courses - School of Mechanical Engineering (/schools/mechanical-engineering/undergraduate/index.aspx)**
- **Scholarships, awards and prizes - School of Mechanical Engineering (/schools/mechanical-engineering/undergraduate/scholarships/index.aspx)**
- **University of Birmingham Formula Student team website (http://www.ubracing.co.uk)**

Why study this course

At Birmingham, we provide diverse, yet balanced, courses, enabling our graduates to gain employment in a wide range of industries. Teaching is provided by lecturers who are global experts in their field, with multi-million pound investment providing leading-edge teaching facilities and laboratories. We produce graduates who can function in today's fast-changing marketplace, and your career prospects will be excellent.

Your Birmingham degree is evidence of your ability to succeed in a demanding academic environment. Employers target Birmingham students for their drive, diversity, communication and problem-solving skills, their team-working abilities and cultural awareness, and our graduate employment statistics have continued to climb at a rate well above national trends.

Modules

Programme organisation

All Mechanical Engineering programmes are organised into integrated modules of learning that are developed over the first two years. The overall structure of the Mechanical Engineering programme is illustrated in diagrams included in these notes. Our course design aims to avoid the fragmentation of knowledge, which is a drawback of the modular approach. Each major topic is taught as an integrated flow of learning that provides students with a framework into which they can place new concepts or techniques. The goal is to ensure a smooth, well-organised accumulation of knowledge as each module proceeds.

The Mechanical Power module provides a good example of this approach. Starting from concepts established at A level, lectures are used to present the fundamental laws governing the flow of fluids and energy. These are illustrated by engineering applications that often link-up with laboratory experiments. For example, in the early weeks of study, students acquire the theoretical tools to make a first, rough estimate of engine performance. They go on to test real engines in the laboratory, so that they can compare and contrast results. Building on such fundamental concepts, students progressively expand their knowledge to encompass more advanced topics, such as heat transfer, combustion, fluid flow and aerodynamics. Thus, by the end of the module, they will have acquired a firm understanding of the theory, design and operation of a wide range of equipment that involves the generation, use or transmission of power.

Links are formed between modules so as to emphasise the holistic nature of engineering. In this respect, the Design modules occupy a central role by providing projects that draw upon the full range of theoretical and practical knowledge. A range of group and individual projects is offered, many involving problems suggested by our industrial collaborators.

All programmes share the first two years, which are designed to help students orientate themselves towards professional engineering. A wide range of lectures, laboratories and projects consolidate relevant areas of A Level mathematics and physics in relation to mechanical design. It also aims to develop laboratory and practical skills and to encourage the formation of a professional outlook. The breadth of this background permits students to change engineering specialism at the end of the second year, should they wish to do so.

In later years students elect a programme that suits their interests. This provides students with the opportunity to follow their personal interests, within the context of a broadly based programme of study. Strong links are formed with our research programmes through the range of options available, to ensure that students benefit from developments at the leading edge of their chosen field. MEng students will be given the opportunity to choose four modules from a list of eight optional course modules in their final year.

The final year project is the highlight of the programme for most students; it provides an opportunity to focus onto one particular subject area of interest and allows them to show their ability & initiative. A broad range of project titles are offered related to the research areas of the members of staff.

Download our brochure, **Mechanical Engineering undergraduate degrees (pdf 1.7 MB) (http://www.birmingham.ac.uk/Documents/college-eps/mechanical/brochures/mechanical-engineering-undergraduate-degrees.pdf)**

Programme structure

Stage 1 Year 1 Certificate Level		Stage 2 Year 2 Intermediate Level	
Semester 1	Semester 2	Semester 1	Semester 2
Mechanics 1		Mechanics 2	
Thermodynamics, fluids and Heat Transfer		Thermodynamics and Fluids	
Mechanical Design and Professional Skills 1		Mechanical Design A	
Engineering Mathematics 1		Engineering Mathematics 2	
Properties and Applications of Materials	Electrical, Electronic and Computer Systems	Industrial Skills	
		Experiments and Statistics 2	
Experiments and Statistics 1		Manufacturing Systems Engineering	Mechatronics
	Computing for Engineers		

Stage 3	Stage 4

Year 3 Higher Level		Year 4 Masters Level only	
Semester 1	Semester 2	Semester 1	Semester 2
Mechanical Design B		Computational Geometry**	Advanced Mechanics**
Powertrain and Vehicle Engineering		Biofuels and Combustion**	Advanced thermal systems**
Design and Professional Skills 3		Advanced Vehicle Engineering**	R&D in Manufacturing Processes**
Control Engineering	CFD and FEA	Process modelling**	Micro and Nano technologies**
Sustainable Energy and the Environment	*MEng: Turbo-machinery and compressible flows	Biomedical Engineering**	Machining Support Systems**
*MEng: Engineering Maths A+B (semester 1&2)		Synoptic Mechanical Engineering	
BEng: Individual Engineering Project (30 credits)		Individual Engineering Project (60 credits)	

* BEng - two modules dropped to enable students to take a 30 credit project
**optional modules (Biofuels and Combustion plus Advanced Vehicle Engineering are compulsory for the automotive programme)

Fees and funding

Standard fees (http://www.birmingham.ac.uk/students/ug/courses/fees/standard) apply
Learn more about **fees and funding (http://www.birmingham.ac.uk/students/ug/feesandfinance/loans.aspx)**

Scholarships

- **Scholarships, awards and prizes (/schools/mechanical-engineering/undergraduate/scholarships/index.aspx)** available in The School of Mechanical Engineering
- Please visit the **scholarships, grants and bursaries page (/undergraduate/fees/funding/index.aspx)** for information on available scholarships
- Learn more about the University of Birmingham's **scholarships and awards (http://www.birmingham.ac.uk/students/ug/feesandfinance/funding/index.aspx)**

Entry requirements

Number of A levels required: 3

Typical offer: AAB

Required subjects and grades: A levels must include Mathematics (this must include Mechanics 1 and 2 – if not, Physics must be offered) plus one from the following: Physics preferred but Chemistry, Design and Technology or Further Mathematics are acceptable); other science A levels may be considered

General Studies: Not accepted

Additional information:

If you are offered the BEng programme at the point of entry, there is an opportunity to upgrade to the MEng if you meet the relevant progression requirements at the end of your second year of study.

Other qualifications are considered – learn more about **entry requirements (http://www.birmingham.ac.uk/students/ug/requirements)**

International students:

International Baccalaureate Diploma: 35 points, must include Mathematics at HL grade 6 and Physics at HL grade 6 (students with Mathematics at SL grade 7 will be considered on an individual basis for BEng entry).

Standard English language requirements apply.
Learn more about **international entry requirements (http://www.birmingham.ac.uk/students/ug/requirements/international)**.

Depending on your chosen course of study, you may also be interested in the Birmingham Foundation Academy, a specially structured programme for international students whose qualifications are not accepted for direct entry to UK universities. Further details can be found on the **foundation academy web pages (http://www.birmingham.ac.uk/students/foundation-academy/Pathways/index.aspx)**.

How to apply

Apply through UCAS at **www.ucas.com (http://www.ucas.com/)**
Learn more about **applying (http://www.birmingham.ac.uk/students/ug/courses/apply)**

Key Information Set (KIS)

Key Information Sets (KIS) are comparable sets of information about full- or part-time undergraduate courses and are designed to meet the information needs of prospective students.

All KIS information has been published on the Unistats website and can also be accessed via the small advert, or 'widget', below. On the **Unistats website (http://unistats.direct.gov.uk)** you are able to compare all the KIS data for each course with data for other courses.

The development of Key Information Sets (KIS) formed part of HEFCE's work to enhance the information that is available about higher education. They give you access to reliable and comparable information in order to help you make informed decisions about what and where to study.

The KIS contains information which prospective students have identified as useful, such as student satisfaction, graduate outcomes, learning and teaching activities, assessment methods, tuition fees and student finance, accommodation and professional accreditation.

Related links

Undergraduate degree courses - School of Mechanical Engineering (/schools/mechanical-engineering/undergraduate/index.aspx)

Scholarships, awards and prizes - School of Mechanical Engineering (/schools/mechanical-engineering/undergraduate/scholarships/index.aspx)

Mechanical Engineering undergraduate brochure (pdf 1.7 MB) (/Documents/college-eps/mechanical/brochures/mechanical-engineering-undergraduate-degrees.pdf)

Related news and events

The Mechanical Engineering degree programmes offered at Birmingham have scored highly in the National Student Survey (NSS). (/schools/mechanical-engineering/news/national-student-survey.aspx)

Learning and teaching

As a Birmingham student you are part of an academic elite and will learn from world-leading experts. At Birmingham we advocate an enquiry based learning approach, from the outset you will be encouraged to become an independent and self-motivated learner, qualities that are highly sought after by employers. We want you to be challenged and will encourage you to think for yourself.

Your learning will take place in a range of different settings, from scheduled teaching in lectures and small group tutorials, to self-study and peer group learning (for example preparing and delivering presentations with your classmates).

To begin with you may find this way of working challenging, but rest assured that we?ll enable you to make this transition. You will have access to a comprehensive support system that will assist and encourage you, including personal tutors and welfare tutors who can help with both academic and welfare issues, and a formal **transition review (https://intranet.birmingham.ac.uk/student/transitionreview/index.aspx)** during your first year to check on your progress and offer you help for any particular areas where you need support.

Personal Tutor: At the start of your degree, you will be assigned a Personal Tutor who will remain with you throughout your studies to help you in three important areas: supporting your academic progress, developing transferable skills and dealing with any welfare issues.

Delivery of the course
In your first and second years, the course is delivered as lectures, small group workshops, laboratories, computer-based activities, enquiry-based learning and tutorials. A strong emphasis is placed on design and research project work in your third and fourth years respectively.

Laboratory-based practical work forms an integral part of the School's degree programmes. Laboratory classes not only develop your experimental practical skills, but also reinforce concepts introduced in lectures or explore a particular phenomenon. Practical sessions, typically, last three hours.

Small-group tutorials/personal tutorials run alongside the lecture course, addressing any individual problems you may have and allowing you to consolidate the lecture material, as well as test your understanding through problem-solving exercises. Your Personal Tutor is assigned to you at the start of your course and remains with you until graduation, helping you in three important areas: supporting your academic progress, developing transferable skills and helping with welfare issues.

Enquiry Based Learning (EBL) provides an environment where your learning process is driven by enquiry. The lecturer's role is purely as a facilitator. Typically a group activity, this requires working in a team and you can be assessed in a variety of ways: in either a group or individually, by written reports and sometimes as a presentation. EBL will give you a research-orientated approach to a problem, and has a synergy within research-led institutions like the University of Birmingham.

Project work: The range of projects in your final year includes practical work in the laboratory, computer-based projects, or theoretical studies. You can choose the topic of your project from a pool of titles and work with your project supervisor to tailor it to your particular research interests. Many projects are directly linked to supervisor's current research projects and many have industrial links. Students are also free to propose their own projects, so long as a suitable supervisor can be identified.

Assessment methods

Studying at degree-level is likely to be very different from your previous experience of learning and teaching. You will be expected to think, discuss and engage critically with the subject and find things out for yourself. We will enable you to make this **transition (https://intranet.birmingham.ac.uk/student/transitionreview/index.aspx)** to a new style of learning, and the way that you are assessed during your studies will help you develop the essential skills you need to make a success of your time at Birmingham.

You?ll be assessed in a variety of ways, and these may be different with each module that you take. You will be assessed through coursework which may take the form of essays, group and individual presentations, laboratory-based work (depending on your chosen degree) and formal exams. Nearly 64% of the assessment of this course is by written examination, which compares favourably with many other universities, who range from 42%-70%.

Each module is assessed independently. Assessment methods used include end-of-year examinations, written assignments, oral and poster presentations, computer-based tests, class tests and laboratory and project reports. Some modules are completely assessed by coursework. Examinations are taken in May and June.

Credit is awarded under three headings:

- Examinations for lecture courses.
- Continuous assessment for various kinds of project work.
- Laboratories.

Early years are dominated by examination as you concentrate on the underpinning engineering principles. As you move into later years, the increased emphasis on project work shifts the balance towards continuous assessment.

We place strong emphasis on providing prompt and informative feedback on all pieces of work that you submit during your studies. Feedback comes in a variety of forms, including written feedback on pieces of assessment, class feedback sessions and one-on-one discussions with your tutors. In all cases, the feedback will highlight the good points as well as those areas that require more attention.

During your first year the University will require you to undergo a formal 'transition' review, mentioned above, to see how you are getting on and if there are particular areas where you need support. This is in addition to the personal tutor who is based in the School and can help with any academic issue you encounter. Our Academic Skills Centre also offers you support with your learning. The centre is a place where you can develop your mathematical, academic writing and general academic skills. It is the centre?s aim to help you to become a more effective and independent learner through the use of a range of high-quality and appropriate learning support services. These range from drop-in sessions with support with mathematics and statistics based problems provided by experienced mathematicians, to workshops on a range of topics including note taking, reading, writing and presentation skills.

At the beginning of each module, you will be given information on how and when you will be assessed for your particular programme of study. You will receive feedback on each assessment within four weeks, so that you can learn from and build upon what you have done. You will be given feedback on any exams that you take; if you should fail an exam, we will ensure that particularly detailed feedback is made available to enable you to learn for the future.

Related staff

Dr Andrew Tobias (/staff/profiles/mechanical/tobias-andrew.aspx)

Employability

Feedback shows that 90%-95% of our students go on to work or study on graduation. Of those in employment, 95%-100% gain graduate-level jobs and are earning salaries in the region of £24,000-£32,000 pa six months after graduation.

As one of our Mechanical Engineering students, a huge and exciting array of career opportunities will be open to you when you graduate - both at home and abroad. You could pursue a career in one of the major manufacturing industries (the UK has the 6th largest manufacturing base in the world); or you could work in other areas of science and technology, such as sustainable energy. Other areas that favour the problem-solving skills you will acquire are finance, law and marketing as well as teaching and/or research.

Superb opportunities exist for you to gain industrial experience before you graduate. You can opt to add a year to your programme and spend this time with one of our industrial partners; usually between your second and third study years. You will gain relevant work experience, and earn money putting into practice the skills and knowledge gained from your degree. Students on placement get involved in serious projects that ask difficult questions that require good scientific/engineering answers - and which often lead to sponsorship and/or the offer of a graduate job.

A rich vein of expertise will be available for you to tap into, not only through the University's Careers Network for more details see below, but from the School's own industrial liaison officer. From these professionals you will gain the skills to help you secure any of a range of placements from summer jobs to industrial years and, eventually, your graduate job.

Career destinations of previous graduates include:

- BP, Aberdeen
- Rolls Royce, Derby
- Delcam, Birmingham
- Jaguar-Landrover, Coventry
- Lotus,
- Mercedes-Benz,
- PA Consulting, London
- MultiMetal Works, Malaysia
- Atomic Weapons Establishment, Berkshire
- Oxford Technologies, Oxford
- RBCCM Banking, London
- RBS, London
- MOD
- BAE Systems, Barrow in Furness
- IBC Solar, Malaysia/Germany
- Saudi Aramco, Saudi Arabia
- Ball Packaging Europe, Wreham
- Parsons
- Vehicle Certification Agency, Birmingham
- Porterbrook Railway Co - Rosco, Berkshire
- AMEC, London
- RAF
- Petronas oil & Gas Company
- British Army, Sandhurst
- Zener Company, Iran
- DFM Medical, Germany

University Careers Network

Preparation for your career should be one of the first things you think about as you start university. Whether you have a clear idea of where your future aspirations lie or want to consider the broad range of opportunities available once you have a Birmingham degree, our Careers Network can help you achieve your goal.

Our unique careers guidance service is tailored to your academic subject area, offering a specialised team (in each of the five academic colleges) who can give you

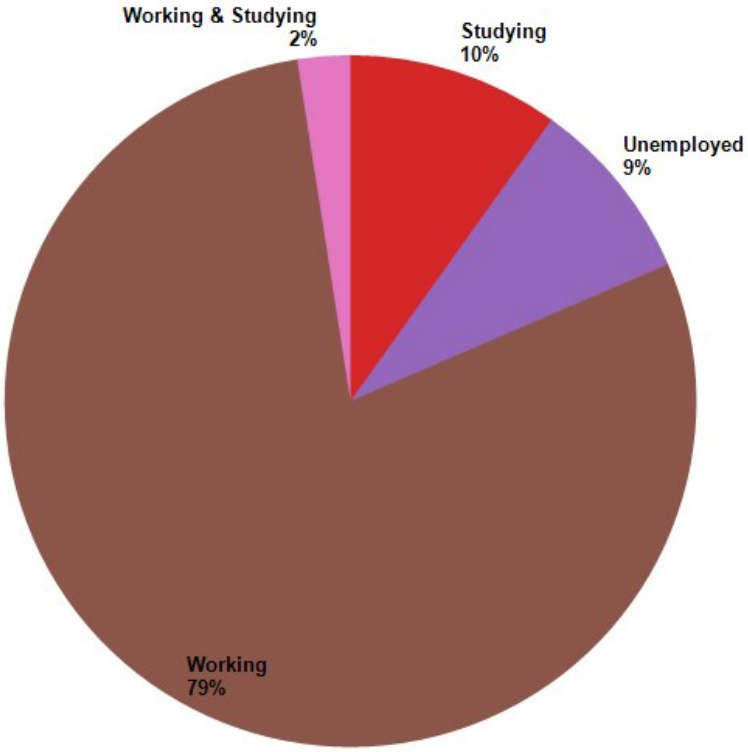
expert advice. Our team source exclusive work experience opportunities to help you stand out amongst the competition, with mentoring, global internships and placements available to you. Once you have a career in your sights, one-to-one support with CVs and job applications will help give you the edge.

And once you have a career in your sights, one-to-one support with CVs, interview practice and job applications will further help to give you the edge. In addition, our employer-endorsed, award-winning **Personal Skills Award (PSA) (https://intranet.birmingham.ac.uk/as/employability/psa/index.aspx)** recognises you extra-curricular activities, and provides an accredited employability programme designed to improve your career prospects.

If you make the most of the **wide range of services (https://intranet.birmingham.ac.uk/as/employability/careers/college/eps/index.aspx)** you will be able to develop your career from the moment you arrive.

Destinations of Leavers from Higher Education (DLHE) 2011/12

The DLHE survey is conducted 6 months after graduation.



Examples of occupations

- Aerospace Engineer
- Auditor
- Calibration Engineer
- Design Engineer
- Engineer
- Engineering Officer Cadet
- Financial Analyst
- IT Consultant
- Mechanical Engineer
- Project Engineer

Further study - examples of courses

- MSc Automotive Engineering
- MSc Computer Science
- MSc Environment and Sustainable Technologies
- MSc Industrial Product Design
- MSc Physics
- PGCE Mathematics
- PhD Aerospace Engineering
- PhD Biomedical Engineering
- PhD Manufacturing and Mechanical Engineering

Visit the **Careers section of the University website**

(https://intranet.birmingham.ac.uk/as/employability/careers/college/eps.aspx) for further information.

Professional accreditation

This programme is fully accredited by the Institution of Mechanical Engineers (IMechE).

Institution of MECHANICAL ENGINEERS
Improving the world through engineering

BEng (Hons): This course is recognised by the Engineering Council for the purposes of meeting in full the academic requirement for IEng and in part for CEng.

90% Students agreed staff are good at explaining things

BEng (Hons) Mechanical Engineering
Full time

To see more details and compare with other courses

Visit UNISTATS

Official data collected by HEFCE

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