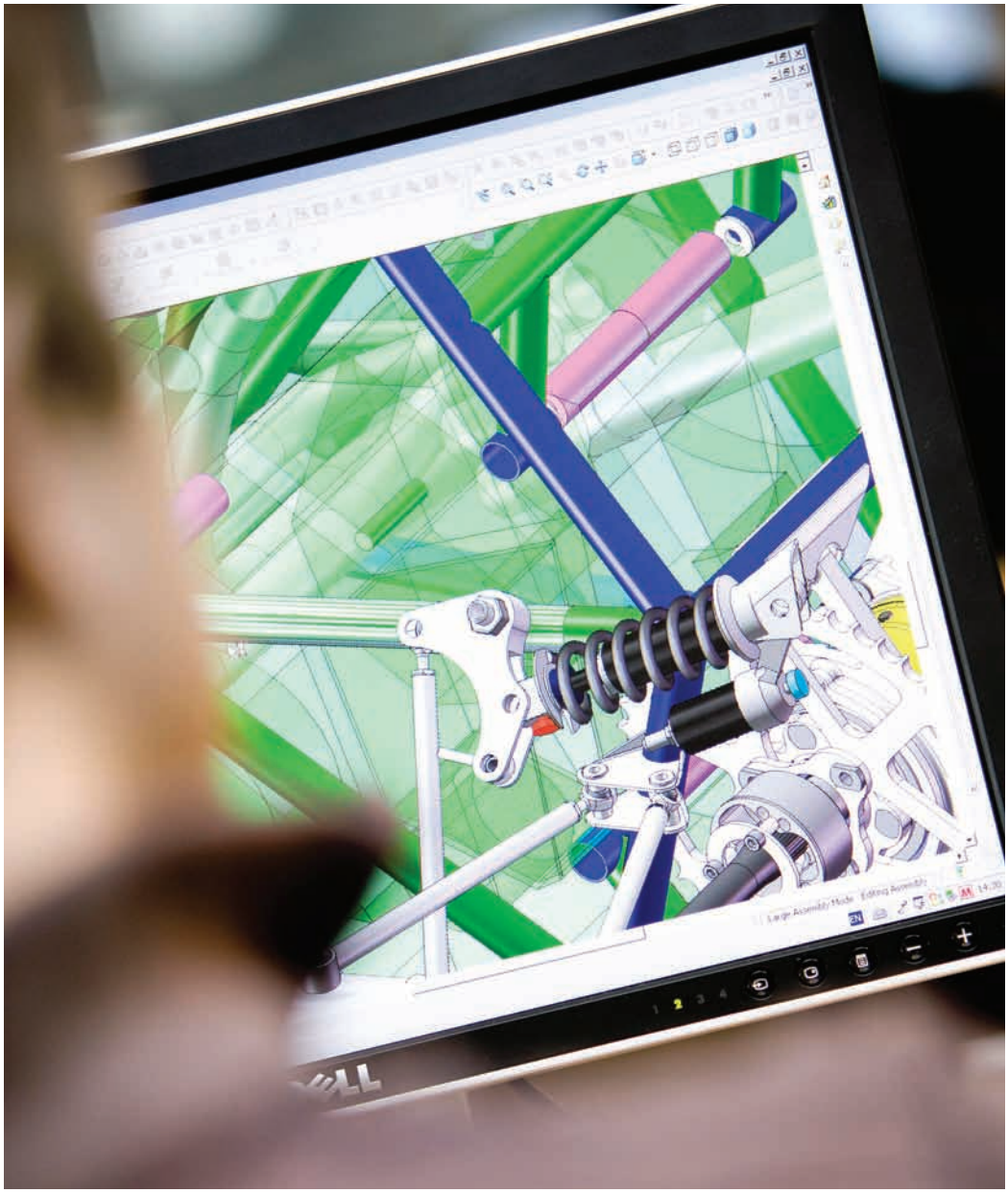
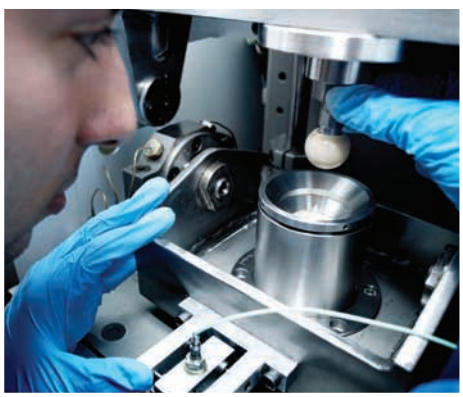
School of Mechanical Engineering
FACULTY OF ENGINEERING

UNIVERSITY OF LEEDS

Postgraduate
Masters Courses





Contents

For current information on courses, fees and entry requirements please visit our website at **www.engineering.leeds.ac.uk/mechanical/postgraduate**

School of Mechanical Engineering

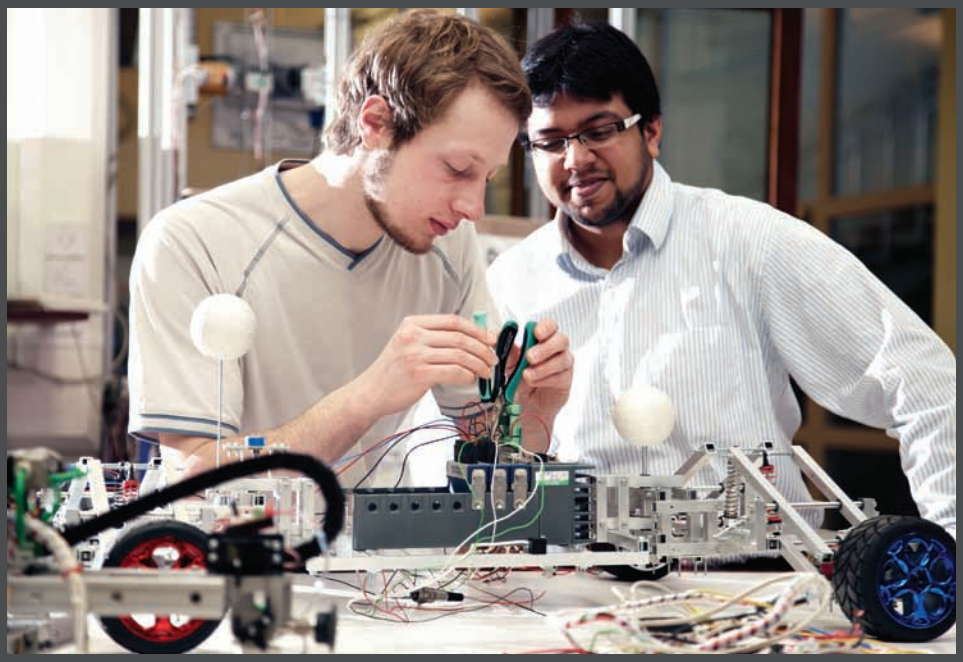
In the latest UK Government Research Assessment Exercise (RAE) the School achieved an impressive 75% of research activity rated internationally excellent or world leading confirming its status as one of the leading international departments for mechanical engineering.

Our taught courses are driven by our research profile to ensure you are taught the latest developments by internationally renowned researchers.

We have a track record of delivering high-quality research to solve real world problems with particular expertise in: engineering systems and design; thermofluids, surfaces and interfaces; medical devices and regenerative medicine in conjunction with colleagues in biological sciences and medicine.

We have strong collaborative links with other Schools within the University of Leeds, as well as with other academic institutes and industry around the world. With 70 academic and research staff and over 700 students, and over £7.5 million in research income a year, we are a major player in the field of mechanical engineering.

Our masters courses will allow you to further your knowledge, widen your skills base and improve your career prospects. They are also excellent preparation for those individuals wishing to undertake further, in-depth study in the form of a PhD.



www.engineering.leeds.ac.uk/mechanical

Why choose us?

Research intensive

Our MSc courses are delivered by academic staff who are research active and have extensive knowledge and expertise accumulated over time, many of whom are leading experts in their chosen fields of specialisation. Our research feeds directly into our teaching, which means you'll learn about the latest developments within your field from world-class academics who will challenge, encourage and support you.

First-class facilities

As you'd expect of a top-rated UK research school with over 80 postgraduate students from around the world, facilities for postgraduate study are of the highest standard.

Our School is purpose-built, self-contained, and offers a pleasant and friendly environment for study, with central University facilities just a few minutes' walk away. You will have access to excellent manufacturing and measurement facilities and laboratories that are equipped with the latest technology.

We have excellent computational facilities with a forty-station CAD suite and a number of high performance workstations for analytical studies. As the University is a member of the White Rose Consortium, we also have access to the White Rose Grid, a research infrastructure providing massive parallel computing power.

The University's library is one of the largest in the country possessing over 3 million items while its website provides access to electronic resources, including networked databases and electronic journals.

Strong industrial links

The content of each course is industrially orientated and members of staff maintain close contact with industry to ensure that material is up to date and in-line with employer needs.

An Industrial Advisory Board ensures that industrial partners provide input into the ongoing development and review of the courses. Industrial partners also contribute to the delivery of the course through guest lecturers, hosting and supervising projects, and funding prizes.

Our industrial partners include:

- Shell
- Chevron
- Mercedes-Benz HPE
- Statoil
- SKF
- Jaguar Land Rover
- MAHLE Group
- Powertrain
- Sasol
- Siemens
- DePuy UK
- ArthroCare
- Smith & Nephew
- Tissue Regenix

Careers

Alongside the specific content of our courses, you will be able to enhance your transferable professional skills, which are vital for future career development. The courses incorporate training in presentation skills, scientific writing, project management, intellectual property awareness, team working and applying research methodology.

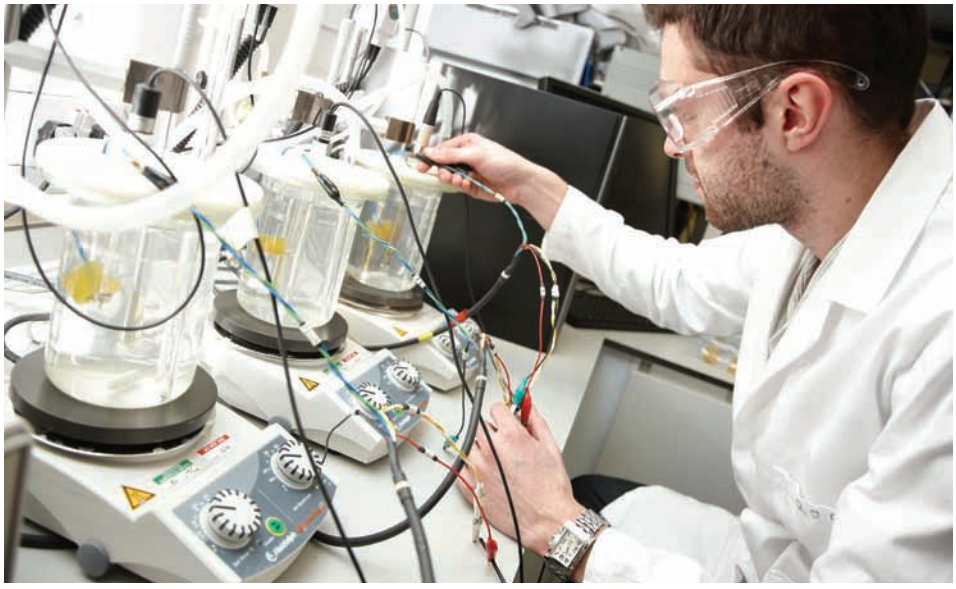
Engineering Careers Fair

We hold an annual Engineering and Computing Careers Fair attracting over 32 graduate recruiters including organisations such as Atkins, AECOM, Balfour Beatty, BP, Deloitte, Ernst & Young, Jaguar Land Rover, Procter and Gamble, Network Rail and Thales, to name but a few. The fair provides you with the chance to explore the opportunities available after graduation.

Careers Centre

Our on-campus Careers Centre is one of the largest in the country. It offers an excellent range of services and has a great relationship with graduate recruiters. The Careers Centre can help you to improve your CV and complete job applications. The Careers Centre also holds training events and workshops to assist you with your career progression.

More information on the Careers Centre can be found at **www.careerweb.leeds.ac.uk**



Learning and assessment

All of our MSc courses operate on a credit-based modular system. A standard module is worth 15 credits and the research project is worth 75 credits. You are required to take modules totalling 180 credits. The taught modules and preparatory work for the research project are undertaken over the first two semesters with the summer being devoted to the research project.

Course work assignments are a significant part of the course and contribute towards the module assessment. Examinations may also be included as part of the assessment. Assignments may include group presentations, reports, essays, or practical work. The research project is assessed by dissertation and oral presentation.

Each of the MSc courses is undertaken on a full-time basis (one calendar year – September - September).

Research project

The project is possibly one of the most satisfying parts of the course. It gives you the opportunity to take what you have learnt and to explore and develop specific interests by applying it to your own piece of research.

The project is chosen by you and is usually associated with one of our world-class research institutes. You will work individually on a project and you will be assigned a project supervisor. A proportion of projects are also formally linked to industry and can involve spending time working at the collaborator's site during the summer semester. You can also become involved in projects linked to the design, construction and testing of the formula student race car.

Continuing professional development

Some modules on the courses can also be taken as individual short courses. This is ideal if you want to undertake Continuing Professional Development but your work and other commitments mean that you are not able to commit to the full-time Masters programmes. For further information visit **www.engineering.leeds.ac.uk/short-courses**

The application process

Due to the high demand for our courses, we advise applying early. Applications from international students should be submitted by mid July and UK applications by early September of the year of entry. However, there is an application deadline of 30 June relating to the excellence scholarship and to be eligible for this, applicants need to have an offer of a place on one of our postgraduate courses.

For further information about applying for postgraduate study visit **www.leeds.ac.uk/pgthowtoapply**

Fees

For up-to-date details on fees please contact our Postgraduate Admissions Team or visit **www.engineering.leeds.ac.uk/masters-courses/fees**

Scholarships

We are part of the Faculty of Engineering, which offers a range of scholarships. Details can be found at **www.engineering.leeds.ac.uk/scholarships** or by contacting the Postgraduate Admissions Team. The University also offers a number of scholarships, for more information on these visit **http://scholarships.leeds.ac.uk**

English language requirements

Applicants whose first language is not English, or whose Bachelor's degree is not from a university in an English speaking country, are required to provide evidence of proficiency in English by having attained the following or its equivalent:

IELTS – 6.5 with not less than 6.0 in listening, reading, speaking and writing.

Pre-sessional English language courses are available at the Language Centre for students who wish to improve their language skills prior to commencing their studies, to find out more visit **www.leeds.ac.uk/languages/intro**

Contact us

If you have any queries please contact:

Postgraduate Admissions Team
School of Mechanical Engineering
University of Leeds
Leeds LS2 9JT, UK

t: +44 (0)113 343 2149

e: pgmech@leeds.ac.uk

w: **www.engineering.leeds.ac.uk/mechanical**

Visit us

You are welcome to visit us, please contact the Postgraduate Admissions Team on

t: +44 (0)113 343 2149

Postgraduate masters courses:

MSc Advanced Mechanical Engineering

This course offers a broad range of advanced subjects across various engineering disciplines. Particular emphasis is placed on the application of advanced computational methods and state-of-the-art software packages to solve complex engineering problems.

Through selecting modules from a range of options, the course can be tailored to meet your particular needs and interests.

On completion of this course you will be able to analyse and solve complex engineering problems using a combination of theoretical, experimental and computational techniques.

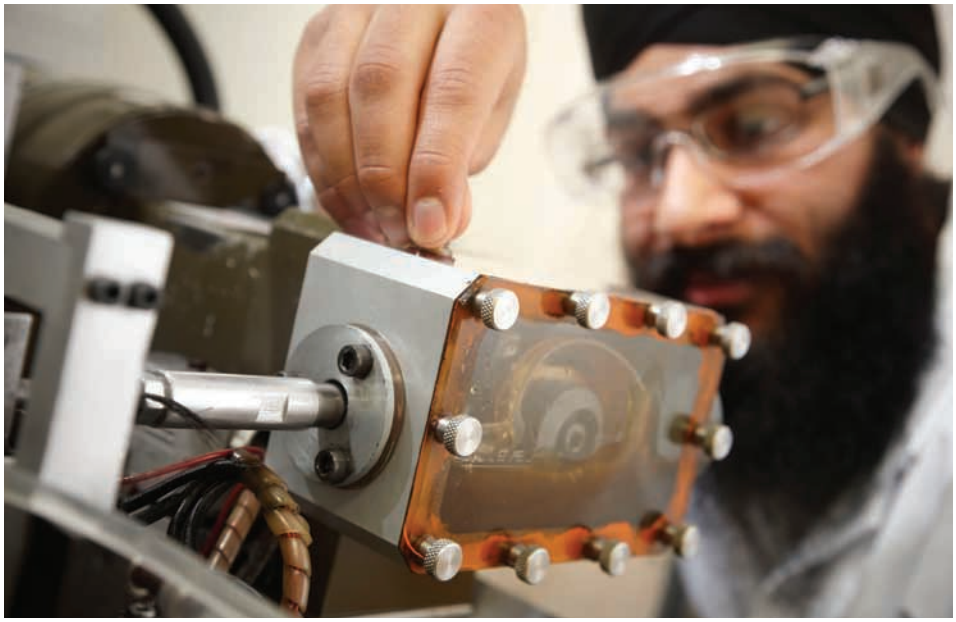
Who will benefit?

This course will appeal to:

- Professional engineers already working in the industry who wish to deepen their knowledge and expertise so enabling future career enhancement and development
- graduate engineers who wish to gain a strong background knowledge in the modern methods of engineering analysis, including computer-based methods
- those who would like experience of undertaking a research-led project in a leading mechanical engineering department.

Specialist facilities

- Advanced CAD facilities for design work
- a well-equipped workshop for building parts including laser sintering facilities, wire EDM and CNC machinery
- access to the latest industry standard software for computational fluid dynamics and finite element modelling of material stress analysis
- advanced measurement laboratory
- laboratory facilities for solid and fluid mechanics, erosion, corrosion, tribology, combustion, control and dynamics, robotics and optical measurement.



Typical careers

Graduating from this course you will be in a good position to seek employment with many leading companies. Recent graduates from the School can be found in organisations such as, Siemens, E-ON UK, Cummins UK, Crompton Technology Group, Bombardier Transportation, DePuy International, Bentley Motors, Jaguar Land Rover, Nissan Motor Company, Faraday Packaging Partnership, Airbus, EAS Engineering, Prodrive, Ricardo UK and Ford Motor Company.

Entry requirements

A degree equivalent to a UK upper second class honours (2:1) degree, or higher, in engineering, a physical science or mathematics.

For English language requirements see page 07.

Course content

You will study the following modules plus five of the optional modules. You will also undertake a research project during the summer months.

Modules	Contents
Computational and Experimental Methods	Fundamental concepts of computational and experimental methods.
Energy Systems Engineering	Engineering aspects of energy conversion processes; including conventional, i.e. fossil and nuclear fuels, and renewable energies.
Optional modules	
Aerodynamics with Computational Fluid Dynamics	Problem solving in the area of potential (ideal) flow theory, wing theory and computational fluid dynamic approaches to advection and diffusion-based flows.
Aerospace Structures	Methods of computer-based design and analysis of structures such as frames and shells.
Aerospace Systems and Propulsion	Gas turbines, their turbomachinery, combustion chambers and control systems.
Automotive Chassis Engineering	Important aspects of chassis systems and behaviour including suspension and steering systems, chassis structures, and noise, vibration and harshness (NVH).
Automotive Driveline Engineering	An overview of all the key elements of a driveline with particular focus given to the design of geared transmissions.
Biomaterials	Short course covering a range of topics associated with biomaterials – the emphasis here is on the life-science interface.
Biotribology	Distance learning module underpinning the science behind the successful application of engineering to joint replacements.
Combustion and Pollution Chemistry	The thermochemical principles prerequisite to the understanding of combustion processes in and pollution emissions from engines, burners and explosions.
Combustion in Engines	The key principles of combustion processes and pollution emissions from engines, burners and explosions.
Finite Element Methods of Analysis	Principles and applications of FEM.
Functional Joint Replacement Technology	Applies the standard engineering principles of mechanics, tribology and biomaterials to the understanding of the technology used in the development of total joint replacements.
Introduction to Tribology	A broad-based introduction to the interdisciplinary scientific discipline of tribology, covering how tribology impacts on the design and operation of mechanisms and the means adopted to lubricate them.
Mechatronics and Robotics Applications	The integration of components such as actuators, mechanisms, mechanical structures, sensors and computer control/electronics into a unified form.
Rotary Wing Aircraft	The theory of vertical flight, design and analysis of helicopters, autogyros and other rotary wing aircraft and an appreciation of the extra difficulties involved when the vehicle flow is cyclic in nature.
Surface Engineering	Surface engineering technologies for the control of wear, corrosion and fatigue of engineering components.

This module list is an indicative list and actual content may vary as we regularly review the content of our courses in light of new experiences and developments in the field.

Research project

The research project is possibly one of the most satisfying parts of the course. It gives you the opportunity to take what you have learnt and to explore and develop specific interests by applying it to your own piece of research.

The project is chosen by you and is usually associated with one of our world-class research institutes. You will work individually on a project and you will be assigned a project supervisor.

Recent research projects:

- Turbulent combustion (experiment and theory/modelling)
- Alternative/sustainable fuels
- Gas turbine cooling ring effectiveness
- Engine combustion

MSc Automotive Engineering

This course caters for industry's demand for highly-skilled graduates in the automotive industry in the advanced areas of analysis, design and manufacture.

Traditionally this industry has been associated with high volume vehicle manufacture. However, the nature of the industry has changed over the last decade and it is now dominated by automotive component manufacturers and specialist design and consultancy houses.

During this course you will acquire the range of skills and knowledge required by these organisations. Particular emphasis is placed on the application of computational methods and software packages in automotive engineering analysis, design and manufacture.

Who will benefit?

This course will appeal to:

- Professional engineers already working in the industry who wish to deepen their knowledge and expertise so enabling future career enhancement and development
- graduate engineers who wish to gain specialist knowledge and skills relevant to the automotive industry.

Specialist facilities

- SAE car build area including computerised engine test bays
- access to the Faculty Workshop with its high level CNC and wire EDM facilities
- brake test area
- advanced measurement laboratory
- access to the latest industry standard software for computational fluid dynamics and finite element modelling of automotive related systems and materials along with ADAMS software for suspension simulation
- state-of-the-art facilities for tribology (to study wear on engine parts)
- a 'stirred bomb' for characterising fuel ignition
- advanced engines with optical access.

Typical careers

Career prospects are excellent and with this qualification you should expect to find employment in the automotive and motor sport industries. Current graduates can be found working with Bentley Motors, BMW UK, Jaguar Land Rover, Honda, Nissan Motor Company, Renault F1 (Lotus Renault GP), Red Bull Racing and Ricardo UK. Others opt to work in the general engineering industry, remain at university for PhD study or move into a completely different field such as finance or teaching.

Entry requirements

A degree equivalent to a UK upper second class honours (2:1) degree, or higher, in engineering, a physical science or mathematics.

For English language requirements see page 07.

Course content

You will study the following modules and will undertake a research project during the summer months.

Modules	Contents
Automotive Chassis Engineering	Aspects of chassis systems and behaviour including suspension and steering systems, chassis structures, and noise, vibration and harshness (NVH).
Automotive Driveline Engineering	An overview of all the key elements of a driveline with particular focus given to the design of the key machine elements along with some novel applications.
Combustion in Engines	The key principles of combustion processes and pollution emissions from engines, burners and explosions.
Computational and Experimental Methods	Fundamental concepts of computational and experimental methods.
Introduction to Tribology	Broad based introduction to the interdisciplinary scientific discipline of tribology, covering how tribology impacts on the design and operation of mechanisms and the means adopted to lubricate them.
Mechatronics and Robotics Applications	The integration of components such as actuators, mechanisms, mechanical structures, sensors and computer control/electronics into a unified form.
Vehicle Design and Analysis	Basic and more advanced concepts of vehicle performance including ride, handling, aerodynamics and acceleration/deceleration behaviour.

This module list is an indicative list and actual content may vary as we regularly review the content of our courses in light of new experiences and developments in the field.

Research project

The research project is possibly one of the most satisfying parts of the course. It gives you the opportunity to take what you have learnt and to explore and develop specific interests by applying it to your own piece of research.

The project is chosen by you and is usually associated with one of our world-class research institutes. You will work individually on a project and you will be assigned a project supervisor.

Recent research projects:

- Regenerative braking systems – impact on fuel consumption and vehicle stability in HEVs
- Thermo-mechanical analysis of disc brake for vehicle rollaway
- Coated lightweight brake rotors
- Designing, measuring and modelling of vehicle dynamics

Formula student race car

The Formula SAE (Society of Automotive Engineering) International and Formula Student are annual competitions based in America and Europe where students design, build, test and race an open wheeled, single seater race car. Typically cars designed at Leeds may do 0-60 mph in just over 3 seconds with the engine revving at close to 14000 rpm!

The University of Leeds was one of the first UK universities to enter the American Formula SAE competition and over the last few years has been one of the most successful teams, winning the Award for Best Analytical Approach to Engineering Design twice and coming first in the Overall Design Competition.

You can become involved in this initiative through your research project linked to your course. These projects provide you with the opportunity to work as part of a dynamic team that has to design a new vehicle from scratch in just nine months.

A sample of recent projects include:

- Development of a data-logging system for the SAE car
- Sensitivity of IC engine friction to design and operating parameters in a racing car
- Crashworthiness and optimisation of a bonded race car chassis using finite element applications
- Traction control on the SAE car

If you would like to learn more visit: **www.racing.leeds.ac.uk**

MSc Medical Engineering

Medical engineering is the application of engineering principles and techniques to medicine. It combines the design and problem solving skills of engineering with medical and biological sciences to contribute to medical device solutions and interventions for a range of diseases and trauma.

This exciting and challenging course provides you with a broad coverage of this rapidly expanding field whilst at the same time allowing a degree of specialisation through the provision of optional modules.

Particular emphasis is placed on inter-professional training and the multidisciplinary nature of the discipline, enabling you to successfully complete complex tasks at the increasingly important interface between engineering and the life sciences.

Who will benefit?

This course will appeal to:

- Graduate engineers or scientists who wish to gain a postgraduate qualification in medical engineering before pursuing a career in either the medical devices sector or health service
- a range of personnel already involved in medical engineering including engineers, sales and marketing staff and regulatory personnel, who wish to enhance their career prospects
- orthopaedic or neuro-surgeons with an interest in the engineering aspects of their specialisation
- candidates who wish to pursue research work in this sector but do not have the prerequisite background.

Specialist facilities

- Europe's largest collection of multi-axis simulators for hip, knee and spine testing
- a suite of microCT equipment for characterising bone geometry and morphology
- bioreactors for tissue engineering and assessing material compatibility
- advanced computer simulations of spine and articulating joints
- cardiac imaging and modelling.

Typical careers

Career destinations are diverse and include medical engineering within industrial or public sector organisations, regulatory affairs and sales and marketing.

Entry requirements

A degree equivalent to either: a UK upper second class honours (2:1) degree or higher, in engineering, a physical science or mathematics; or a medical degree or allied subject with a background in orthopaedics.

For English language requirements see page 07.

Course content

You have the opportunity to select modules from a range of delivery styles including distance learning, short courses and more traditional semester-long modules, enabling part-time students with busy life or work schedules to have a more flexible approach to their learning.

You will study seven of the following modules and will undertake a research project during the summer months.

Modules	Contents
Basic Orthopaedic Engineering	An introductory short course module designed for clinical or biological personnel.
Biomaterials	Short course covering a range of topics associated with biomaterials – the emphasis here is on the life-science interface.
Biomedical Engineering Simulation	Short course providing the student with a thorough grasp of the techniques and ideas used in simulating complex medical systems or issues.
Biotribology	Distance learning module underpinning the science behind the successful application of engineering to joint replacements.
Computational and Experimental Methods	Basic concepts of computational and experimental methods.
Functional Joint Replacement Technology	Applies the standard engineering principles of mechanics, tribology and biomaterials to the understanding of the technology used in the development of total joint replacements.
Introductory Medical Device Engineering	Distance learning module for students with experience of the underpinning engineering required for a career in this sector.
Research Methods	Short course focusing on the skills required for the development of a successful career in industry or academia including imaging, computational modelling and statistics.
Spinal Biomechanics and Instrumentation	Distance learning module delivering the underpinning biomechanics required to understand the new innovations in spinal surgery.
Tissue Engineering	Leading edge short course providing the student with the fundamentals of the rapidly expanding field of Tissue Engineering.

This module list is an indicative list and actual content may vary as we regularly review the content of our courses in light of new experiences and developments in the field.

Research project

The research project is possibly one of the most satisfying parts of the course. It gives you the opportunity to take what you have learnt and to explore and develop specific interests by applying it to your own piece of research.

The project is chosen by you and is usually associated with one of our world-class research institutes. You will work individually on a project and you will be assigned a project supervisor.

Recent research projects:

- Investigating aspects of wear in total disc replacements
- Finite element analysis of tissue engineered structures
- Determining properties of bone and cement augmentation in vertebroplasty
- Cartilage tribology

MSc Oilfield Corrosion Engineering

Corrosion in the oil and gas sector is one of the major flow assurance issues. From an economic point of view the efficient management of corrosion ensures that oil and gas can be recovered from wells for longer. Corrosion is also a major cause of hydrocarbon leaks and so safety drives the technological advances in corrosion control.

There is currently an increasingly high demand for qualified corrosion engineers with specific expertise in oilfield operations.

This course helps satisfy this demand by providing engineers and physical scientists with skills in corrosion measurement, asset integrity assessment, corrosion prediction and corrosion management.

Who will benefit?

This course will appeal to:

- Professional engineers already working in the industry who wish to deepen their knowledge and expertise so enabling future career enhancement and development
- graduate engineers and physical scientists who wish to gain specialist knowledge and skills relevant to the oil and gas sector.

Specialist facilities

- AC, DC and noise electrochemical monitoring
- scanning reference electrode
- quartz crystal microbalance
- sour facilities
- erosion-corrosion rigs
- advanced surface analysis
- commercially used software.

Typical careers

With this qualification, excellent career options are open to you to practise as a professional corrosion engineer and play a major role in ensuring the safe and efficient recovery of natural resources.

Entry requirements

A degree equivalent to a UK upper second class honours (2:1) degree, or higher, in engineering, a physical science or mathematics.

For English language requirements see page 07.

Course content

You will study the following modules plus two of the optional modules. You will also undertake a research project during the summer months.

Modules	Contents
Advanced Oilfield Corrosion	An in-depth introduction to the corrosion processes experienced in the oilfield. Covers material selection and engineering design in an oilfield context; corrosion management strategies; basic CO_2 corrosion models; and strategies for new or mature assets.
Failure Analysis	Addresses the likely causes of component failure from a knowledge of service conditions; microscopic and analytical techniques in the forensic investigation of metallurgical or materials failure; techniques to employ on the basis of the selected tests; and remedial measures to prevent recurrence of a given failure.
Metals and Alloys	The principles of physical metallurgy and their application to the design of alloys for engineering applications; the historical development of metals and alloys to satisfy the needs of different industrial sectors; the traditional limitations on the properties which may be obtained in particular metals and how metallurgists may seek to circumvent these; microstructures in a range of metals and alloys and account for their development.
Oilfield Chemistry and Corrosion	An introduction to the fundamental principles of oilfield chemistry and corrosion. Explains the properties and application of a range of chemicals used in corrosion control for oil and gas production and the principal theories of corrosion science and engineering.
Surface Engineering	Surface engineering technologies for the control of wear, corrosion and fatigue of engineering components.
Optional Modules	
Introduction to Tribology	A broad based introduction to the interdisciplinary scientific discipline of tribology; how tribology impacts on the design and operation of mechanisms and the means adopted to lubricate them.
Operations and Innovation Management	An introduction to operations management covering the nature and significance of operations management as an organisational practice; the role and typical responsibilities of the operations manager; and key operations management theories.
Thin Films and Surfaces	Basic concepts in the thermodynamics of surfaces; structures and phase behaviour of amphiphilic molecules; methods of preparation of molecularly thin films; the origin of the most common types of surface interactions in vapours and in simple liquids; and the principles of major analytical techniques used in the study of surfaces and ultra-thin films.

This module list is an indicative list and actual content may vary as we regularly review the content of our courses in light of new experiences and developments in the field.

Research project

The research project is possibly one of the most satisfying parts of the course. It gives you the opportunity to take what you have learnt and to explore and develop specific interests by applying it to your own piece of research.

The project is chosen by you and is usually associated with one of our world-class research institutes. You will work individually on a project and you will be assigned a project supervisor.

Recent research projects:

- Crevice corrosion on cemented stems in metal on metal tjr – the effect of antibiotic in the cement
- Assessing corrosion of pipeline material in scale formation environments
- Characteristics of iron sulphide films formed in sour corrosion on pipeline steels
- Corrosion and erosion-corrosion study on pipeline welds

MSc Tribology and Engineering Interfaces

Tribology is the science and engineering of interacting surfaces in relative motion. It includes the study and application of the principles of friction, lubrication and wear. Tribology and the design of engineering interfaces has been an area of research in the School of Mechanical Engineering for over a century, providing a solid foundation to develop this MSc course.

This course provides training in tribology and the application of tribological principles to the development of engineering interfaces for a wide range of different engineering systems. The core components of tribology, such as lubrication, contact mechanics, wear, surface engineering and surface characterisation will be central to the course with optional modules available specialising in the research-led fields of engine tribology and biotribology.

Industry has been actively involved in driving the development of this course, which means you will learn material that is in-line with employer needs. Seminars from industrial companies are incorporated in the course to provide you with a broader understanding of the tribology challenges facing industry.

Who will benefit?

This course will appeal to:

- Professional engineers already working in industry who wish to deepen their knowledge and expertise so enabling future career enhancement and development
- graduates who wish to gain a strong background knowledge in Tribology (friction, wear and lubrication) and engineering interfaces
- those who would like experience of undertaking a research-led project in a leading mechanical engineering department
- graduates who wish to build a strong basis from which they can develop their research career (i.e. preparation for PhD studies).

Specialist facilities

- Engine Tribology – fired and motored engine testing, ring pack and liner sampling, engine friction measurements, motored camshaft rigs, viscometers, reciprocating, rotating, and fretting bench top tribometers
- Biotribology – hip joint, pendulum friction and force/displacement controlled knee simulators
- Surface Analysis and Engineering – microindenter, nanoindenter, AFM, XPS, Mini-SIMS, interferometer, FT-IR microscopy, magnetron sputtering, heat treatment facilities
- micro/nanofluidics
- PVD coating deposition system (arc, sputtered, plasma assisted CVD and microwave technologies)
- High Performance Computing – Beowulf cluster with 52 CPUs, 1000GB of RAM and fibre-optical interconnects.

Typical careers

With this qualification, excellent career options are open to you in the automotive, manufacturing, lubricant, or component (bearing, gear, seal, etc) industries. It will also put you in a good position to pursue a research career (i.e. preparation for PhD studies).

Entry requirements

A degree equivalent to a UK upper second class honours (2:1) degree, or higher, in engineering, a physical science or mathematics.

For English language requirements see page 07.

Course content

You will study the following modules plus three of the optional modules. You will also undertake a research project during the summer months.

Modules	Contents
Engine Tribology	In depth tribological understanding of the major frictional components of the reciprocating internal combustion engine (bearings, piston assembly and valve train).
Introduction to Tribology	Introduction to the interdisciplinary scientific discipline of tribology, focusing on understanding of real surfaces, friction and wear phenomena and lubrication regimes.
Lubrication and Lubricants	Lubrication theory and its application to study real, industrial, engineering systems where lubrication is critical to the systems' performance. Lubrication regimes, lubricant physical and chemical properties, greases, etc.
Surface Engineering	Surface engineering technologies for the control of wear, corrosion and fatigue of engineering components.
Optional modules	
Biotribology	Distance learning module underpinning the science behind the successful application of engineering to joint replacements.
Computational and Experimental Methods	Fundamental concepts of computational and experimental methods.
Failure Analysis	Addresses the likely causes of component failure from a knowledge of service conditions; microscopic and analytical techniques in the forensic investigation of metallurgical or materials failure; techniques to employ on the basis of the selected tests; and remedial measures to prevent recurrence of a given failure.
Operations and Innovation Management	An introduction to operations management covering the nature and significance of operations management as an organisational practice; the role and typical responsibilities of the operations manager; and key operations management theories.
Thin Films and Surfaces	Basic concepts in the thermodynamics of surfaces; structures and phase behaviour of amphiphilic molecules; methods of preparation of molecularly thin films; the origin of the most common types of surface interactions in vapours and in simple liquids; and the principles of major analytical techniques used in the study of surfaces and ultra-thin films.

This module list is an indicative list and actual content may vary as we regularly review the content of our courses in light of new experiences and developments in the field.

Research project

The research project is possibly one of the most satisfying parts of the course. It gives you the opportunity to take what you have learnt and to explore and develop specific interests by applying it to your own piece of research.

The project is chosen by you and is usually associated with one of our world-class research institutes. You will work individually on a project and you will be assigned a project supervisor.

The MSc research projects will be highly guided by our industrial partners, addressing real industrial application problems.

About the University

The University of Leeds is one of the UK's top universities. Our degrees are well respected by employers and universities worldwide; in the 2010 QS World University Rankings, our Employer Review score was 88%.

Established in 1904, we are part of the prestigious Russell Group – the 20 leading research universities in the UK. We are also in the top ten UK research intensive universities. We have performed consistently well in the National Student Survey, in fact, in the latest survey, 82% of students said they were very satisfied or satisfied with their experience at Leeds.

Our single-site campus is conveniently located, a short 10 minute walk to the city centre providing access to a vibrant city life and excellent local services and facilities.

We have more than 5,000 taught postgraduate students and 2,000 research postgraduate students. Students come from over 130 countries to make use of our outstanding facilities, including a major academic research library, laboratories and computing facilities.

Located at the heart of our campus, is our award-winning Students' Union which has over 31,000 members. It is an excellent University resource that hosts postgraduate networking events and provides specialist advice on a range of issues including academic support, housing, money and finances.

Our new £12 million gym and pool, The Edge is one of the biggest on any university campus. Featuring a 200-station fitness suite, squash courts, climbing wall, Starbucks café, steam room and sauna, plus much more, it has something for everyone. For more information visit **www.leeds.ac.uk/sports**

The diverse community of cultures studying and working within the University enriches the experience of studying at Leeds. We are committed to providing an excellent level of service and support for all our students and for international students we have extensive academic support services including a Language Centre and a Skills Centre.

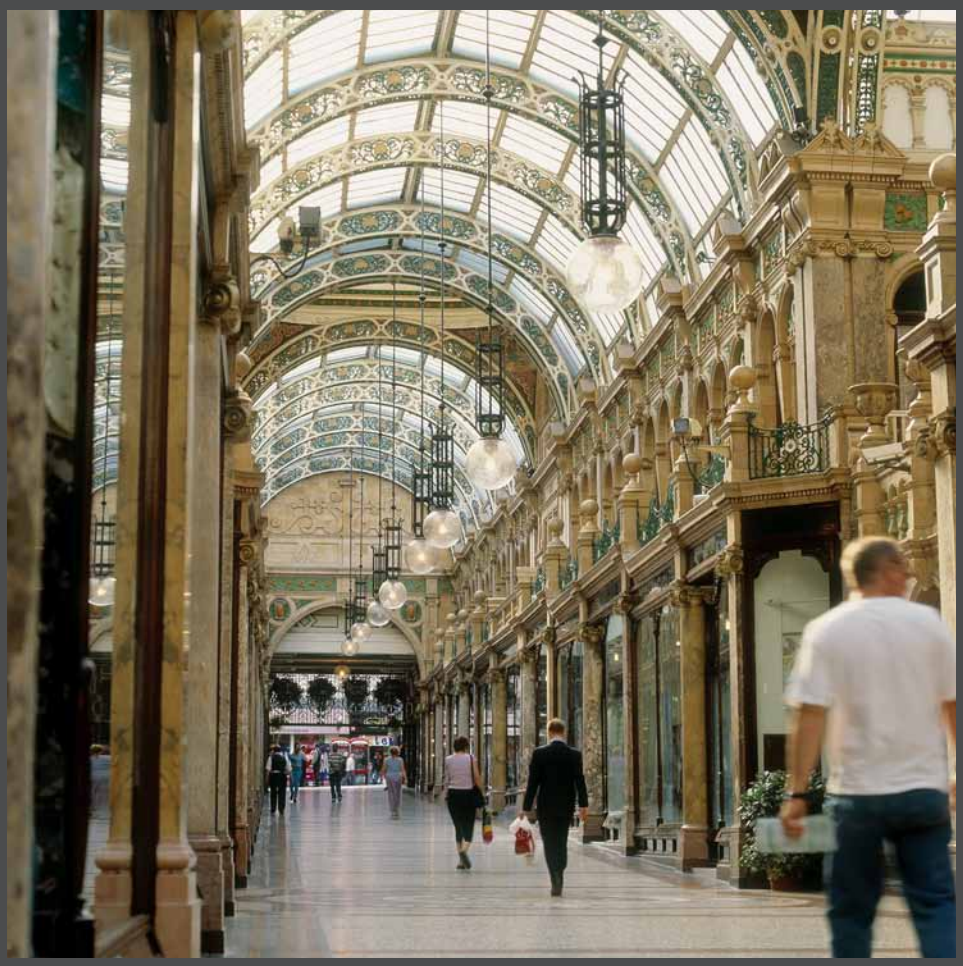
The University of Leeds is one of the most popular destinations in the UK for high-quality international students. An active International Centre brings together the international student community and is a source of information, guidance and support, as well as a great place to make new friends. International students have a guaranteed place in University accommodation throughout their studies, provided that a completed application form and deposit reaches us before the summer deadlines.* For more information visit **www.leeds.ac.uk/international**

***This guarantee applies to all single students from outside the EU.**

About the city

Leeds is a fantastic place to live and learn; it's a multi-cultural and cosmopolitan city with over 200,000 students, all enjoying the safe, friendly environment.

Leeds is renowned as a major shopping destination and centre for entertainment, nightlife, the arts and leisure. The city boasts over two miles of traffic-free shopping and beautiful Victorian and Edwardian arcades filled with shops of every kind. The city also offers an extensive choice of places to eat and drink whatever your culinary tastes or budgets. Nightlife in and around the city is known for its diversity and popularity, and offers a range of music to suit all tastes.



Leeds is one of the greenest cities in Britain with more parkland than any other European city. In and around Leeds you will find many areas of natural beauty and within easy reach of the city are the national parks of the Yorkshire Dales, Peak District, Lake District and historic towns such as York, Harrogate and Bradford.

Located at the heart of the UK, Leeds is midway between Edinburgh and London making it an ideal centre from which to visit other parts of the country. Leeds can be reached easily by train from any part of the UK, and is served by Leeds/Bradford International Airport, with train connections from Manchester and London International Airports.

Adapting to life in a new place can be both exciting and challenging. Finding somewhere to live where you feel comfortable will help you settle in quickly. Leeds has plenty of accommodation to choose from: residences large and small, in contemporary or traditional buildings, on campus or off campus. All of our accommodation is within easy walking distance to campus or on a frequent bus route. Living in University accommodation is one of the best ways to make new friends and help you settle into university life. For more information visit **www.leeds.ac.uk/accommodation**

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