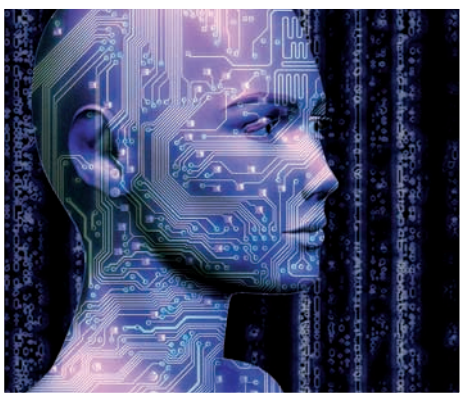
School of Computing

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/computing/postgraduate**

School of Computing

The School of Computing is a leading international centre for computing research, in the top-10 of UK computer science departments, as confirmed by the latest UK Government Research Assessment Exercise (RAE).

As well as confirming the School's status as one of the foremost research and learning centres for computing in the UK, these high ratings enable us to attract funding to invest further in our research and teaching facilities and to attract the best staff and students. This wealth of expertise and investment ensures that you receive the best quality of education.

Our taught courses are driven by our research profile to ensure you are taught the latest developments in computing by internationally renowned researchers. Our research ranges from breakthrough results in the theoretical foundations of computer science through to highly applied and multidisciplinary settings such as computational modelling and systems engineering driven through excellent connections with many other disciplines including biology, mathematics, earth sciences and modern languages, as well as links with leading companies.

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/computing

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

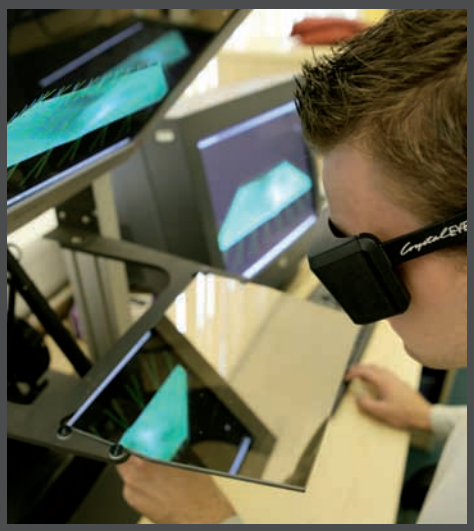
As you'd expect of a top-rated UK research school, with over 60 postgraduate students from around the world, facilities for postgraduate study are of the highest standard.

The School provides a pleasant and friendly environment for study, with central University facilities nearby. The School has an enviable range of multi million pound facilities, for example, there are cutting edge visualization laboratories, including a Powerwall (53 megapixel display wall), a 3D virtual reality suite and a new Cloud Computing testbed.

You will have access to laboratories that are equipped with state-of-the-art workstations with both Linux and Windows platforms. The University supports a ubiquitous wireless network and a VPN that allows you to connect when working off campus.

The University is a member of the White Rose Consortium, which gives the School 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 with over 3 million items; the library's 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 lectures, hosting and supervising projects and funding prizes.

Our industrial partners include:

- British Telecom
- IBM
- The British Library
- GlaxoSmithKline
- NHS Information Authority
- Shell
- Accenture

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 you are required to take modules totalling 180 credits. The taught modules and preparatory work for the research project is 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.

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. It also provides the opportunity to work alongside academics doing ground breaking 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 have included:

- Street navigation aid for visually impaired
- Source code for auditing for security
- Developing a computer based learning system that offers constructive feedback
- An investigation into the application of web technologies to support student feedback
- Real time gesture controlled 3D animation
- An evaluation of the potential of information mining techniques to support radical process improvements in the British Library
- Design and development of an ontology integrated content management system
- Personalised online communities
- Implementing a multiplatform web application using .NET
- A framework of assessing e government activities via website analysis
- Automation of water distribution management
- Classifying objects from their motion

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 Computing
University of Leeds
Leeds LS2 9JT, UK

t: +44 (0)113 343 5440

e: pgadmit@comp.leeds.ac.uk

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

Visit us

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

t: +44 (0)113 343 5440

Postgraduate masters courses:

MSc Advanced Computer Science

IT professionals and computer science researchers are required to have both a broad knowledge of the state-of-the-art technologies and techniques and also a deeper understanding of several more specialised subjects.

The solution of real world problems such as those relating to climate change, medicine or financial affairs requires computer scientists with advanced skills and knowledge in modelling and algorithm design. It requires IT professionals able to apply cutting-edge systems development techniques such as the application of modern cloud computing. Our MSc in Advanced Computer Science is an ideal foundation for these kinds of careers.

The MSc in Advanced Computer Science focuses on some of the key research strengths of the School of Computing derived from its two world-class research institutes; the Institute for Computational and Systems Science and the Institute for Artificial Intelligence and Biological Systems.

You will study a range of advanced topics including Algorithms and Complexity, Distributed Systems and Scheduling, and Artificial Intelligence.

Who will benefit?

This course will appeal to:

- Those wishing to expand, develop or update their knowledge in specialist areas of advanced computer science
- those who wish to seek future employment within the IT industry
- graduates who might later register for PhD research and will benefit from the rigorous teaching of a top-class MSc.

Typical careers

Graduates in computing disciplines from the University of Leeds have always had excellent job prospects. Recent graduates from the School have been employed in many types of organisations across a range of sectors including manufacturing, retail, finance, public authorities and consultancies.

Entry requirements

A degree equivalent to a UK upper second class honours (2:1) degree or higher in computing or in a related discipline with a significant computing component. You are expected to have programming competence, some prior systems development experience and knowledge of data structures and algorithms. Relevant work experience will also be taken into consideration.

For English language requirements see page 07.

Course content

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

Modules	Contents
Advanced Distributed Systems	The different architectures of existing distributed systems and the future directions they are taking. The module will provide the opportunity for you to design a framework for a distributed system based on architectures such as the Internet, Grid and Cloud computing and use a range of middleware tools to implement an advanced distributed design.
Algorithm Design	The principles of algorithm design including both design methods and data structures. A number of algorithms will be studied including graph and approximation algorithms. You will have the opportunity to implement and analyse some fundamental algorithms and data structures.
Computational Modelling	A range of modelling techniques and their applications, from simple linear systems to dynamical systems and simulations. The module provides the opportunity for you to design and implement a simple computational model and to analyse its output with the help of basic statistical techniques.
Machine Learning	The principal representations and algorithms used in machine learning and the techniques used to evaluate their performance. You will implement a challenging learning system using a publicly available pack of standard algorithms.
Scheduling	State-of-the-art approaches and solution strategies in designing practical scheduling optimisation algorithms. The module will look at a number of real-life problems and case studies from different domains such as transport, computer networks and healthcare.
Scientific Computation	Computational methods and the importance of reliability, efficiency and accuracy. Principles of parallel programming on distributed memory architectures and the application to Scientific Computing problems.
Techniques for Knowledge Management	The issues of how organisations gather, manage and use the knowledge that they acquire. In particular you will explore the nature and importance of organisational knowledge, of how databases are modelled and maintained, and of how data can be graphically displayed to aid people's understanding of complex problems and data sets. Further related topics include issues of human-computer interaction to identify user needs when developing user-centred systems, and data mining.
Optional modules	
Language	The theory and terminology of empirical modelling of natural language. The module provides you with the opportunity to use existing algorithms, resources and techniques for implementing Natural Language Processing (NLP) systems and will look at the application of machine learning and reasoning techniques to NLP.
Vision	The principal ideas and techniques of computer vision, including the role of machine learning. The module provides the opportunity for you to apply the theoretical knowledge gained in the module to the design of vision systems for solving specific problems.

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.

MSc Artificial Intelligence

Computer games, web searching, biometric systems and many other areas of modern IT are underpinned by Artificial Intelligence. In this course you will learn cutting-edge technologies and techniques in key areas such as machine learning, knowledge discovery and bio-computation.

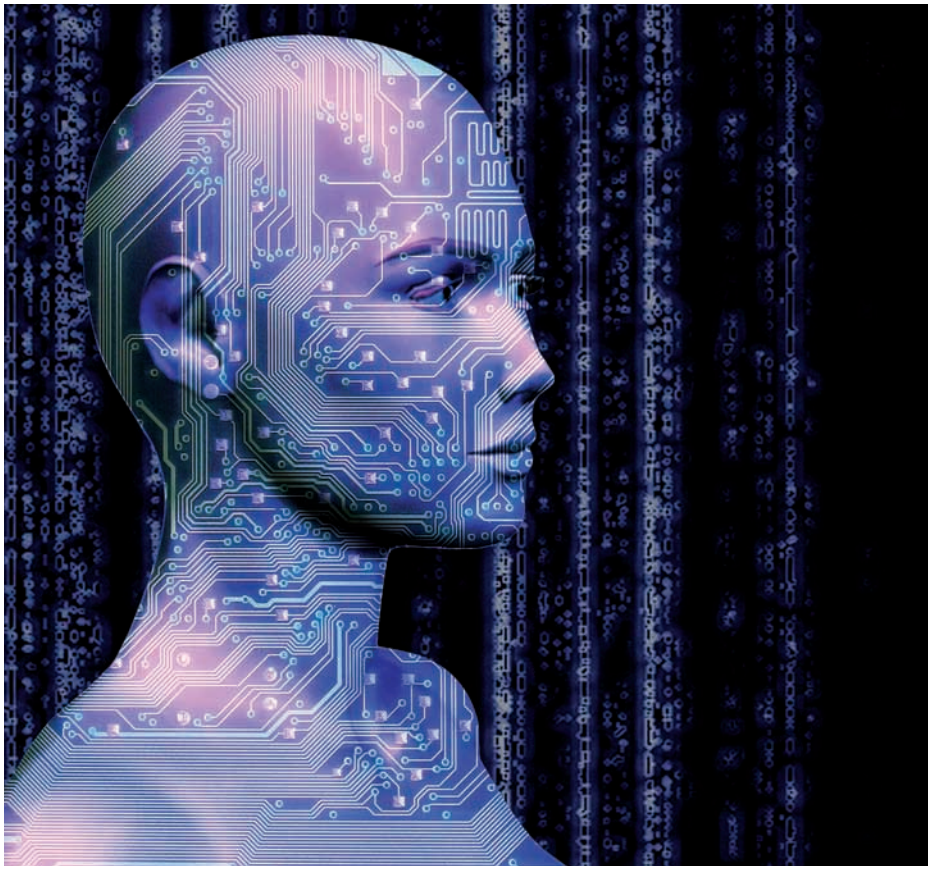
The course is derived directly from the research of the School's world-class research Institute of Artificial Intelligence and Biological Systems and covers both traditional AI techniques and state-of-the-art methods.

You will benefit from learning our cutting-edge approaches to video analysis, corpus based language studies, qualitative reasoning about space and time, and investigations into computational mechanisms in biological systems. You will also gain first-hand experience of a number of high profile and prize winning research projects.

Who will benefit?

This course will appeal to:

- Those wishing to expand, develop or update their knowledge
- those who wish to seek future employment in a wide range of technology companies working with intelligent systems.



Typical careers

Commercial applications of the course are wide-ranging, from predicting market behaviours or drug design, to developing computer games. A variety of opportunities also exist in the public sector, with for example, the Defence Research Agency or the Meteorology Office.

Recent graduates from the School of Computing can be found in organisations such as Accenture, Logica, GE Consumer Finance, William Hill Plc, HBOS, BTexact Technologies, Defence Science & Technology Laboratory UK and Lloyds TSB Registrars, amongst many others.

Entry requirements

A degree equivalent to a UK upper second class honours (2:1) degree or higher in computing or in a related discipline with a significant computing component.
You are expected to have programming competence, some prior systems development experience and knowledge of data structures and algorithms. Relevant work experience will also be taken into consideration.

For English language requirements see page 07.

Course content

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

Modules	Contents
Bio-inspired Computing	Introduces the use of natural systems as the inspiration for artificially intelligent systems. The module covers the history, philosophy and application of bio-inspired computing including swarm intelligence, neural networks and evolutionary design.
Computational Modelling	A range of modelling techniques and their applications, from simple linear systems to dynamical systems and simulations. The module provides the opportunity for you to design and implement a simple computational model and to analyse its output with the help of basic statistical techniques.
Knowledge Representation and Reasoning	You will learn how to analyse problems and real world situations in terms of a number of different formal representation languages and use automated reasoning software to compute inferences from these representations.
Language	The theory and terminology of empirical modelling of natural language. The module provides you with the opportunity to use existing algorithms, resources and techniques for implementing Natural Language Processing (NLP) systems and will look at the application of machine learning and reasoning techniques to NLP.
Machine Learning	The principal representations and algorithms used in machine learning and the techniques used to evaluate their performance. You will implement a challenging learning system using a publicly available pack of standard algorithms.
Scheduling	State-of-the-art approaches and solution strategies in designing practical scheduling optimisation algorithms. The module will look at a number of real-life problems and case studies from different domains such as transport, computer networks and healthcare.
Techniques for Knowledge Management	The issues of how organisations gather, manage and use the knowledge that they acquire. In particular you will explore the nature and importance of organisational knowledge, of how databases are modelled and maintained, and of how data can be graphically displayed to aid people's understanding of complex problems and data sets. Further related topics include issues of human-computer interaction to identify user needs when developing user-centred systems, and data mining.
Vision	The principal ideas and techniques of computer vision, including the role of machine learning. The module provides the opportunity for you to apply the theoretical knowledge gained in the module to the design of vision systems for solving specific problems.

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.

MSc Computing and Management

This course offers you the opportunity to pursue your interests in both computing and management subjects at a postgraduate level. The course runs in collaboration with Leeds University Business School.

The course is designed to develop future IT professionals with the computing and management knowledge and skills required to ensure the effective exploitation of IT within businesses.

In the current global economy, businesses will have to excel in the strategic management of their IT whilst at the same time keeping abreast with the ever-advancing technologies. With effective IT deployment now being considered a primary success factor across all businesses, IT professionals are now expected to possess a combination of management knowledge and technology expertise. The course addresses this pressing need for improved business understanding among IT specialists and professionals.

The course is run in conjunction with Leeds University Business School, which is one of the most influential business schools in the UK and has received global recognition for the quality of its teaching and research. This is reflected in the rankings which place it in the world's top 100 business schools and 3rd in Europe for research (The Financial Times 2006). Based in the impressively renovated 19th century buildings of the former Leeds Grammar School, on the western side of the University campus, the Business School boasts state-of-the-art facilities for learning, teaching and research.


Leeds University Business School

Who will benefit?

This course will appeal to graduates from outside the computing and management disciplines who wish to develop a career as an IT professional with both sophisticated technical knowledge and management expertise. This course is also well suited to those wishing to expand, develop or update their knowledge in the areas of computing and management.

Typical careers

Having completed this course you will be equipped to enter high-flying careers as IT professionals with both a sophisticated technical knowledge and the ability to approach the deployment of IT from a management perspective. Job prospects are likely to be found in all areas requiring the synthesis of IT and management expertise for example, IT project management, the implementation of IT strategy in companies, and the management of companies through IT-enabled change.

Entry requirements

A degree equivalent to a UK upper second class honours (2:1) degree or higher.

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
Advanced Distributed Systems	The different architectures of existing distributed systems and the future directions they are taking. The module will provide the opportunity for you to design a framework for a distributed system based on architectures such as the Internet, Grid and Cloud computing and use a range of middleware tools to implement an advanced distributed design.
Business Information Systems	The main objective of this module is to trigger awareness of the social, organisational and economic context of the implementation and utilisation of information systems in today's organisations. You will be introduced to the system concepts and the nature of information, and both the technical and non-technical issues of implementing information systems within a business context. You will explore the key strategic issues of information systems and evaluate approaches to the management of information, information technology and systems.
Marketing for Management	On completion you will understand the major concepts of marketing and the decision elements involved in the foundation of an effective marketing plan. Emphasis is placed on the operational mechanisms required to translate marketing concepts into successful marketing plans.
Operations and Innovation Management	Introduces Operations Management, how it is practised, and what the key issues and concerns related to the discipline are. Explores how innovation can be applied within organisations and used to support operations.
Problem Solving with Computers	Introduces the main concepts underlying modern programming and programming languages. You will discover how to write small computer programs to meet specifications, and learn systematic techniques for testing, debugging and modifying existing programs. A range of modern programming languages will be explored, providing you with a foundation for making informed choices on the appropriate technology to deploy in a given situation.
Strategic Management	Explores the nature of strategic management, of strategy, the strategy process and the strategic context. It addresses issues like strategy formulation and explanations of successful strategies, incorporating assessment of corporate and business strategies, explanations of competitive advantage, etc.
Techniques for Knowledge Management	The issues of how organisations gather, manage and use the knowledge that they acquire. In particular you will explore the nature and importance of organisational knowledge, of how databases are modelled and maintained, and of how data can be graphically displayed to aid people's understanding of complex problems and data sets. Further related topics include issues of human-computer interaction to identify user needs when developing user-centred systems, and data mining.
Understanding Organisations	This module develops knowledge and understanding of organisation theory and practice. Psychological, sociological and managerial perspectives will be used to enable participants to understand behavioural dynamics operating at multiple levels of analysis by addressing 'macro' organisation-environment relations and 'micro' processes of individual and group 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.

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.

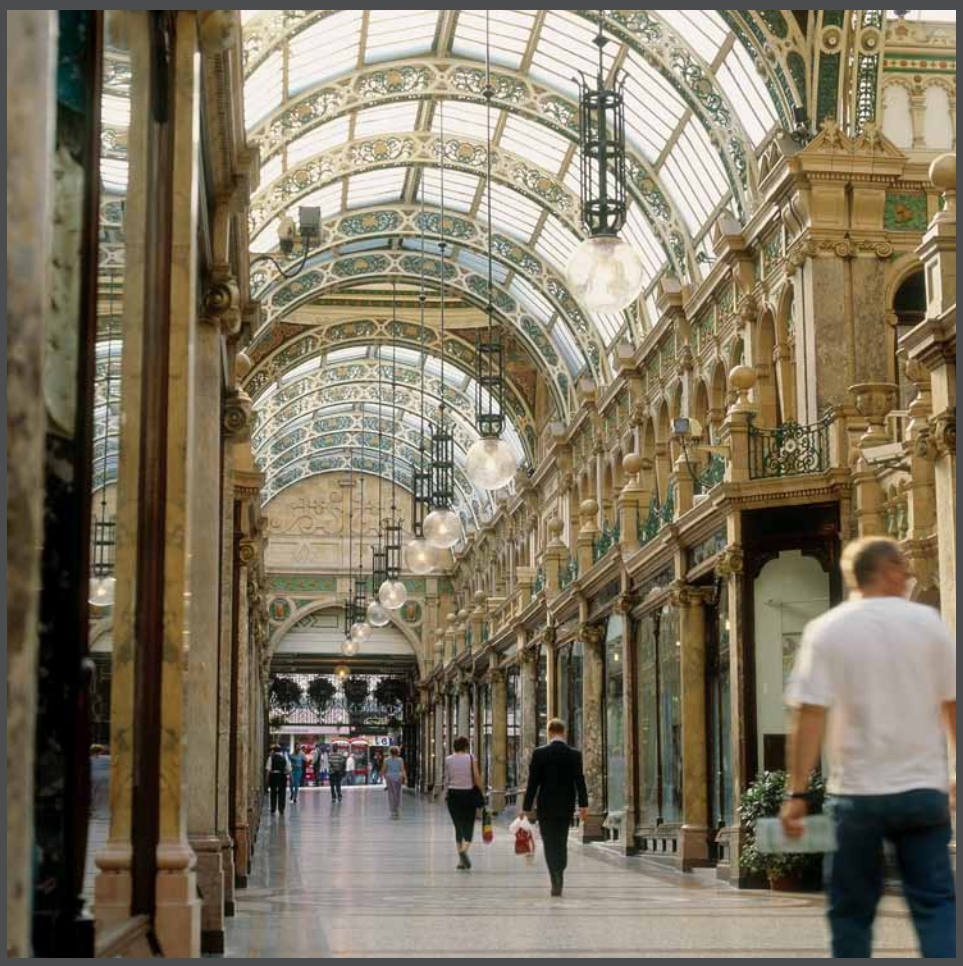
The University of Leeds is one of the most popular destinations in the UK for high-quality international students. An active International Centre brings together the international student community and is a source of information, guidance and support, as well as a great place to make new friends. International 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**

UNIVERSITY OF LEEDS

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

t **+44 (0)113 343 5440** f **+44 (0)113 343 5468**
e **pgadmit@comp.leeds.ac.uk**
w **www.engineering.leeds.ac.uk/computing**