MSc Design and Management of Sustainable Built Environments

Interdisciplinary skills for a sustainable future
Interdisciplinary approach to building design and management with a research-intensive environment.

Collaboration with other internationally leading schools, both within and beyond the University of Reading.

Closely aligned with the Innovative and Sustainable Technologies (IST) research group within the School of Construction Management and Engineering.

Underpinned by expertise from the Centre for Technologies for a Sustainable Built Environments (TSBE), which offers a range of engineering doctorates relating to sustainability in the built environment.

The School of Construction Management and Engineering is an internationally recognised centre of excellence in the area of sustainability.

The course will equip students with globally sought after skills, thereby maximising employability.

Exposure to best practice, a series of site visits throughout the year, invited industry experts and a vast network of industry links will expose students to state-of-the-art practice.

Teaching is informed by the latest research of the School’s internationally leading academics, complemented by selected industry experts.

Academic excellence combined with a focus on real-world problems.
MSc in Design and Management for Sustainable Built Environments

The MSc in Design and Management for Sustainable Built Environments draws from the extensive research base in sustainability within the School of Construction Management and Engineering. It is highly innovative in taking an interdisciplinary perspective of design and management which transcends current professional boundaries. The input from research is balanced by insights into current best practice led by invited industry experts. If you feel passionately about sustainability in the built environment, then this is the course for you.

The aim of this programme is to provide an in-depth understanding of the key subjects required for the design and management of modern built environments to meet carbon emission reduction targets. The core modules build a robust understanding of the underlying theoretical principles of designing and managing sustainable built environments. Students also acquire key practical skills to enhance their employability in the workplace. Such skills include the analysis and synthesis of building performance data as well as the ability to utilise advanced computer simulation techniques. You will also be exposed to the latest techniques in the design and assessment of energy efficient environmental systems. Coverage extends from individual buildings to city-scale urban infrastructure. The programme draws from the very latest research on the performance of high-technology environmental systems, but also emphasises the benefits to be gained from passive building systems. The programme is inherently interdisciplinary and hence suitable for students from a range of different professional backgrounds including: architects, urban planners, developers, service engineers, building scientists, construction managers and facilities managers.

Irrespective of the specialist interests of different students, the programme aims to broaden your understanding of sustainable urban and building design. If you are interested in environmental engineering, system management and the application of digital technology to the sustainability of the built environment this is the MSc programme for you.
Why choose Reading?

The University of Reading is recognised as being in the top 1% of global universities and as one of the UK’s top 20 research-intensive universities. Nearly 90% of our research has been rated as being of international standing (RAE 2008).

We have a long history of welcoming international students and currently host a thriving international community of around 3,500 international students from 130 countries. 89% of our students reported being satisfied with their experience at Reading, with 92% of international students saying they were satisfied/very satisfied with the support they received. International students, both undergraduate and postgraduate, are guaranteed a place in university accommodation if they apply for a room with a firm offer from the University before 1 August. Other reasons for international students to come to Reading include the following:

- We have recently invested over €100 million in the redevelopment of campus facilities, including halls of residence and the Sports Park.
- The town of Reading is home to a large shopping and recreational centre, as well as being located close to London, Oxford and Birmingham, all of which make great day trips.
- The University of Reading has a thriving Student Union providing entertainment and student support. There are over 100 sports clubs and societies. The University of Reading is recognised as being in the top 1% of global universities.
- The Whiteknights campus is set in 130 hectares of beautiful parkland, with green open spaces, a lake and plenty of trees and wildlife.

Facilities

The School is well endowed in terms of research infrastructure, with approximately 300m² of laboratory space together with a supporting machine workshop. Facilities include a dedicated environmental chamber, a grey water facility and a recently refurbished wind tunnel.

The laboratories are especially important in supporting students to conduct experimental work. There is also an extensive range of materials-testing equipment which is available to support students. The School possesses a dedicated innovation lab which utilises a range of digital technologies, including 3D laser scanners for the purposes of creating digital models of physical spaces. Access is available to the 3D immersive VR facility located within the School of Systems Engineering (SSE). Teaching facilities include a dedicated computer lounge equipped with the latest digital technology to support experimentation in building information modelling (BIM). Software is also available to support the teaching of building energy simulations and urban microclimate modelling.

Our courses

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<th>Duration</th>
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<td>12 months</td>
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<tr>
<td>PGD Design and Management of Sustainable Built Environments</td>
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Standard offers

Candidates should hold a good first degree in a relevant subject area, including architecture, engineering, physics, environmental science, construction, planning and management/business studies. Preference will be given to candidates with relevant industrial experience. Consideration will also be given to applicants with relevant professional qualifications.
Core modules

Energy in buildings
20 credits
Comprises, a comprehensive overview of energy use in buildings. Coverage comprises an introduction to renewable energy technologies and methods for improving energy efficiency in buildings, including environmental architectural design, environmental systems operation and adaptive occupant behaviour. Particular emphasis is given to tools and procedures for the assessment of building energy consumption. Students will gain an understanding of building simulation with hands-on experience of using commercial software packages such as Integrated Environmental solutions (IES).

Green building assessment
10 credits
Provides a comprehensive knowledge of the concept of ‘green buildings’ and methods of green building assessment. Students will learn how to evaluate the ‘green performance’ of a real building using green building assessment tools. Coverage focuses on energy efficiency, resource conservation and indoor environment together with associated assessment methods. Additional topics include:
- a critical understanding of carbon emission targets
- theory and practice in the rating and measurement of the sustainability of individual buildings.
Students will also gain a broad understanding of resource conservation in construction.

Sustainable design and environmental engineering
20 credits
Aims to provide a holistic approach to the delivery of sustainable buildings. The integration of design, operation and management processes is at the core of this module. Students develop the knowledge and understanding to be able to assess passive and active building systems in terms of their environmental performance and impact. The module further introduces the issues of building site impact, building façade design and building services engineering systems. Coverage includes construction materials and the role of facilities management and system controls in moderating the internal building environment. Particular attention is given to the energy implications of different design solutions. Technical issues are addressed in tandem with the needs of building users in the quest for integrated solutions based on a grounded understanding of socio-technical systems.
ICT and energy management
10 credits
Focuses on people-centred energy efficiency in the operation phase of the building life cycle. A particular emphasis is placed on the use of ICT approaches for monitoring and managing energy consumption in buildings. The module addresses information and building energy technologies and their application to inform, engage and empower building users to achieve substantial energy savings at modest cost. In addition to technical approaches for achieving energy efficiency in buildings, attention is also given to organisational barriers and the need to develop an awareness of relevant regulations. Quality systems also have an important role to play in achieving energy efficiency. Students gain hands-on experience of the latest digital technologies and energy data processing software, thereby enhancing their employability.

Research methods
10 credits
Students will learn how to access the necessary sources to conduct a critical literature review on a topic of their choice relating to the design and management of sustainable built environments. The module is specifically designed to assist students in their preparation of the final project/dissertation. Coverage includes the need to identify gaps in current knowledge, formulation of a focused research question and the development of a full research proposal. Research planning is addressed to ensure successful completion within the allocated timescale. Additional topics covered include the preparation of professional quality reports and an understanding of ethical issues relating to research involving human subjects. Different types of research are covered together with the use of different research methods. Students also gain training and practical experience in the oral presentation of research findings.

Urban microclimates
10 credits
Provides a comprehensive knowledge of urban microclimates and the impact of built form and texture on urban climate and building performance. The module outlines the basic physics of urban microclimates to provide a strong underpinning theoretical understanding. It also introduces the most recent advances in urban fluid mechanics, energy balance, solar radiation and, acoustic effects. A particular focus lies on the evaluation of how urban surroundings interact with individual buildings in the creation of local microclimates. Coverage includes the application of urban microclimate principles to guide and assess urban climate planning and the use of urban climate simulation tools.
Core modules (cont.)

**Environmental quality and well-being**

**10 credits**

Addresses the fundamental principles of environmental quality. The built environment is designed to regulate the immediate surroundings of people to aid the daily activities we undertake. This is relevant from city scale through to individual buildings and indoor space. In the context of the built environment, environmental quality provides a measure for determining the impact of the environment on human health. An understanding of environmental quality will be developed by introducing principles of environmental systems, measurement of environmental quality, health and well-being and the influence of urban development on environment. Students will develop an understanding of the different scales (from city to building) associated with environmental quality and control.

**Urban sustainability**

**10 credits**

Develops an awareness and knowledge of how the principles of sustainable development can be applied in an integrated and holistic way at city level. The module explores the different ways in which new cities (e.g. eco-cities and smart cities) and existing cities may be viewed through a range of conceptual frameworks which include ‘metabolic systems’ and ‘complex adaptive’ systems. Consideration is also given to the challenges of retrofitting and re-engineering cities to 2050, and the ways in which futures studies can not only help shape city visions, but also help cities plan and monitor energy, water and waste targets.

**Building Information Modelling (BIM) and asset management**

**10 credits**

Enables students to understand the process of technology development and use, and help them to appreciate the challenges and difficulties faced by the sector from a practical perspective. The module involves invited industry speakers discussing a range of case studies which illustrate advanced BIM practices on major construction projects. Students also have the opportunity to engage in practical hands-on learning using state-of-the art BIM technologies. The taught element covers the key features of this technology and how this technology influences the delivery of current construction projects. Consideration is also given to the potential barriers and the way they can be overcome. Students will have the opportunity to explore the extent to which BIM technologies can contribute to sustainable building design.
Carbon management  
10 credits
To frame the need for carbon management against the scientific understanding of climate change, noting how clear understanding of scientific uncertainty is fundamental in developing appropriate carbon management policy and actions. To explore political, economic and technological responses to climate change, recognising how these are can be implemented across a range of scales from global/regional agreements, through national policy approaches, down to actions taken by businesses and individuals.

Dissertation  
60 credits
Dissertations are written during the summer term and summer vacation and are between 12,000 – 15,000 words on a theme of interest to the student, in accordance with the aims of the degree programme. MSc candidates undertake an individual research project, which allows a detailed investigation of a particular aspect of the course. Many projects involve significant design and practical work. A number of projects will be proposed and supported by industrial partners, whilst candidates may also suggest project ideas from their own experience. Potential dissertation research topics include:
- Urban microclimates and the urban heat island
- Sensor technology and building energy management
- Designing for natural ventilation
- Indoor air quality: an empirical study
- Sustainable urban design and the challenges of eco-city assessment.

Related subjects
- MSc in Construction Management
- MSc in Project Management
- MSc in Construction Cost Management
- MSc in Construction in Emerging Economies

Research degrees
In addition to taught programmes, we offer research degrees. For more information about the availability of research degrees, please contact k.j.saxelby-smith@reading.ac.uk, phone 0118 378 8982 or visit www.reading.ac.uk/cme-pgr-about.aspx
Employability

The School has international alumni spread throughout the globe. Many are in senior positions within governments, NGOs or the private sector. Graduates from the MSc in Design and Management for Sustainable Built Environments will be uniquely equipped to engage with the challenges of reducing the built environment’s carbon footprint. Students acquire the expertise and skills significantly to enhance their employability options in a wide range of sustainability-related occupations. They achieve a rigorous understanding of the concept of sustainability in the built environment, thereby enabling them to engage in practical action. Students also receive practical guidance on the use of building assessment tools and other techniques for enhancing sustainability. Particular attention is given to the development of research skills and critical thinking ability. Graduates are able to operate with authority within their core areas of expertise, manage others in a team environment and contribute to policy-level debate.

Continuous Professional Development

Individual modules may be taken as part of a personal Continuing Professional Development (CPD) programme. CPD delegates are not assessed and only attend module sessions. A University certificate is awarded on completion of each module.

Funding

There are a range of possibilities of accessing funding to participate in our programmes.

International students seeking funding should contact their local British Council office. Further information is available from their website www.britishcouncil.org.uk

For information on scholarships www.britishcouncil.org.uk/education/funding

The University of Reading offers a limited number of scholarships and bursaries to UK and EU students. Please note that there is considerable competition for all these sources of funds.

Please see the link below. www.reading.ac.uk/cme-pgr-funding.aspx
Our staff

The course is led by internationally renowned and research active academic staff. Specialist expertise is provided by a number of visiting experts who contribute to the course as external lecturers, advisers and research collaborators.

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Further details of staff can be found here  
www.reading.ac.uk/CME/cme-staff.aspx