

**MSc Design and Management of Sustainable Built Environments (full-time)**  
**For students entering in 2015/6**

Awarding Institution:	University of Reading
Teaching Institution:	University of Reading
Relevant QAA subject Benchmarking group(s):	
Faculty:	Science Faculty
Programme length:	12 months
Date of specification:	21/Sep/2015
Programme Director:	Prof Runming Yao
Programme Advisor:	
Board of Studies:	SCME Board of Studies for Postgraduate
Programmes and the Annual Review Panel:	
Accreditation:	Chartered Institute of Building (CIOB), Chartered Institution of Building Services Engineers (CIBSE).

**Summary of programme aims**

The aim is to provide advanced understanding of the key subjects required for the design and management of modern built environments to meet carbon emission reduction targets. Building for a sustainable environment requires new types of technical, processual and organisational knowledge. Because built-environment professions, such as urban planners, architects and engineers, are relatively compartmentalised and because perceptions of sustainability differ across policy-makers, built-environment professions, industry stakeholders and end-users, there are real challenges to developing a sustainable built environment. The programme prepares professionals to address these challenges and to promote collaborative working between these different constituencies. Through the content of different modules we assimilate the range of topics necessary to analyse and synthesis solutions in sustainable built environment design. This programme is a truly interdisciplinary course covering a design and management areas in the built environments.

**Transferable skills**

The University's Strategy for Teaching and Learning has identified a number of generic transferable skills which all students are expected to have developed by the end of their degree programme. In following this programme, students will have had the opportunity to enhance their skills relating to career management, communication (both written and oral), information handling, numeracy, problem-solving, team working, use of information technology and hands-on skills in computer simulations.

The programme will develop the following transferable skills:

- Critical systems theory skills
- Systems dynamics and systems evolution analysis skills
- Environmental management and technology skills
- Environmental design skills
- Reflective practitioner skills
- Scientific, engineering and management skills
- Inter-professional team working skills
- Hands-on computer simulation skills

**Programme content**

**Core modules:**

CEM107		40	7
CEM108	Engineering Research and Dissertation	60	7
CEM220	Urban Sustainability	10	7
CEM221	Energy in Buildings	10	7
CEM223	Urban Microclimates	10	7
CEM225	Building Information Modelling	10	7
CEM226	ICT and Energy Management	10	7
CEM229	Green Building Assessment	10	7
CEM236	Environmental Quality and Well-being	10	7

**Optional modules - Anyone from this list:**

CEM224	Carbon Management	10	7
CEM227	Renewable Energy in Power Systems	10	7
CEM235	Engineering Project Management	10	7

CEM242	Advanced Visualisation and Interactive Technologies	10	7
CEM243	New Technology, Management and Change	10	7
CEM301	Thermodynamics of Energy Systems	10	7

### **Part-time or modular arrangements**

This programme may be taken on a flexible-modular basis, normally over 24 months, up to a maximum of 63 months, with a choice of September or January start.

All 10-credit modules will be provided in one week attendance periods at the University.

Any 10-credit module provided by the School can be taken as a short course on an ad-hoc basis.

### **Progression requirements**

There are no intermediate progression requirements.

### **Summary of Teaching and Assessment**

The general assessment pattern for each module is by coursework. Detailed assessment regimes are specified in the relevant module descriptions.

The overall mark for the programme will be the aggregate mark of modules, weighted by credit value and classified as below. For further details see 'How to calculate an award' at: <http://www.reading.ac.uk/exams/>

The programme uses the University's classification scheme:

*Passing categories:*

70 - 100% Work of distinction standard

60 - 69% Work of merit standard

50 - 59% Work of good standard

*Failing categories:*

40 - 49% Work below threshold standard (BTS)

0 - 40% Unsatisfactory Work

Further information on the classification conventions, including borderline criteria, are available at

<http://www.reading.ac.uk/internal/exams/Policies/exa-class.aspx>

### **Masters award**

To obtain the Masters award a student must take 180 credits consisting of the nine compulsory core modules and one optional module. To pass the MSc students must gain an average mark of 50 or more over 180 credits including a mark of 50 or more for the dissertation. In addition, the total credit value of all modules marked below 40 must not exceed 30 credits and the total credit value of all modules marked below 50 must not exceed 50 credits.

Students who gain an average mark of 70 or more overall or an average mark of 68 or more and a mark of 70 or more in 90 credits, including a mark of 60 or more for the dissertation, and have no marks below 40 will be eligible for a Distinction. Those gaining an average mark of 60 or more overall or an average mark of 58 or more and a mark of 60 or more in 90 credits, including a mark of 50 or more for the dissertation, and have no mark below 40 will be awarded a Merit.

### **Diploma award**

To obtain the Postgraduate Diploma a student must take 120 credits including at least three compulsory core modules (not including CEM108 Engineering Research and Dissertation or CEM107 Sustainable Design and Management Principles and Practice). To pass the Diploma students must gain an average mark of 50 or more over the 120 credits. In addition the total credit value of all modules marked below 40 must not exceed 30 credits and the total credit value of all modules marked below 50 must not exceed 50 credits.

Students who gain an average mark of 70 or more over 120 credits or an average mark of 68 or more over 120 credits and a mark of 70 or more in 60 credits, and have no mark below 40 will be awarded a Distinction. Those gaining an average mark of 60 or more over 120 credits, or an average mark of 58 or more and a mark of 60 or more in 60 credits, and have no mark below 40 will be awarded a Merit.

### **Certificate award**

To obtain the Postgraduate: CEM108 Engineering Research and Dissertation or CEM107 Sustainable Design and Management Principles and Practice). To pass the Certificate students must gain an average mark of 50 or more over the 60 credits. In addition the total credit value of all modules marked below 40 must not exceed 10 credits.

Note: A module cannot be credited for more than one award.

### **Admission requirements**

Applicants are normally required to have a good undergraduate honours degree in any subject. Candidates with a lesser degree and relevant professional qualifications (e.g. RIBA, ARICS, MICE, MCIOB, MCIBSE) will also be considered.

**Admissions Tutor:** Prof Runming Yao

### **Support for students and their learning**

University support for students and their learning falls into two categories. Learning support is provided by a wide array of services across the University, including: the University Library, the Careers, Placement and Experience Centre (CPEC), In-session English Support Programme, the Study Advice and Mathematics Support Centre teams, IT Services and the Student Access to Independent Learning (S@il) computer-based teaching and learning facilities. There are language laboratory facilities both for those students studying on a language degree and for those taking modules offered by the Institution-wide Language Programme. Student guidance and welfare support is provided by Personal Tutors, School Senior Tutors, the Students' Union, the Medical Practice and advisers in the Student Services Centre. The Student Services Centre is housed in the Carrington Building and offers advice on accommodation, careers, disability, finance, and wellbeing, academic issues (eg problems with module selection) and exam related queries. Students can get key information and guidance from the team of Helpdesk Advisers, or make an appointment with a specialist adviser; Student Services also offer drop-in sessions and runs workshops and seminars on a range of topics. For more information see [www.reading.ac.uk/student](http://www.reading.ac.uk/student)

All students in the School are provided with guidance and support for their learning in a variety of ways. Interaction takes place with the Programme Director, Lecturing Staff and Dissertation Supervisors who provide guidance throughout the period of study. Dissertation Supervisors will guide students through the dissertation by organising regular structured meetings. A minimum of 12 supervision meetings would be expected during the programme at times that are mutually convenient. Furthermore all students will be able to meet the Programme Director and lecturing staff at mutually convenient times throughout the year. The School's administrative, support and technical staff help to support and personalise students' experience with the School. In addition to the above, students will have access to the SCME Resource Room and receive a detailed programme handbook and other relevant information packages. The Programme Director will also organise an annual induction event where all students will be welcomed by their lecturing staff in a friendly and informal setting.

All modules are supported by learning materials on a dedicated website. Students are given access to the material via the Blackboard platform, which can be accessed on or off campus.

### **Career prospects**

Graduates will typically find employment in cost management or quantity surveying with public and private sector clients, consultants, or contractors in the building, civil engineering or oil & gas sectors.

### **Opportunities for study abroad or for placements**

There are no formal arrangements for study abroad or placements.

### **Programme Outcomes**

Students completing this award will be able to:

- Deal with complex issues both systematically and creatively, make reasoned judgements in the absence of complete data, and communicate their conclusions clearly to specialist and non-specialist audiences.
- Demonstrate self-direction and originality in tackling and solving problems, and act autonomously in planning and implementing tasks at a professional or equivalent level.
- Continue to advance their knowledge and understanding, and to develop new high level skills.
- Possess the qualities and transferable skills necessary in their employment to be capable
  - exercising initiative and personal responsibility
  - decision making in complex and unpredictable situations
  - independent learning required for continuing professional development.
- Demonstrate competence in the design and management of environmental systems and their performance assessment in the context of sustainability.
- Possess an understanding of conventional and renewable energy requirements in building environmental control, to allow evaluation and synthesis to be undertaken.
- Possess evaluation skills in the areas of low carbon building and urban design.
- Possess abilities in the management of sustainable built environment design.

These outcomes include those detailed outcomes described in specific modules.

### **Knowledge and Understanding**

#### **A. Knowledge and understanding of:**

1. Strategic planning, briefing and management at design and management phases.
2. Design and performance evaluation of environmental systems.
3. Carbon management in urban and building scales.
4. Types of energy conversion systems and their environmental impact.
5. Building energy management.
6. Indoor environment and assessment.
7. Urban environment.
8. System design methods.
9. Management of engineering projects.

#### **Teaching/learning methods and strategies**

The core one-week modules provide the concepts in a variety of disciplines that form the multi-disciplinary study. Optional modules allow students to tailor their learning experience to their needs. Application of the principles is undertaken in the integrating studies module. Teaching methods include formal lectures, guest lecturers from invited industry speakers, tutorial discussions, individual and group presentations, group exercises, case studies, guided reading and guidance on key sources of reference material. Feedback and guidance are important elements in formative assessment and complement an emphasis on self-study. Learning is supported by Blackboard VLE.

#### *Assessment*

Details of assessment are provided in the module descriptions. Modules are individually assessed through assignments and coursework, with some group work. The assessment in the integrating studies module is designed to focus on the application of knowledge from individual modules. Independent research skills and the ability to produce a major report are assessed in the dissertation.

#### **Summary**

Teaching and learning is offered through case-supported lectures and tutorials, web-based material, guest speakers from international firms, visits to national and international institutions, and guided reading.

### **Skills and other attributes**

#### **B. Intellectual skills - *able to*:**

1. Analyse and interpret data and design information related to environmental systems.
2. Reason critically the methodologies used in the design and evaluation of environmental systems.
3. Strategic design method.
4. Solve problems using scientific, engineering and management skills.
5. Communicate with other members of a building design team.

#### **Teaching/learning methods and strategies**

Intellectual skills are developed through the teaching programme outlined earlier. Each module involves presentation and discussion of concepts and their application to problem solving. Evaluation of the various decisions made by peers and assessors.

#### *Assessment*

Intellectual skills are assessed by means of assignments and examinations:

1. Individual and teamwork problem-solving exercises and assignments.
2. Case-based assignments including reports and presentations, examinations.
3. Class tests and intensive teamwork exercises, presentations and reports.
4. Case-based teamwork assignments, examinations.

5. Case-based assignments, examinations and dissertation work.

#### **Summary**

Intellectual skills are gained through all modes of teaching/learning as part of every individual module and are assessed through individual and teamwork assignments, reports, presentations, class tests, examinations and a dissertation.

### **C. Practical skills - *able to*:**

1. Obtain required information from the literature, internet and professionals.
2. Use advanced computer simulation tools in problem solving and design.
3. Plan, undertake and report on a piece of research or design.
4. Knowledge of the interaction between people, buildings and their environmental systems.

### **Teaching/learning methods and strategies**

Students receive initial training on literature search both in libraries and through the internet. Comprehensive bibliographies are provided for each course at the outset, as are guides on report and dissertation writing. Module material is available on the internet. Computer laboratory classes are scheduled for the relevant modules.

#### *Assessment*

Skills (1-3) are assessed through coursework. Skill (4) is assessed through examination and coursework.

#### **Summary**

All practical skills will be developed through case-based group assignments and finally demonstrated and improved through a dissertation. In addition to that students will learn practical skills through directed reading and lectures.

### **D. Transferable skills - *able to*:**

1. Work independently and in a group.
2. Use computer software for the design of environmental systems.
3. Enhance skills relating to career management, communication (both written and oral) and information handling.
4. Solve problem and use information technology.
5. Undertake research.

### **Teaching/learning methods and strategies**

The major content of all courses, including coursework and feedback, are given to the student (1). (3) is learned through the management of time to meet various deadlines for coursework submission. Skills (2) and (4) are developed in lectures, laboratory classes and private study. Tutorials and laboratory classes have elements of discussion and interaction between the students and lecturer and among the students themselves.

#### *Assessment*

Skills (1) and (3) are assessed through oral and written presentation of coursework. The coursework mark reflects both of the oral and written skills. Skills (2) and (4) are assessed through coursework but skill (5) is assessed by dissertation.

#### **Summary**

Transferable skills are attained through all modules in the way of exercises, problem-solving assignments, presentations, lectures, and through the Blackboard VLE.

**Please note - This specification provides a concise summary of the main features of the programme and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. More detailed information on the learning outcomes, content and teaching, learning and assessment methods of each module can be found in the module description and in the programme handbook. The University reserves the right to modify this specification in unforeseen circumstances, or where the process of academic development and**

**feedback from students, quality assurance process or external sources, such as professional bodies, requires a change to be made. In such circumstances, a revised specification will be issued.**