



WHY STUDY URBAN WATER SYSTEMS AT EXETER?

- **Unique specialist MSc training with excellent employment prospects**
- **Taught by the internationally renowned Centre for Water Systems**
- **Incorporates the study of water systems technology within a broader systems-wide approach to the creation of sustainable and affordable water management systems**
- **Multidisciplinary research institutes in informatics, mathematics and advanced technologies**
- **Opportunities for collaborative training awards to gain teaching experience**
- **Generous scholarships**

Water supply, sanitation and drainage are fundamental to the health and well-being of all urban communities worldwide. In the industrialised world, serious issues of asset deterioration, water resource depletion and climate change are major contemporary challenges. In developing countries establishing and maintaining reliable, affordable and sustainable urban water management systems is key to survival for millions and fundamental in improving the quality of life for billions more across the globe.

Conventional and well-established practices for water and wastewater management are being questioned in a world of rapidly changing urban environments, a changing climate and changing priorities. System integration, involving technical, environmental and socio-cultural aspects, is seen as an important way forward to providing sustainable, economic and reliable water systems. This programme will train you in the essentials of water systems technology, in a context that encourages a wide, integrated, systems approach to their implementation.

This programme is offered by the internationally acclaimed Centre for Water Systems (www.exeter.ac.uk/cws), led by Professors Dragan Savic and David Butler, and is the only course of its type in the UK. It draws on the experience and cutting-edge research capability of Centre staff together with external lecturers from leading companies and government agencies, ensuring delivery of a theoretically sound and practically relevant course.

The Centre specialises in the development and application of hydroinformatics particularly to the area of urban water systems. With a research income of over £300,000 per year and approximately 25 researchers, the Centre is the largest in its field in the UK and has wide international links in North America, Europe, Australasia and beyond.

This Masters will appeal to engineering and science graduates who wish to enhance their capabilities in urban water design, operation and management, and to engineers working in the water industry who are looking to acquire knowledge, skills and a formal qualification in this area. The programme will open up a wide range of employment opportunities and will act as a foundation for further research in the areas of urban water management and water systems.

Urban Water Systems



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I currently work as an engineer for Faber Maunsell AECOM; a leading international consultancy. My employer recognised the importance for me to obtain a relevant and up-to-date Masters and it was their recommendation that I enrolled as a part-time student with the University of Exeter.

Exeter University is a fantastic place to study and one that supports achievement in all career aspirations. Since joining I've been selected as one of the Institution of Civil Engineers (ICE) President's apprentices. This involves shadowing ICE President Jean Venables OBE for some of her presidential duties throughout 2009. Exeter has been wholly supportive of this great opportunity, with the flexibility and industrial focus of the programme making it possible to do both.

The lectures and tutorials are responsive to my needs and I'm part of one of the most productive learning environments I could wish for. I attend lectures every Tuesday and by Wednesday I have already put the knowledge into practise!

BEN WARD

KEY FACTS

MSc/PgDip/PgCert in Urban Water Systems

Duration 12 months full-time, 24 months part-time

Start-date October

Entry requirements All applications are considered individually on merit. Normally a Second Class Honours degree or above (or equivalent) in an engineering or science subject is required. All international students whose first language is not English will need to satisfy our English Language requirements; for further information see the Postgraduate Prospectus at www.exeter.ac.uk/postgraduate

Fees (2009/10) UK/EU students: £4,500; International students: £12,250

Funding opportunities Generous international scholarships are available from the School; visit www.exeter.ac.uk/secam/scholarships for full details. There are also University Scholarships including Full Fee Masters Scholarships, British Council Fellowships and Awards and Foreign and Commonwealth Scholarships. Visit www.exeter.ac.uk/scholarships for further information.

Programme overview

This programme will train you in the essentials of urban water supply and urban drainage technology, as well as the hydrodynamic tools for simulating their performance, all in a context that encourages a wide integrated systems approach to their implementation. Current and emerging issues are covered, including hydroinformatics, integrated system modelling, risk and uncertainty, whole-life costing, water efficiency, and catchment-based management. The programme will build on your capabilities, allowing you to develop the most up-to-date skills and knowledge for an industrial career or further study and research.

Programme aims

- Provide you with a knowledge of classical and contemporary problems in management of urban water systems for the practising engineer;
- Enable you to obtain practical experience in using hydroinformatics tools over a wide range of application areas in urban water systems;
- Develop your enthusiasm for the application of systems analysis and an understanding of its role in modelling urban water problems;
- Teach you the necessary research skills, personal skills and core academic skills, to prepare you for a wide range of employment opportunities;
- Prepare you for further research in the area of urban water systems.



Programme structure

The MSc programme can be studied full-time over 12 months (arranged into two 12-week teaching semesters) and a summer project, or part-time over 24 months (one day per week each semester). A shorter diploma and certificate are also available.

The programme is modular and flexible, carrying 180 credits in total. The structure consists of five core modules totalling 165 credits, including a 60-credit dissertation project, plus one option module to be chosen from a list of advanced Masters-level modules (15 credits each). However, we recommend you follow the Case Studies and Special Topics module, as it is specifically tailored to your needs.

For the Diploma (120 credits) students take all the core modules except for the Dissertation. For the Certificate (60 credits) students take the Urban Drainage and Waste Water Management and the Water Supply and Distribution Management modules.

Programme modules

CORE MODULES

Urban Drainage and Waste Water Management

This module covers the problems and solutions for management of urban drainage systems (UDS). It will familiarise you with: types of sewer systems and structures; synthetic and experimentally determined inflows; principles of flow simulation in sewer networks, including aspects such as modelling of urban flooding and real-time control; modern methodologies (GIS techniques, SUDS, asset management); and environment-related approaches such as combined sewer overflow treatment, water re-use and integrated management. The module also offers practical experience in using tools for modelling UDS.

Water Supply and Distribution Management

This module provides a basic knowledge of classical and contemporary problems in the management of water supply and distribution systems for the practising engineer, such as optimal design, leakage control, water quality management and water conservation techniques. It also

offers practical experience in using water supply and distribution modelling tools.

Hydroinformatics Tools

Hydroinformatics is the integration of information technology (computing and software tools) with knowledge and understanding of water quantity and quality to enhance our understanding and resolve problems related to the aquatic environment. You will gain an understanding of tools in hydroinformatics for the practising engineer, and be able to apply some of these tools in your research project (dissertation). We will discuss the theoretical and practical aspects of hydroinformatics tools such as geographical information systems (GIS), optimisation tools, data mining methods and decision support tools, as applied to urban water systems.

Engineering Systems Analysis

This module provides you with an understanding of the numerical methods, simulation and optimisation techniques needed in both engineering design and management activities. Both traditional methods and modern computational intelligence methods are introduced and particular importance is placed on the use of such techniques to solve management related problems. This is a common module for all engineering MSc programmes and provides a good opportunity for you to interact with students from other MSc programmes.

Dissertation Research Project

The main aim of this module is to solve a research or industrially related practical problem. The project work will lead to a dissertation, of approximately 30,000 words, and will involve project planning, the interpretation of analytical, experimental or empirical results and a clear demonstration of how the goals of the project have been met. You will select a project in consultation with your potential supervisors; researchers from within the Centre for Water Systems, from other research centres, and/or UK and overseas industrial collaborators. As part of the research project, you are expected to undertake a considerable amount of self-study. There is no formal taught component

in this module, but you are expected to have regular meetings with your supervisor.

OPTION MODULES

Case Studies and Special Topics

This module will develop your ability to pursue independent study in an area relevant to the programme and to acquire specialist knowledge of that area through in-depth study of a special topic or on an industrially relevant case study. It is based around an extensive list of guest and internal lecturers explaining current issues and on-going research projects.

Methods and Algorithms

This module explores a diverse range of mathematical topics, emphasising their practical aspects. The topics covered will range from matrix algebra to differential systems and optimisation and provide a theoretical grounding in many of the tools used in mathematical modelling. It allows considerable discussion of this mathematical framework and practical applications whilst developing mathematical ability and reasoning skills.

Computational and Numerical Analysis

This module introduces the popular computer package Matlab and other relevant software. Topics from linear algebra, differential equations, statistical modelling, optimisation and dynamical systems are used to demonstrate the versatility and capabilities of such packages in the application of modern numerical modelling techniques. The topics discussed have wide-ranging applications in industrial and research contexts and will give hands-on experience of numerical modelling together with an understanding of the mathematics underlying each method.

Advanced Topics in Statistics or Operational Research

This module exposes you to some recent developments in statistics or operational research, allowing you to study one or more advanced topics in some depth and gain an insight into areas of postgraduate research in statistics or operational research.

As the programme continues to develop, module options may change. This is only an indicative list; please visit our website for the latest information.



Learning methods and academic support

The programme is delivered through a mix of lectures, seminars, tutorials, industrial presentations, case studies, technical visits, computer simulations, project work and a dissertation. The programme will have particular value in encouraging transferable skills development including management skills, communication skills, computational techniques, data handling and analysis, problem solving, decision making and research methodology. Many of these skills will be addressed within an industrial and commercial context.

The MSc is assessed on the basis of written examinations (40%), coursework (27%) and the final project (33%).

You will be allocated a Personal Tutor who is available for advice and support throughout your studies, along with support and mentoring from graduates who are now placed in industry. There is also a Postgraduate Tutor available to help with further guidance and advice.

Research

Research within the School is organised into three Research Institutes; the Advanced Technologies Institute, the Mathematics Research Institute and the Informatics Research Institute. Each has its own Research Centre, providing the focus for significant multi-disciplinary research activity, transferring technology between academia and industry.

The MSc in Urban Water Systems is run by the Centre for Water Systems and falls within the **Informatics Research Institute**. Building on Exeter's international reputation for informatics activities, this Institute concentrates on the increasingly important areas of hydroinformatics (urban water systems), bioinformatics and biomedical informatics, together with computational statistics and information systems research. Our computer science and informatics research outputs were recognised as having both industrial and social importance in the 2008 RAE with the institute's Centre for Water Systems noted as a clear area of strength.

One current research project of the Centre for Water Systems aims to help alleviate the

pressure on water resources and the water supply system caused by domestic water consumption which has increased by over 50% in the last 25 years. Working with Phoenix Product Development Limited and the Water Research Centre, our engineers are testing and developing a revolutionary new toilet which uses just 1.5 litres per flush compared with many existing toilets that use 9 litres. The device uses a unique 'displaced-air' system to flush the waste using 84% less water and 80% less energy than an average WC. The small scale trials have been so successful that it is planned to refit all the toilets in a large university building and undertake intensive monitoring of durability, water and energy saving and user satisfaction.

Postgraduate facilities and resources

The School provides a warm, friendly and supportive atmosphere. The close personal contact between staff and students contributes to a highly productive and well-organised research environment.

The School has excellent teaching and research resources and has recently invested £2.8 million into providing new academic and social facilities. You will have access to the School's fully-equipped research centres, comprehensive laboratories and workshops and computer facilities including wireless networking in some areas. The School has a brand new study area with core texts for courses, individual rooms for study groups to meet, and wireless connection for laptops and LCD TVs to display presentations.

Our Research Institutes offer weekly seminars which provide invaluable insights into current research and related work as well as a place to meet staff and other students. There is also a range of extra-curricular activities organised by students, student societies and the Research Institutes that provide an opportunity to meet students and staff in more informal settings.

International students

We pride ourselves on making our international students feel welcome and at home, with tutors offering guidance and support. International students appreciate

Exeter's safe location and friendly atmosphere.

There is a thriving international student community of some 2,000 students from over 100 countries. There is a full-time International Student Adviser to help with welfare and visa issues. The INTO University of Exeter Centre provides courses for students who need to improve their English before starting a degree and free tuition during term-time. For further information visit www.exeter.ac.uk/international

Under the Post Study Work Scheme, international students who have graduated from one of our postgraduate programmes may be able to remain and work in the UK for up to 24 months after notification of their results. Students who wish to take advantage of the Scheme are encouraged to contact the University's Careers and Employment Service after they arrive at Exeter to discuss employment possibilities.

International students should note that they will not be permitted to study a programme part-time under the terms of a student visa.

Employment

Graduates of this programme can expect to find themselves in demand for a wide range of possible employment, including civil engineering applied to all aspects of the water industry. This includes work for industry, governmental and non-governmental organisations. The programme will give opportunities to take other employment that requires an understanding of the natural environment, geographic information systems, data collection analysis and prediction. The MSc provides an ideal entry point to advanced studies in water systems, for example PhD or MPhil study at the internationally excellent Centre for Water Systems at Exeter.

Recent graduates have embarked on a diverse range of careers including the Ministry of Defence Engineering and Science Group's graduate training scheme and as a Graduate Engineer within Atkins's Water Team.



Why choose Exeter?

A top 15 research-led university

- The University of Exeter is ranked 13th in the *Times* and 14th in the *Guardian* and *Sunday Times* 2008 league tables. Nearly 90 per cent of Exeter's research was rated as being at internationally recognised levels in the 2008 Research Assessment Exercise. Sixteen of our 31 subjects are ranked in their respective top 10, with 27 in their respective top 20. Every subject was assessed as including world-leading (4*) research.*
- In the last year, £51 million was invested in research and the value of new research grants and contracts rose by 49 per cent.
- We are planning investment of £80 million in science, medicine and engineering over the next three years. £30 million of existing University funds and an anticipated £50 million from external sources will be spent on new appointments and infrastructure to boost research and teaching.

Dedicated support and training

- We invest £4.5 million per year in scholarships and financial support for postgraduates.
- Our employment rates for postgraduates are above the national average;** 97 per cent of postgraduates who graduated in 2006/7 entered employment or further study.***
- The Postgraduate Centre on the Streatham Campus offers purpose-built study and leisure facilities, including a 24-hour computer room, lounges, seminar room, bar and dining room.

- The Postgraduate Union (PGU) represents postgraduates across the University, organising the Postgraduate Forum which gives students the opportunity to provide feedback, as well as social events. Postgraduates are well represented on the Guild's award-winning media and wide range of clubs and societies. Each October, there is a Welcome Week specifically designed for new postgraduates.

Investment in student and research facilities

- We are near to completing a £140 million investment programme in new buildings and facilities, ranging from dedicated postgraduate study facilities and new research centres to the Students' Guild building and nightclub.
- The University is now looking to the future with a planned £450 million investment in campus facilities by the end of the next decade. This will include a £40 million redevelopment of the centre of the Streatham Campus and a new £45 million INTO Centre for international students.
- Exeter's expenditure on library books, journals and electronic resources is 35 per cent above the national average in terms of spend per full-time student.****
- An £8 million development programme has given Exeter some of the best sports facilities in the country. New indoor tennis facilities to LTA standards opened in 2004 on the Streatham Campus, making

Exeter one of only nine UK universities to have such facilities. A new £2 million cricket centre will open in spring 2009.

An exceptional location

- The Streatham Campus in Exeter is one of the most beautiful in the country.
- A safe, student-friendly city within walking distance of both campuses, Exeter is consistently rated one of the best places to live in the UK for the quality of its facilities and low crime rate. For those looking to escape city life, sandy beaches, moorland and some of the most stunning countryside in Britain are all just a short journey away.
- No longer the 'sleepy cathedral town', Exeter is booming economically and culturally but without losing its human scale and relaxed ambience. Large companies like the Met Office are choosing to relocate and there are major developments in shopping, leisure and nightlife in the city centre, including a £200 million new retail centre. Exeter ranks joint 8th (just behind Brisbane, Shanghai, Sydney and London) in a worldwide study of promotion of inward investment and was voted 2nd best place for retail therapy in the UK outside London (Yellow Pages survey, 2007).

* based on percentage of research categorised as 3* and 4* (internationally excellent or world leading)

** HESA 2005/6

*** Figures at Jan 2008 as a percentage of Home Full-time graduates available for employment or further study

**** LISU/SCONUL figures, 2006/7



Application procedure

You can apply online via the programme page on our website at www.exeter.ac.uk/postgraduate

Further information on application procedures can be found at www.exeter.ac.uk/postgraduate/admissions



Useful contacts

School of Engineering, Computing and Mathematics

Telephone: +44 (0)1392 263624

Email: t.albutt@exeter.ac.uk

www.exeter.ac.uk/secam

Postgraduate admissions

Telephone: +44 (0)1392 263316

Email: pg-ad@exeter.ac.uk

Information for international students

Telephone: +44 (0)1392 263405

Email: intoff@exeter.ac.uk

www.exeter.ac.uk/international

University accommodation

www.exeter.ac.uk/postgraduate/accommodation

Fees and finance

www.exeter.ac.uk/postgraduate/money

This document forms part of the University's Postgraduate Prospectus. Every effort has been made to ensure that the information contained in the Prospectus is correct at the time of going to press. However, the University cannot guarantee the accuracy of the information contained within the Prospectus and reserves the right to make variations to the services offered where such action is considered to be necessary by the University. For further information, please refer to the Postgraduate Prospectus (available at www.exeter.ac.uk/pgp/disclaimer).