

<b>MODULE TITLE</b>	<b>Water Supply and Distribution Management</b>		<b>CREDIT VALUE</b>	15
<b>MODULE CODE</b>	ECMM133		<b>MODULE CONVENER</b>	Prof Raziye Farmani (Coordinator)
<b>DURATION: TERM</b>	1	2	3	
<b>DURATION: WEEKS</b>	12	0	0	
<b>Number of Students Taking Module (anticipated)</b>	0			

#### DESCRIPTION - summary of the module content

With the world's population expanding rapidly and pressures mounting from increasing industrial development and urbanisation, the right balance between water consumption and supply from limited natural water resources is becoming ever more important.

The module will provide you with the theoretical and practical knowledge and understanding of classical and contemporary issues related to the management of water supply and distribution systems. You will learn about different types of water sources, how to build, calibrate and use various models to optimally (re)design and/or operate water distribution systems. Furthermore, you will learn how to use manage pressures, leakage, demands and water quality, all in an integrated risk-based asset management type framework with the aim to identify more sustainable and resilient solutions to practical, real-life problems.

#### AIMS - intentions of the module

This module aims to provide you with a basic knowledge of classical and contemporary problems in management of water supply and distribution systems for the practising engineer. It also offers you practical experience in using different water supply and distribution modelling tools.

#### INTENDED LEARNING OUTCOMES (ILOs) (see assessment section below for how ILOs will be assessed)

##### Discipline and Module Intended Learning Outcomes:

On successful completion of this module, you should be able to:

##### Module Specific Skills and Knowledge:

- 1 Understand water supply and distribution system components, their characteristics and functioning of such systems
- 2 Appreciate supply and distribution system management problems
- 3 Use water supply and distribution modelling and management principles

##### Discipline Specific Skills and Knowledge:

- 4 Identify, formulate and analyse a management problem in a given water supply/distribution system
- 5 Critically assess research results
- 6 Demonstrate some practical experience of using water supply/distribution modelling tools

##### Personal and Key Transferable / Employment Skills and Knowledge:

- 7 Show improved independent learning skills
- 8 Exhibit enhanced report and presentation skills
- 9 Display improved IT skills

#### SYLLABUS PLAN - summary of the structure and academic content of the module

- Introduction to clean water systems; water sources: basic elements and their characteristics (wells, open reservoirs)
- Water distribution systems (WDS): basic elements, their characteristics and hydraulics
- WDS modelling (steady-state, extended period simulation, water quality models)
- WDS model assembling, calibration and validation (data collection, GIS, SCADA, etc.)
- WDS design (conventional and advanced) and operation (pump scheduling)
- Performance indicators
- Pressure management
- Leakage management
- Water demand management
- Water quality management
- Integrated asset management
- Sustainability

#### LEARNING AND TEACHING

##### LEARNING ACTIVITIES AND TEACHING METHODS (given in hours of study time)

<b>Scheduled Learning &amp; Teaching Activities</b>	44.00	<b>Guided Independent Study</b>	108.00	<b>Placement / Study Abroad</b>	0.00
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**DETAILS OF LEARNING ACTIVITIES AND TEACHING METHODS**

Category	Hours of study time	Description
Scheduled learning and teaching activities	26	Lectures
Scheduled learning and teaching activities	18	Tutorials (specialised, state-of-the-art software provided)
Guided independent study	60	Work required to complete the coursework
Guided independent study	46	Private study including wider reading, lecture preparation, assessment practice; feedback provided by module convener on request

**ASSESSMENT****FORMATIVE ASSESSMENT - for feedback and development purposes; does not count towards module grade**

Form of Assessment	Size of Assessment (e.g. duration/length)	ILOs Assessed	Feedback Method
Question asked in lectures	N/A	All	Answers provided on the spot

**SUMMATIVE ASSESSMENT (% of credit)**

<b>Coursework</b>	30	<b>Written Exams</b>	70	<b>Practical Exams</b>	0
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**DETAILS OF SUMMATIVE ASSESSMENT**

Form of Assessment	% of Credit	Size of Assessment (e.g. duration/length)	ILOs Assessed	Feedback Method
Examination	70	2 hours	All	Oral (on request)
Coursework assignment report on a given topic (e.g., literature review on a given topic) or report on a solution obtained for a given engineering problem (e.g., calibration of hydraulic model of a real-life pipe network)	30	5,000 words (8 pages A4)	All	Written, comments in the report and/or the assessment form

**DETAILS OF RE-ASSESSMENT (where required by referral or deferral)**

Original Form of Assessment	Form of Re-assessment	ILOs Re-assessed	Time Scale for Re-assessment
All above	Written examination (100% - 2 hours)	All	Referral/deferral period

**RE-ASSESSMENT NOTES**

Reassessment will be by a single written exam only worth 100% of the module. For deferred candidates, the mark will be uncapped. For referred candidates, the mark will be capped at 50%.

**RESOURCES****INDICATIVE LEARNING RESOURCES - The following list is offered as an indication of the type & level of information that you are expected to consult. Further guidance will be provided by the Module Convener****Web based and Electronic Resources:**

ELE: <http://vle.exeter.ac.uk>

**Reading list for this module:**

Type	Author	Title	Edition	Publisher	Year	ISBN	Search
Set	Trifunovic, N	Introduction to Urban Water Distribution	1st	Taylor & Francis	2006	0-415-39517-8	<a href="#">[Library]</a>
Set	Kapelan, Z	Calibration of Water Distribution System Hydraulic Models		Lambert Academic Publishing	2010	978-3838353418	<a href="#">[Library]</a>
Set	Walski T.M, Chase D.V, Savic D.A, Grayman W, Beckwith S and Koelle E.	Advanced Water Distribution Modeling and Management		Haestad Press	2009	000-097-141-412-2	<a href="#">[Library]</a>
Set	Rossman L	Epanet2 Software and User Manual		<a href="http://www.epa.gov/ORD/NRMRL/wswrd/epanet.html">http://www.epa.gov/ORD/NRMRL/wswrd/epanet.html</a>	2005		<a href="#">[Library]</a>
Set	Savic, D, Banyard, J	Water Distribution Systems		ICE Publishing	2011	978-0727741127	<a href="#">[Library]</a>
Set	Twort AC	Water Supply	5th	Butterworth-Heinemann	2000	978-0340720189	<a href="#">[Library]</a>
Set	Linsley, R.K., Franzini, J.B, Freyberg, D.L. and Tchobanoglous, G.	Water Resources Engineering		McGrawHill	1992	0-071-12689-9	<a href="#">[Library]</a>
Set	US EPA	Water Distribution System Analysis: Field Studies, Modelling and Management	Report No. EPA/600/R-06/028	<a href="http://www.epa.gov/ORD/NRMRL/pubs/600r06028/600r06028.pdf">http://www.epa.gov/ORD/NRMRL/pubs/600r06028/600r06028.pdf</a>	2005		<a href="#">[Library]</a>
Set	Wu, Z, Farley, M, Kapelan, Z et al	Water Loss Reduction	1st	Bently Institute Press	2011	978-1934493083	<a href="#">[Library]</a>
Set	Mays, Larry	Water Distribution System Handbook		McGraw Hill Professional - <a href="https://www.e-bookdownload.net/search/water-distribution-system-handbook">https://www.e-bookdownload.net/search/water-distribution-system-handbook</a>	1999	10 : 007177677X	<a href="#">[Library]</a>

<b>CREDIT VALUE</b>	15	<b>ECTS VALUE</b>	7.5
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**PRE-REQUISITE MODULES** None

**CO-REQUISITE MODULES** None

**NQF LEVEL (FHEQ)** 7

**AVAILABLE AS DISTANCE LEARNING** No

**ORIGIN DATE** Tuesday 10 July 2018

**LAST REVISION DATE** Thursday 05 October 2023

**KEY WORDS SEARCH**

Water Supply, Distribution System, Pipe Network, Asset Management, Leakage/Pressure Management, Sustainability, Pump Scheduling, Least Cost Design