

IL911-15 Water and Environmental Management

21/22

Department

Institute for Advanced Teaching and Learning

Level

Taught Postgraduate Level

Module leader

Elena Riva

Credit value

15

Module duration

1 week

Assessment

100% coursework

Study location

University of Warwick main campus, Coventry

Description

Introductory description

This is a five-day intensive module including lectures, seminars, and tutorials.

[Module web page](#)

Module aims

The main aim of this module is to present to students a global topic such as water in its complexity and to engage them so they can discover, research and experiment the great potentialities of an interdisciplinary approach to the matter.

Outline syllabus

This is an indicative module outline only to give an indication of the sort of topics that may be covered. Actual sessions held may differ.

The module will consist of 5 days sessions. The module leader will attend all of each session, to integrate and stimulate the interdisciplinary learning.

The core design is that each day the module leader and subject specialists will choose how they wish to deliver a combination of discipline or application grounded material with activities that will allow the students (with the module leader) to develop their learning in an interdisciplinary style that will help them to explore and deepen their knowledge of that day's theories and set texts/materials. Active learning methods (i.e. Team Based Learning; Open Space Learning) will be implemented in order to heighten student engagement and understanding of the week's topic.

Daily topics

Here reported the topics of the lectures held by the experts. The second part of each day's session will always be a workshop led by the module leader for facilitating the learning experience of the students.

Day 1: Water – not an ordinary liquid!

The module leader will introduce the module and deliver a lecture that will permit students to scientifically explore this little molecule that has shaped our history. We will look at water's unusual physical properties (i.e. it is one of only a very small number of molecules which expand when cooled) and how it 'dodges' chemical rulings. In particular, we will analyse water's ingenious chemistry and how its peculiar propensity for bonding – with itself and with almost all other substances – accounts for its extraordinary versatility as a solvent, as a chemical reactant, as a barely compressible liquid, as a solid that can adopt umpteen crystal forms and as the vital context for the DNA, RNA and proteins that have concocted all living things – or at least the ones that we know of.

In summary, the lecture will help students to understand how exceptional and out of ordinary is this liquid that we take for granted but we still don't understand. "Of all known liquids," wrote the great water chemist Felix Franks, "water is probably the most studied and least understood."

Day 2 (morning): Ecosystems and water

Expert from School of Life Sciences

Although much of the water cycle is controlled by physical processes, ecosystems, and in particular, wetland ecosystems such as rivers, lakes, marshes and coastal areas provide many 'services' that contribute to human well-being. Examples of such ecosystem services are the regulation of flooding, erosion protection, soil formation, the retention, recovery and removal of excess nutrients and pollutants, and provision of habitats for resident and transient species (e.g. migratory birds). This lecture will consider the diversity and importance of ecosystem services related to water and will discuss some of the pressures that industry, agriculture and other human activities puts on them.

Day 2 (afternoon): Water Sanitation

Sanitation is the hygienic means of promoting health through prevention of human contact with the hazards of wastes as well as the treatment and proper disposal of sewage or wastewater. A sanitation system has as input human wastes and often other wastes such as 'grey' water. Various stages of water management strongly affect the incidence of faecal-oral diseases, and in this lecture, the techniques of storage, transportation, concentration and different sanitation techniques will be presented.

Day 3: Water ecology – an engineering perspective

Prof. Ian Guymer (School of Engineering – Warwick Water) will present to students the aspects of water engineering. In particular, he will focus on environmental and water ecology problems and he will help students to understand the fate of soluble pollutants and contaminated fine sediments

within rivers, urban drainage systems and the coastal environment.

The workshop that will follow the lecture will be a field study on campus. Students, under the guidance of Guymer's PhD students and utilising Guymer's group equipment, will identify and quantify the dominant transport and mixing processes of pollutants running a field experiment on one of the water stream of Warwick campus.

Day 4: Water memories.

Experts from the Centre for Cultural Policy Studies and the Centre of Interdisciplinary Methodologies will give two lectures about the relationship between culture and water, rivers, flooding/drought. In a time when flooding, drought and water management (particularly in cities) is a growing future global concern, they will draw students' attention to the issues linked to the cultural management of water, the social value of city rivers and the concept of memorialising floods using digital media.

Day 5: Water management

This lecture will discuss about the sustainable water management. Water is used by human beings in enormous quantities. Many societies use over 300 litres per inhabitant per day. The main uses of water are classified as domestic, irrigation, industrial, transport, recreational, water for livestock and fish production. Sustainability is a big issue, both in its resource/environmental sense and in its organisational aspects. Water resources management will have to continue to adapt to the current and future issues facing the allocation of water. With the growing uncertainties of global climate change and the long term impacts of management actions, the decision-making will be even more difficult.

Learning outcomes

By the end of the module, students should be able to:

- Demonstrate advanced understanding on the effects of scientific discoveries in the field of water on our planet's history, ecology and future.
- Critique the central role of water in our society, in the organisation of our cities and in the development of political scenarios.
- Demonstrate comprehensive knowledge and understanding of disciplinary theories, positions and research themes related to the field of water.
- Conceptualise the importance of a global, significant and different approach to issues pertaining to water based on dialogue across the boundary.
- Evaluate the water resources and their efficient and effective management for variety of uses.
- Identify approaches for sanitation for various uses of water, and criticize the possible adverse effects.
- Summarise their multidisciplinary learning into a global approach to water related issues and problems (= interdisciplinarity), developing their own research in a holistic way that crosses disciplinary boundaries (= transdisciplinarity).
- Understand how to apply this more systematic and global approach to problems in order improve their own learning and investigative practices both in and beyond academic disciplinary studies.
- Develop skills of communication and take part in informed interdisciplinary discussions with their peers and with academics.

- Effectively work on independent and collaborative projects.

Indicative reading list

Day 1 :

- 1- Alok Jha, The Water Book, 2015, Headline Book Publishing (selected chapters)
- 2- Alok Jha, Water: the weirdest liquid on the planet, The Guardian, May 2015
<http://www.theguardian.com/global/2015/may/11/water-weirdest-liquid-planet-scientists-h2o-ice-firefighters>
- 3- Philip Ball, H₂O A Biography of Water, 2000, W&N; New Ed edition (selected chapters).

Day 2:

- 1- Ecosystems And Human Well-being: Wetlands and Water
www.unep.org/maweb/documents/document.358.aspx
- 2- What Has Nature Ever Done For Us?: How Money Really Does Grow On Trees. Tony Juniper. Profile Books
- 3- Woodland for Water: Woodland measures for meeting Water Framework Directive objectives. Forest Research Monograph
4.
[http://www.forestry.gov.uk/pdf/FRMG004_Woodland4Water.pdf/\\$FILE/FRMG004_Woodland4Water.pdf](http://www.forestry.gov.uk/pdf/FRMG004_Woodland4Water.pdf/$FILE/FRMG004_Woodland4Water.pdf)

Day 3:

- 1- Dr Hemant Pathak, Water Pollution, 2012, CreateSpace Independent Publishing Platform; 1 edition.
- 2- Dr Luxmy Begum, Water Pollution: Causes, Treatments and Solutions!, 2015, CreateSpace Independent Publishing Platform; 1 edition.

Day 4:

- 1- Garde-Hansen, J, F Krause and N Whyte (2013) 'Flood Memories - media, narratives and remembrance of wet landscapes in England' Journal of Arts and Communities, 4: 1-2.

Day 5:

- 1- Daniel H. Chen, (2016) 'Sustainable Water Management' CRC Press.
- 2- Walter Leal Filho, Vakur Sümer (2014) 'Sustainable Water Use and Management: Examples of New Approaches and Perspectives', Springer.

Research element

Develop research skills of evidence synthesis and critical appraisal.

Interdisciplinary

The module adopts an interdisciplinary teaching approach. Students from a wide variety of disciplinary and professional backgrounds will attend this module, enabling them to explore topics

from a range of different perspectives.

Subject specific skills

1. Appreciate the value of adopting inter-disciplinary approaches and trans-disciplinary research methods for understanding global topics such as the water and for attempting solutions to difficult issues.
2. Reflect on the possibility to implement this more global approach to their studies in their own master disciplines, potential research work and practises.
3. Become integrative system thinkers - independently identify and/or devise interdisciplinary connections between all disciplines.
4. Reflect on the value of the use of different methodologies (i.e. field studies and archival research) for tackling issues related to a diverse range of disciplines and for expanding the approach to their own research.
5. Comprehend how to utilise the communicative and collaborative skills used in the module in their professional life.

Transferable skills

1. Research skills
2. Communication skills (written and oral)
3. Presentation skills
4. Problem-solving skills
5. Team-working skills.
6. Apply problem solving skills, information retrieval, and the effective use of general IT facilities
7. Communicate (written and oral; to technical and non-technical audiences) and work with others
8. Exercise initiative and personal responsibility, including time management, which may be as a team member or leader
9. Awareness of the nature of business and enterprise in the creation of economic and social value
10. Overcome difficulties by employing skills, knowledge and understanding in a flexible manner
11. Ability to formulate and operate within appropriate codes of conduct, when faced with an ethical issue
12. Appreciation of the global dimensions of engineering, commerce and communication
13. Be professional in their outlook, be capable of team working, be effective communicators, and be able to exercise responsibility and sound management approaches.

Study

Study time

Type	Required
Lectures	12 sessions of 1 hour (33%)
Seminars	12 sessions of 1 hour (33%)
Project supervision	2 sessions of 1 hour (6%)
Private study	10 hours (28%)
Total	36 hours

Private study description

Pre-module preparation and reading.

Costs

No further costs have been identified for this module.

Assessment

You must pass all assessment components to pass the module.

Assessment group A1

	Weighting	Study time
Student Devised Assessment	50%	57 hours
Assessment method designed in collaboration with the tutor whereby the student will create piece of work (i.e. an article, a video, a talk, etc) that offers a solution to a problem or a question that has risen during the module. Students will be free to select their preferred topic/question and subsequently they will undertake their own research utilising the methodologies and the holistic approach presented throughout the course. Their piece of work will be presented in front of their peers and the tutor. The theory and the ideas explored in the work will be discussed and feedback offered. Students will be marked on the quality of their work (form and theory) as well as on the basis of their contribution to the discussion of other students' pieces.		
Essay (1500 words)	50%	57 hours
An academic piece of writing that takes a focused, analytic approach to a particular question, issue, or theme.		

Feedback on assessment

Detailed written and oral feedback will be provided by tutor to individual students for each element of assessed work, i.e. the student devised assessment and the essay.

Formative oral feedback will also be given to students at relevant points, i.e. within seminars throughout the module as they devise their own form of assessments and between the student's devised assessment and the essay.

Availability

Courses

This module is Core for:

- TESA-H1C1 Postgraduate Taught in Humanitarian Engineering
 - Year 1 of H1C1 Humanitarian Engineering
 - Year 1 of H1C1 Humanitarian Engineering
 - Year 1 of H1C3 Humanitarian Engineering (with Management)
 - Year 1 of H1C2 Humanitarian Engineering (with Sustainability)
 - Year 2 of H1C1 Humanitarian Engineering
 - Year 2 of H1C1 Humanitarian Engineering
 - Year 2 of H1C3 Humanitarian Engineering (with Management)