ES99C-15 Water and Environmental Management

23/24

Department
> School of Engineering

Level
> Taught Postgraduate Level

Module leader
> Modupe Jimoh

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 each session to integrate and stimulate interdisciplinary learning.

Each day the module leader and subject specialists will choose how they wish to deliver a combination of discipline or application grounded materials. Activities will allow the students to develop their learning in an interdisciplinary style and help them 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 to heighten student engagement and understanding of the week's topic.

Daily topics
Here is an indicative description of topics to be covered each day of the week. There might be slight rearrangement during the delivery week.

Day 1: Water Supply
This day introduces students to the module, the SDGs linked with water and the environment. The session would also introduce students to Water, Sanitation, and Hygiene (WASH) concept from an Engineering standpoint.
The second part of the day would consider the theme: WATER SUPPLY, covering water use, source, and system; water quality and treatment; water conveyance and distribution; and gender, social and ethical issues around the water supply.

Day 2: Water and Environmental Sanitation
The day would cover lectures and activities on critical components of water and environmental sanitation. These include Sanitation (Faecal Management), Wastewater management and Solid waste management, giving a thought to concepts of waste to wealth, sustainability and the circular economy.

Day 3: Climate change
The day would focus on climate change, adaptation, and mitigation strategies. Lectures and activities would enable students to understand and analyse the impact of climate change on extreme events.

Day 4: Ecology and Engineering Solutions to Extreme Events.
In continuation of the discussion on climate change, the day would focus on its impact on ecology, socio-economic activities, and human health. A range of traditional hard-engineered solutions and soft nature-based infrastructures and their role in mitigating extreme events will also be discussed.

Day 5: Water and Sustainability
The day will focus more closely on issues linked to "water sustainability" and water pollution with a case study that will explore water issues connected to agriculture. The day covers a holistic view of the interdisciplinary nature of water and the need for proper water resources management to achieve sustainability.

Learning outcomes

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

- Demonstrate advanced understanding of the interconnectivity of water and the environmental with technology, humanitarian services and sustainable development.
- 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).
- Evaluate the economics, engineering, social organisation, and environmental impact analysis of the best choice between competing technologies for any specific water or environmental challenge.
- 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

1. Progress on household drinking water, sanitation and hygiene 2000-2020: five years into the SDGs. Geneva: World Health Organization (WHO) and the United Nations Children's Fund (UNICEF), 2021. Licence: CC BY-NC-SA 3.0 IGO.
2. Masinde, K., Rouse, M., Jepkirui, M., & Cross, K. (2021). Guidance on Preparing Water Service Delivery Plans - A manual for small to medium-sized water utilities in Africa and similar settings. Published by International Water Association, London, UK.
3. Rodriguez, Diego J.; Serrano, Hector A.; Delgado, Anna; Nolasco, Daniel; Saltiel, Gustavo. 2020. From Waste to Resource: Shifting paradigms for smarter wastewater interventions in Latin America and the Caribbean." World Bank, Washington, DC.
4. Brikké, F. & Bredero, M. (2003). Linking Technology Choice With Operation and Maintenance in The Context Of Community Water Supply and Sanitation: A Reference Document for Planners and Project Staff. Published by World Health Organisation (WHO).
5. Alok Jha, The Water Book, 2015, Headline Book Publishing (selected chapters)
6. Alok Jha, Water: the weirdest liquid on the planet, The Guardian, May 2015
7. http://www.theguardian.com/global/2015/may/11/water-weirdest-liquid-planet-scientists-h2o-ice-firefighters
8. Philip Ball, H2O A Biography of Water, 2000, W&N; New Ed edition (selected chapters).
9. Ecosystems And Human Well-being: Wetlands and Water
10. www.unep.org/maweb/documents/document.358.aspx.pd
11. What Has Nature Ever Done For Us?: How Money Really Does Grow On Trees. Tony Juniper. Profile Books
12. Woodland for Water: Woodland measures for meeting Water Framework Directive objectives. Forest Research Monograph
13. http://www.forestry.gov.uk/pdf/FRMG004_Woodland4Water.pdf/$FILE/FRMG004_Woodland4Water
14. Dr Hemant Pathak, Water Pollution, 2012, CreateSpace Independent Publishing Platform; 1 edition.

15. Dr Luxmy Begum, Water Pollution: Causes, Treatments and Solutions!, 2015, CreateSpace Independent Publishing Platform; 1 edition.
16. 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.
17. Daniel H. Chen, (2016) 'Sustainable Water Management' CRC Press.
18. 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 A

	Weighting	Study time	Eligible for self-certification
Student Devised Assessment	60%	65 hours	No

Assessment is such that the student will create a piece of work (i.e., a video, a talk, art piece etc.) that offers a solution to a problem or a question that arise during the module. Students will be free to select their preferred topic/question, and subsequently, they will undertake their research utilising the methodologies and the holistic approach presented throughout the course. In addition to the SDA piece, students are required to present the theory and the ideas explored in the piece in an accompanying piece (1500 words). Therefore, both the SDA and the accompanying piece makes up this assessment. Students will be marked on the quality of both elements of their work (piece and theory).

	Weighting	Study time	Eligible for self-certification
Group Based Case Study Compilation	40%	50 hours	No

The academic piece of writing will take a focused and analytical approach to a particular question, issue, or theme. The submission would be a compilation of 5 case studies on the group's chosen theme. Each case study would be 750 words long. The total mark for this work includes a score from peer assessment (of each member's contribution) by group members. The department will provide the peer assessment platform and guidance at the time of assignment submission.

Feedback on assessment

The module leader will provide detailed written feedback to individual students for the student devised assessment and group feedback for the group case study compilation.
As they devise and develop their assessments, formative oral or email feedback will also be given to students at relevant points, i.e. within seminars throughout the module and on request.

Availability

Courses

This module is Core for:

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

- Year 1 of TESA-H1C4 Postgraduate Taught in Humanitarian Engineering