

# ES4B6-15 Global Water and Sanitation Technologies

**20/21**

**Department**

School of Engineering

**Level**

Undergraduate Level 4

**Module leader**

Modupe Jimoh

**Credit value**

15

**Module duration**

10 weeks

**Assessment**

60% coursework, 40% exam

**Study location**

University of Warwick main campus, Coventry

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## Description

### Introductory description

ES4B6-15 Global Water and Sanitation Technologies

[Module web page](#)

### Module aims

Civil Engineers and those with an interest in appropriate technology require some exposure to Public Health engineering. 'Water' is chosen for its high engineering content and because other development technologies were briefly addressed in earlier modules. This module covers the economically significant applications of hydraulic engineering to agriculture (irrigation) - a field of particular employment opportunity for engineering graduates.

### 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.

Water Supply: engineering of urban systems entailing water treatment; design and dissemination

of village-scale systems involving rainwater catchment, pumping or gravity feed from protected sources.

Biological and physical processes in water treatment, waste treatment and quality testing.

Water and health.

Water lifting with special reference to developing countries.

Sanitation: choice of technology for urban and rural applications in developing countries, design of sanitation programmes.

Irrigation and water control: Inter-relationships between irrigation, hydropower generation, flood and erosion control.

Irrigation technology: water requirements of plants, water in soil. Water balances; technical comparison of methods of transporting and distributing water; water harvesting.

Irrigation systems: irrigation as a development strategy, roles of farmers, agronomists, engineers and managers, choice of scale in construction and management, environmental and social impacts, success and failure of irrigation schemes in developing countries, case studies.

## **Learning outcomes**

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

- Critically analyse common water supply and sanitation technologies and the biological and physical processes underlying them
- Show knowledge of economics, engineering and social organisation the best choice between competing technologies for any specific site
- Design simple irrigation, water supply and sanitation schemes and size component
- Appreciate the significance of approaching global water shortages and possible responses
- Understand the basics of process engineering, as illustrated by practices in the water industry
- Review a technical case study and present it effectively to a technical audience.

## **Indicative reading list**

"Basic Water Treatment", Binnie, C, 2009, 9780727736086, TD 430.S6

"Water Technology", Gray, N.F, 2005, 9780750666336, TD 345.G7

"Controlling the Water: Matching Technology and Institutions in Irrigation Management in India and Nepal", Oxford University Press, 2013, ISBN 0198082924

"The Management of Water Quality and Irrigation Technologies", Taylor & Francis, 2012, ISBN 1136553223

"Water, Sanitation and Hygiene in Humanitarian Contexts: Reflections on Current Practice", Practical Action Publishing, 2015, ISBN 1853398845

"Advances in Water Supply, Sanitation and Environmental Management: A Water, Sanitation and Hygiene (Wash) Perspective for Developing Countries", 2014, ISBN-13 9789966720511

## **Subject specific skills**

1. Ability to conceive, make and realise a component, product, system or process
2. Ability to develop economically viable and ethically sound sustainable solutions
3. Ability to be pragmatic, taking a systematic approach and the logical and practical steps

necessary for, often complex, concepts to become reality

4. Ability to seek to achieve sustainable solutions to problems and have strategies for being creative and innovative
5. Ability to be risk, cost and value-conscious, and aware of their ethical, social, cultural, environmental, health and safety, and wider professional engineering responsibilities

## **Transferable skills**

1. Numeracy: apply mathematical and computational methods to communicate parameters, model and optimize solutions
  2. Apply problem solving skills, information retrieval, and the effective use of general IT facilities
  3. Communicate (written and oral; to technical and non-technical audiences) and work with others
  4. Awareness of the nature of business and enterprise in the creation of economic and social value
  5. Overcome difficulties by employing skills, knowledge and understanding in a flexible manner
  6. Ability to formulate and operate within appropriate codes of conduct, when faced with an ethical issue
  7. Appreciation of the global dimensions of engineering, commerce and communication
  8. Be professional in their outlook, be capable of team working, be effective communicators, and be able to exercise responsibility and sound management approaches.
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## **Study**

### **Study time**

<b>Type</b>	<b>Required</b>
Lectures	28 sessions of 1 hour (19%)
Other activity	2 hours (1%)
Private study	120 hours (80%)
Total	150 hours

### **Private study description**

120 hours of guided independent learning

### **Other activity description**

2x1 hours revision classes

## **Costs**

No further costs have been identified for this module.

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## Assessment

You must pass all assessment components to pass the module.

Students can register for this module without taking any assessment.

### Assessment group D3

	Weighting	Study time
Dual assignment 10 % oral presentation & 20% Essay	30%	
Assignment open ended assignment	30%	
Online Examination ~Platforms - QMP	40%	

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- Online examination: No Answerbook required
  - Students may use a calculator
  - Engineering Data Book 8th Edition

### Feedback on assessment

Written individual feedback on essay submissions and cohort level feedback on the oral presentation and written exam.

[Past exam papers for ES4B6](#)

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## Availability

### Courses

This module is Core for:

- Year 4 of UESA-H217 MEng Civil Engineering
- Year 4 of UESA-H219 MEng Civil Engineering with Exchange Year

This module is Option list A for:

- Year 4 of UESA-H163 MEng Biomedical Systems Engineering

- Year 4 of UESA-H114 MEng Engineering
- Year 4 of UESA-H311 MEng Mechanical Engineering

This module is Option list B for:

- Year 4 of UESA-H311 MEng Mechanical Engineering
- Year 4 of UESA-HH31 MEng Systems Engineering

This module is Option list C for:

- UESA-H311 MEng Mechanical Engineering
  - Year 4 of H30L Mechanical Engineering with Automotive Engineering
  - Year 4 of H30M Mechanical Engineering with Robotics
  - Year 4 of H30N Mechanical Engineering with Systems Engineering