

ES4B6-15 Water and Sanitation Technologies

27/28

Department

School of Engineering

Level

Undergraduate Level 4

Module leader

Modupe Jimoh

Credit value

15

Module duration

10 weeks

Assessment

30% coursework, 70% exam

Study location

University of Warwick main campus, Coventry

Description

Introductory description

ES4B6-15 Global Water and Sanitation Technologies

[Module web page](#)

Module aims

Engineers are sometimes required to carry out public health services related to the water and environmental engineering subsector. This module introduces the concepts of water supply in rural and urban areas, the design of components of the technologies required, and how the choice of technology interacts with economics and social impacts. The module also focuses on the design of technologies required for sustainable sanitation processes; incorporating wastewater, fecal and solid waste management principles.

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.

1. Introduction
 - I. Water supply
 - II. Sanitation
2. Water Supply
 - I. Source
 - II. Quality
 - III. Treatment
 - IV. Storage- Dams and Reservoirs
 - V. Distribution
3. Wastewater Handling
 - I. Generation
 - II. Collection
 - III. Treatment and Disposal
4. Design of unit operations and processes in water and wastewater treatment
 - I. Sedimentation
 - II. Chemical coagulation
 - III. Ion-exchange
 - IV. Filtration
 - V. Dis-infection
5. Sanitation and Faecal Management
 - I. Sanitation principles
 - II. Sanitation technologies
6. Solid Waste Management
 - I. Solid waste classification and surveys
 - II. Design and operation of solid waste collection and disposal systems
 - III. System approach design of land disposal operations
7. Sustainability in Water Resources
 - I. Conservation and usage- Water wastage, leakage & inefficiency
 - II. Flood control
 - III. Hydropower
 - IV. Irrigation
 - V. Navigation- Ports and Harbours
 - VI. River Basin Planning

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. [M2(M), M5(M), M6(M), M7(M)]
- Design the components of water and sanitation technologies with a focus on sustainability. [M2-7(M), M13(M)]
- Comprehend the significance of sustainable water resources technologies and processes,

and their limitations. [M7(M), M8(M), M13(M)]

- Evaluate the economics, engineering, social organisation, and environmental impact analysis of the best choice between competing technologies for any specific site [M6(M), M7(M), M15(M)].
- Review a technical case study and present it effectively to a technical and non-technical audience. [M4(M), M7(M), M17(M)]

Indicative reading list

[Reading lists can be found in Talis](#)

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.

Study

Study time

Type	Required
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.

Assessment

You must pass all assessment components to pass the module.

Students can register for this module without taking any assessment.

Assessment group D6

	Weighting	Study time	Eligible for self-certification
Assessment component			
Individual Oral Presentation	30%		No
Students would give a 7-minute oral presentation on a topic of choice (from a given list) relevant to the syllabus and learning objectives. Depending on the number of students registered for the module, the presentations might be spread across several days towards the end of the module delivery.			

Reassessment component is the same

Assessment component

	Weighting	Study time	Eligible for self-certification
Online Examination ~Platforms - QMP	70%		No

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

Reassessment component is the same

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](#)

Availability

Courses

This module is Core for:

- Year 4 of UESA-H217 MEng Civil Engineering
- UESA-H218 MEng Civil Engineering with Intercalated Year
 - Year 4 of H218 Civil Engineering with Intercalated Year
 - Year 5 of H218 Civil Engineering with Intercalated Year