Liverpool John Moores University

Title:	SUSTAINABLE INFRASTRUCTURE
Status:	Definitive
Code:	**6159UG** (102686)
Version Start Date:	01-08-2016
Owning School/Faculty:	Civil Engineering
Teaching School/Faculty:	Civil Engineering

Team	Leader
Felicite Ruddock	Y
Clare Harris	
Alan Jones	

Academic Level:	FHEQ6	**Credit Value:**	12	**Total Delivered Hours:**	32
Total Learning Hours:	120	**Private Study:**	88		

Delivery Options
Course typically offered: Summer

Component	Contact Hours
Lecture	16
Tutorial	16

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Test	AS1	In Class Assessment (3 hours, closed book)	60	
Report	AS2	Report (1500 words or equivalent)	40	

Aims

To provide the student with a thorough grounding in the practical operational management of water supply and sanitation systems.

Learning Outcomes

After completing the module the student should be able to:

1 Critically evaluate the complex factors affecting water and sanitation management, showing an appreciation of the relationship between sanitation and health.
2 Critically appraise the existing procedures for the planning, design and implementation of wastewater and refuse management systems and suggest improvements that are socially, economically, ethically, technically and environmentally sound.
3 Develop and undertake the critical evaluation of alternative proposals and designs for water supply and sanitation systems considering the measures taken to meet quality standards and customer expectation.
4 Design and critically appraise flood control options.
5 Develop critical awareness of own learning through reflection.
6 Locate, and critically analyse, relevant material from journals and other sources.

Learning Outcomes of Assessments

The assessment item list is assessed via the learning outcomes listed:

TEST	1	2	3	4
REPORT	5	6		

Outline Syllabus

Water, sanitation and health. Global view of levels of provision of water supply and sanitation services. Water, waste and health relationships. Water and waste related infections. Water and sanitation use patterns. Cultural attitudes, impacts and taboos on water and sanitation practices.

Health and environmental education and communication. Importance of socio-economic studies and data collection. Projection of water supply and sanitation demand.

Institutional and organisational framework. International standards for water and sanitation. Models for the organisation of water and sanitation at national, regional and local government levels, including the planning, design, operation and maintenance of facilities and the training of operatives. Financing water and sanitation projects and requirements of international financing bodies such as the world bank.

Water supply systems.
A review of water supply systems including: water quality standards, design water demand, components of supply systems, system selection and typical facilities provision, surface and groundwater sources and their protection, water transportation and distribution systems. Potable water treatment processes.

Wastewater collection and transportation systems.

A review of sewerage systems in including: classification and description of wastewaters, sustainable integrated drainage systems management, drainage and sewer planning, design, construction and maintenance, management of both conventional and unconventional sewerage systems.

Wastewater minimisation, treatment, reuse and disposal.
Objectives of wastewater treatment. Hierarchy of wastewater management options. Wastewater and sludge treatment and disposal methods. The potential for treated water and sludge reuse - irrigation and soil conditioning - associated health and safety issues.

Sustainable sanitation systems.
Pit, VIP and communal latrines, pour flush toilets, vault toilets and cartage. Aqua privies. Septic tanks and soakaway systems. Lagoon and land treatment. Reed bed and related treatment methods. Sullage disposal. Nightsoil and sludge reuse and disposal. Health and environmental impacts and user education.

Anthropogenic causes of flooding. Flood Control measures.
Pollution sources, impacts and pollution prevention - natural variations in water quality. Pollution causes, fate of pollutants in the aquatic environment; 'oxygen sag'; eutrophication; Impact of toxic substances: Pollution prevention measures and regulation of discharges.

Learning Activities

Lectures and seminars.

Notes

This module provides a thorough grounding in the practical operational management of water supply and sanitation systems. This is achieved by considering the socio-cultural-economic factors that influence the planning, design and operation of sustainable water and sanitation systems. It provides methods for choosing technologically, socially, economically and environmentally sustainable water supply and sanitation systems. It ensures awareness and understanding of the institutional framework necessary for the management of such systems. It provides some background into the polluting effects into rivers and how this can be managed or avoided. Basic knowledge of flood management will also be gained.