

Liverpool John Moores University

Title: CIVIL ENGINEERING HYDROLOGY AND ENVIRONMENTAL SCIENCE
Status: Definitive
Code: **5504ICBTCE** (126971)
Version Start Date: 01-08-2021

Owning School/Faculty: Civil Engineering and Built Environment
Teaching School/Faculty: ICBT, Colombo

Team	Leader
Alison Cotgrave	Y

Academic Level: FHEQ5 **Credit Value:** 15 **Total Delivered Hours:** 77

Total Learning Hours: 150 **Private Study:** 73

Delivery Options

Course typically offered: S2 and Non Std S2 (S2 for Jan)

Component	Contact Hours
Lecture	45
Practical	9
Workshop	21

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Portfolio	AS1	Portfolio – Coursework (1500 words) and Lab Report	30	
Exam	AS2	Written Examination	70	2

Aims

This unit enables learners to develop an understanding of the hydrological cycle and the importance of hydrological influences for civil engineering projects. Learners will also cover water supply, water treatment, and wastewater and apply hydrological design to civil engineering projects.

Learning Outcomes

After completing the module the student should be able to:

- 1 Identify the importance of hydrological influences for civil engineering projects.
- 2 Produce precipitation calculations for civil engineering projects.
- 3 Identify quality control methods for water supply and discharge.
- 4 Apply hydrological design to civil engineering projects and identify water & wastewater treatment processes.
- 5 Assess the environmental impact of water and wastewater and examine water quality parameters through laboratory experiments.

Learning Outcomes of Assessments

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

Portfolio	3	5	
Exam	1	2	4

Outline Syllabus

Hydrological influences: hydrological cycle, surface water, groundwater, human influences, hydrological budget at the catchment scale, water balance calculations, reservoir storage requirements.

Precipitation calculations: different methods of precipitation measurements, rain gauges, rain gauge network design criteria, recording of rain-fall data, missing value estimation.

Quality control methods: infiltration, Horton's equation, phi index, SCS method, factors affecting infiltration and theories of evaporation (evapotranspiration and estimation). pan- evaporation, Penman's equation.

Hydrological design: catchment characteristics (area, length, slope, runoff coefficients, land use and cover, streamflow).

Principles of hydrological design: surface runoff, measurement of runoff, catchment characteristics (area, length, slope, runoff coefficients).

Water collection and distribution: surface water collection, groundwater collection, water transmission systems, water distribution systems. pipeline and valves, hydraulics of pipelines, network of pipelines, valves, pumps and pumping installations.

Wastewater collection systems: collection of sewage and stormwater, sewer materials, flow measurements in sewers, sewer installations and testing, hydraulics of sewer systems, quantities of wastewater flows, design of sewers,

maintenance of pipes and equipment, urban runoff and combined sewer overflow management.

Pollution: surface and groundwater pollution control, types and sources of pollution, effects of water pollution and control measures, solid and hazardous waste management, air pollution, noise control.

Water treatment and standards: water treatment processes, environmental quality. Water quality (concepts, need of water quality studies and standards, physical/chemical/biological characteristics of water, water related diseases). Water supply systems, assessment of water demand, sources of water.

Learning Activities

Students will be supported in their learning, to achieve the above learning outcomes, in the following ways:

By a series of lectures and tutorials and through participation within practical sessions for problem solving.

Self-managed investigative study to analyse cases related to the industry.

In-class participation and case studies are key features of this module.

A recommended resource list - indicating key reading, internet support and physical learning assistance, is provided to help enable students to undertake self-directed study.

Notes

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