



Module Descriptor Form

Civil and Environmental Engineering

CL987 - Engineering Hydrology

Module Code	CL987	Module Title	Engineering Hydrology				
Module Registrar	Bertram, Dr Douglas G						
Other Staff Involved							
Credit Weighting	10	Semester	2	Elective	No	Academic Level	5
Pre-requisites							
Required for							

Module Format and Delivery (hours):

Lectures	Tutorials	Assignments	Labs	Private Study	Total
25	15	40	0	20	100

Educational Aim

This module aims to:

This module aims to:

- Explore the hydrological cycle and the influence of weather, climate and the key processes on the environment
- Develop application of hydrological cycle for engineering analysis and design, including:
 - o Estimating precipitation, including spatial distribution analysis techniques
 - o Estimating evaporation and evapotranspiration
 - o Estimating other hydrological losses, including infiltration
- Develop skills examining catchments using Engineering Hydrology approaches, including:
 - o Analysing relationships between precipitation, runoff and storage
 - o Analysing hydrographs
 - o Examining the influence of urbanisation and land management practices
 - o Introducing drainage design techniques and analysis
 - o Sustainable Urban Drainage systems

Syllabus

This module will teach the following:

Hydrological cycle; homogeneous measurements; records with missing data
 Atmospheric water; Water vapour, Precipitation, Evapotranspiration
 Hydrologic Measurement of atmospheric water and surface water; rain gauges, calculation of catchment inflow from multiple rain gauges – Thiessen polygons, isohyets
 Catchment water balance
 Catchment Hydrology: Precipitation; evaporation; overland flow; groundwater flow; rainfall and runoff analysis; the Unit Hydrograph; reservoir routing; flood frequency analysis.
 Storm Drainage systems and SUDs basic principles

Learning Outcomes

On Completion of the module, the student is expected to be able to:

LO: 1	Outline the significance of the water cycle in the environment, developing appropriate engineering models for the hydrological process and applying the hydrological cycle as a tool in analysing catchments.
LO: 2	Undertake a range of design and calculation activities based on engineering hydrology, analysing spatially distributed real and synthetic rainfall, surface runoff, base flows and appreciating the underlying relationships and uncertainties.

(UK SPEC suggests no more than 4 learning outcomes per module. Statements must be broad and be syllabus free and link in with the intended learning outcomes on the programme specifications.)

Assessment of Learning Outcomes - Criteria

Learning Outcome: 1

	Criteria
1	C1 Detail the underlying principles and individual components of the hydrological cycle
2	C2 Use catchment and environmental characteristics to determine contributions of hydrological cycle components
3	C3 Ability to perform catchment water balance analysis techniques
4	C4 Detail various possible sources of uncertainty in each hydrological process and outline suitable means of addressing each

Learning Outcome: 2

	Criteria
1	C1 Ability to spatially distribute and convert rain gauge data to estimate inflow to a catchment
2	C2 The ability to review, adjust and analyse basic hydrological data to convert rainfall to runoff
3	C3 The ability to solve complex hydrological analyses to determine rainfall-runoff responses
4	C4 The ability to solve complex model drainage systems involving hydrological processes.

Assessment Method(s) Including Percentage Breakdown and Duration of Exams

To Pass the module, students need to gain a summative mark of: 50%

Description	Semester	Start Week	Duration	Weight	Submission Week	Linked Criteria
Catchment Hydrology Water Balance	2	0		35%	8	LO 1: C1, C2, C3, C4 LO 2: C1
Online Test Assessments	2	1		15%	E	LO 1: C1, C2, C3, C4 LO 2: C1, C2, C3, C4
Hydrology Project	2	0		50%	E	LO 1: C1, C2, C3, C4 LO 2: C1, C2, C3, C4

Principles of Assessment Feedback

1. All assignments and assessments combine straightforward and challenging tasks. Assessment criteria are set clearly in advance, as are marking rubrics and resources.
2. All assessed coursework assignments are returned to students with feedback including annotations and comments. Model solutions are provided for some coursework assignments.
3. Tutorial problems with answers to encourage and guide private study are provided. These are supported with online learning technology and resources focusing on relevant problem sets..

Opportunity for one-to-one interaction between instructors and students and timely feedback will be made at least every two weeks but is planned on a weekly basis. Online forums and discussion environments will be used and participation encouraged for peer learning on problems.

Additional Information

Resit Procedure

3 hr online text examination in August diet & submission of coursework(s) prior to commencement of the August exam diet.

Resit examinations will be held in the resit diet and consist of a resit coursework and online test. Further course work resubmissions at the discretion of the lecturer.

Recommended Reading

***Purchase recommended **Highly recommended reading *For reference

Shaw. Hydrology in Practice, 4th Ed. Routledge, Taylor Francis
Wilson, Engineering Hydrology, 4th Ed, Palgrave MacMillan.
Hamil, Understanding Hydraulics, 3rd Ed, Palgrave MacMillan.

Online copies of the above are facilitated via the Library

Module Timetable

Week	Semester 1	Semester 2
0		
1		
2		
3		
4		
5		
6		
7		
8		Submission 35%
9		
10		
11		
E		Continuous 15%, Submission 50%

Date of Last Modification

06-11-2025