

Environmental Engineering: Water Resource and Supply Engineering

Module Code	CIVE50004	FHEQ Level	Level 5
Pre-requisites	N/A	Co-requisites	N/A
Teaching Term	Autumn and Spring	Available for CPD (MSc only)	No
Primary Department	Civil & Environmental Engineering		
Module Leader	Mijic, Ana		
Additional Teaching Departments	N/A		
Teaching Staff	Mijic, Ana; Butler, Adrian; Buytaert, Wouter		
Programmes on which the Module is delivered			Core/Elective
MEng Civil Engineering (H201)			Core
MEng Civil Engineering with a Year Abroad (H202)			Core
Civil Engineering (H21E)			Core
Module Overview	<p>As a result of this module you will be able to:</p> <ul style="list-style-type: none"> • Apply principles of hydrology and water engineering to understand the concepts and processes governing the natural and man-made water cycle. • Consider how to approach the exploitation and planning of water resources. • Explain the principles of human water use and apply them in a context of water resources management. • Explain the importance of groundwater as a water resource and how it can be modelled using physical principles and measured using boreholes and wells. • Consider how to estimate and forecast extreme flood events Identify solutions for sustainable water management. 		
Learning Outcomes	<p>Upon successful completion of this module you will be able to:</p> <ul style="list-style-type: none"> • Demonstrate understanding of the water catchment processes including surface and groundwater flows. • Evaluate human water use and its provision through water resources management. • Apply models to calculate aquifer properties and how these can be used to evaluate groundwater resources. 		

	<ul style="list-style-type: none"> • Apply the basic methods of rainfall-runoff modelling and extreme value statistical analysis to quantify the flood flow extremes. • Identify solutions for simple flood management and drainage design problems. 		
Description of Content	<ul style="list-style-type: none"> • You will first learn about the water cycle and key hydrological processes. You will then explore the mechanisms of precipitation, the flow in the unsaturated soil layer, and its interaction with vegetation dynamics. • Next you will develop understanding of the water resources and use under conditions of environmental change including climate change. • You will be then introduced to groundwater systems, and how this resource can support the society. • Finally, you will investigate the behaviour of a water system under extreme flood conditions, and apply analysis to identify management options. 		
Assessment			
Assessment information will be provided separately.			
Learning & Teaching Hours	Independent Study Hours	Placement Hours	Total Hours
40	85	0	125
ECTS Credit	5	CATS Credit	10
Date of introduction	1/10/2020	Date of Last Revision	2/09/2020

Reading Lists:

Category as defined by Central Library:

C = Core, S = Supplementary

C	Shaw, E.M., Beven, K.J., Chappell, N. A., Lamb, R., Hydrology in practice, 4rd Edn, CRC Press, 2010.
C	Rainfall-runoff modelling – The primer, by Keith Beven, Wiley, 2001.
C	Applied Statistics for Civil and Environmental Engineers Second Edition, by Kottegododa and Rosso, Blackwell, 2008.
C	Hiscock, K., Hydrogeology: Principles and Practice, Wiley Blackwell, 2004.
S	Ward, R.C. & Robinson, M., Principles of hydrology. McGraw-Hill, 4th Edn, 2000.
S	Barry, R., Chorley, R., Weather and Climate, 9th edition. Routledge, 2009
S	Davie, T. 2003. Fundamentals of hydrology. Routledge, 169pp.
S	Gordon, N.D., McMahon, T.A. & Finlayson, B.L., Stream hydrology: an introduction for ecologists. Wiley, 1992.
S	Newson, M.D., Hydrology & the river environment. Clarendon Press, 1994.

S	Newson, M.D. et al. (eds), Managing the human impact on the natural environment: patterns & processes. Wiley, 1995.
S	Flood estimation handbook, Institute of Hydrology, UK, 1999 (available in Civil Engineering library)