



UNIVERSITI TEKNOLOGI MARA

CEW541: ENGINEERING HYDROLOGY

Course Name (English)	ENGINEERING HYDROLOGY APPROVED
Course Code	CEW541
MQF Credit	3
Course Description	This course introduces the hydrological cycle and concept of water budget. It covers topics on precipitation, evaporation, infiltration and surface water. Topics on hydrologic analysis including unit hydrograph, flow routing, statistical methods and frequency analysis in hydrology are also provided. Application of hydrology principles in urban stormwater design using procedures outlined in Urban Storm Water Management Manual (MSMA) are also introduced to students.
Transferable Skills	Rainfall, infiltration, evaporation, stream flow measurement techniques and analysis; Flood peak analysis; Hydrological data analysis; Flood routing; Application of MSMA for urban drainage design.
Teaching Methodologies	Lectures
CLO	CLO1 Illustrate the concept of hydrological cycle, precipitation, losses, stream flow measurement and calculation. CLO2 Assess hydrological data using statistical and hydrologic routing methods for design problem solving. CLO3 Conduct urban stormwater design using Urban Stormwater Management Manual (MSMA, 2012).
Pre-Requisite Courses	No course recommendations
Topics	
1. Introduction to Hydrology 1.1) Hydrological cycle, water budget equation, definition of hydrologic processes, its measurement and related equations.	
2. Precipitation and Losses 2.1) Types of precipitation, measurement of precipitation. Analysis of precipitation using isohyetal, Thiessen and Mean Arithmetic method. Introduction to evaporation and its measurement and estimation.	
3. Stream Flow Measurement 3.1) Measurement of stage and velocity, apparatus, velocity-area method, stage-discharge relationship, extrapolation of rating curve.	
4. Surface Runoff and Hydrograph Analysis 4.1) Rainfall-runoff relationship, storm hydrograph and annual hydrograph, components of hydrograph, groundwater recession, separation techniques, unit hydrograph development, derivation of unit hydrograph, S-Hydrograph and Lagging methods, synthetic unit hydrograph: Snyder method and SCS method.	
5. Hydrological Data Analysis 5.1) Statistical approaches to runoff determination, frequency analysis, Gumbel, Log Normal and Log Pearson distribution, concept of risk and reliability.	
6. Hydrological Routing 6.1) Hydrologic river routing using Muskingum method, reservoir routing by storage indication method, concept of attenuation and lag.	
7. Hydrological Application 7.1) Urban storm water design (design rainfall, design flow estimation, rational method, time area method and open channel design)	

Assessment Breakdown	%
Continuous Assessment	40.00%
Final Assessment	60.00%

Details of Continuous Assessment	Assessment Type	Assessment Description	% of Total Mark	CLO
	Assignment	Assignment	6%	CLO3
	Group Project	Project	4%	CLO1
	Test	Test 1	12%	CLO1
	Test	Test 1	18%	CLO2

Reading List	Recommended Text	<ul style="list-style-type: none"> Subramanya, K. 2013, <i>Engineering Hydrology</i>, 4th Ed Ed., Tata McGraw-Hill Education [ISBN: 9781259029974]
	Reference Book Resources	<ul style="list-style-type: none"> Warren Viessman, Gary L. Lewis 2012, <i>Introduction to Hydrology</i>, 5th Ed Ed., Pearson Education [ISBN: 9780132763608] Ward, R.C. and Robinson, M. 2011, <i>Principles Of Hydrology</i>, 4th Ed Ed., McGraw-Hill Education [ISBN: 9781259002243] DID 2012, <i>Urban Storm Water Management Manual for Malaysia</i>, 2nd Edition Ed., Department of Irrigation and Drainage Malaysia Kuala Lumpur

Article/Paper List	This Course does not have any article/paper resources
Other References	This Course does not have any other resources