



**UNIVERSITI TEKNOLOGI MARA**

**EVT423: HYDROLOGY AND WATER RESOURCES**

<b>Course Name (English)</b>	HYDROLOGY AND WATER RESOURCES <b>APPROVED</b>
<b>Course Code</b>	EVT423
<b>MQF Credit</b>	2
<b>Course Description</b>	<p>This course will interactively engage students cognitively and scientifically in areas of hydrology and water resources. Hydrology is introduced as earth science that concerned with the distribution and movement of water on earth surface as well as for measuring present conditions and estimating future variations in water resources availability and demand. Students will describe the basic concepts of hydrology as a description of the water cycle and the role of water in the natural environment. Students are expected to be able to distinguish and evaluate the various sources of water supply and explain the various technologies of processed water, the advantages and disadvantages in solving water-related problems. The designated lecture session is used to discuss basic principles to solve a variety of hydrologic problems and basic calculation in water distribution and management which have implication for water resources management and conservation. The outcomes shall be assessed through a variety of tools which include the traditional paper examination, tests, written assignment and oral presentation and classroom engagement.</p>
<b>Transferable Skills</b>	Students able to explain regarding the process of hydrologic cycle.
<b>Teaching Methodologies</b>	Lectures, Case Study, Discussion
<b>CLO</b>	<p>CLO1 Describe the basic concepts of hydrology as a description of the water cycle and the role of water in the natural environment.</p> <p>CLO2 Explain the sources of water supply and various technologies of processed water, the advantages and disadvantages in solving water-related problems.</p> <p>CLO3 Apply the concepts of water budget and its use in analyzing water supply problems, potential solution and sustainable water resources management.</p> <p>CLO4 Solve a variety of hydrologic problems and by applying basic calculations in water distribution and management.</p>
<b>Pre-Requisite Courses</b>	No course recommendations
<b>Topics</b>	
<p><b>1. Introduction to Hydrology</b></p> <p>1.1) 1.1 Hydrologic cycle and water budget            1.2) 1.2 Overview of Malaysian Environmental Policy            1.3) 1.3 Hydrologic equation and water balance in nature            1.4) 1.4 Precipitation: types, measurement and variation            1.5) 1.5 Surface Runoff: Watersheds &amp; stream-flow.            1.6) Estimation of Basin recharge/runoffs            1.7) 1.6 Groundwater and streams            1.8) 1.7 Interaction between surface water and groundwater            1.9) 1.8 Components of hydrologic cycle: Variation and measurement</p>	
<p><b>2. Surface Water Hydrology</b></p> <p>2.1) 2.1 Introduction to surface water hydrology            2.2) 2.2 Rivers: Components and morphology            2.3) 2.3 Lakes: Type, ecological zones and thermal cycle            2.4) 2.4 Watersheds &amp; Overland Flow            2.5) 2.5 Precipitation and runoff pattern            2.6) 2.6 Storm-water management and estimation of runoff            2.7) 2.7 Urbanization and Flood events</p>	

**3. Ground water hydrology**

- 3.1) 3.1 The geology of groundwater hydrology
- 3.2) 3.2 Groundwater recharge
- 3.3) 3.3 Aquifers: Types and properties
- 3.4) 3.4 Groundwater movements
- 3.5) 3.5 Groundwater use and problems

**4. Sources for water supply**

- 4.1) 4.1 Chemical properties and role of water in natural environment
- 4.2) 4.2 Availability of water resources
- 4.3) 4.3 Major water compartments – groundwater and surface water
- 4.4) 4.4 Sources of water supply: Natural and processed freshwater
- 4.5) 4.5 Identification and selection of water resources
- 4.6) 4.6 Interim National Water Quality Standards for Malaysia: Section 7A of
- 4.7) Water Act 1989
- 4.8) 4.7 Field visit

**5. Water Management and Conservation**

- 5.1) 5.1 Type of water demand
- 5.2) 5.2 Trends in water use and conservation
- 5.3) 5.3 Sustainable water use & Groundwater sustainability
- 5.4) 5.4 Estimation of water demand for water supply
- 5.5) 5.5 Technology in freshwater resource: Desalination
- 5.6) 5.6 Water management and the environment
- 5.7) 5.7 Wetlands: Natural functions & Restoration

**6. Water Distribution System**

- 6.1) 6.1 Design factors: Required flow & pipeline layout
- 6.2) 6.2 Water mains: Material, appurtenances and installation
- 6.3) 6.3 Pumping Stations: Characteristic, operation and efficiency
- 6.4) 6.4 Distribution storage and Reservoirs
- 6.5) 6.5 Flow in pipe networks

**7. Presentation**

- 7.1) n/a

Assessment Breakdown	%
Continuous Assessment	60.00%
Final Assessment	40.00%

Details of Continuous Assessment	Assessment Type	Assessment Description	% of Total Mark	CLO
	Assignment	Assignment 1	10%	CLO1 , CLO2
	Assignment	Assignment 2	10%	CLO2 , CLO3 , CLO4
	Case Study	Field work	10%	CLO2 , CLO3 , CLO4
	Presentation	n/a	10%	
	Test	Test 1	10%	CLO1 , CLO2 , CLO3
	Test	test 2	10%	CLO2 , CLO3 , CLO4

Reading List	Recommended Text	<ul style="list-style-type: none"> <li>Gray NF 2005, <i>Water Technology: An Introduction for Environ</i>, 2 Ed., John Wiley Publishers, London</li> </ul>
	Reference Book Resources	<ul style="list-style-type: none"> <li>Cunningham, W.P., Cunningham, M.A. 2004, <i>Principle of Environmental Science: WaResourc</i>, Ed., , McGraw-Hill companies, New York. America [ISBN: ]</li> <li>Cech T.V 2003, <i>Principles of Water Resources: Development, M</i>, Ed., , Wiley Publishers, London [ISBN: ]</li> <li>Viessman, W and Hammer, M.J. 2005, <i>Water Supply and Pollution Control</i> 7 Ed., , PearsPrentice Hall, New Jersey.</li> </ul>
Article/Paper List	This Course does not have any article/paper resources	
Other References	This Course does not have any other resources	