



UNIVERSITI TEKNOLOGI MARA

EVT712: WATER POLLUTION CONTROL TECHNOLOGY

Course Name (English)	WATER POLLUTION CONTROL TECHNOLOGY APPROVED
Course Code	EVT712
MQF Credit	3
Course Description	This course aims to provide students with advanced understanding of water pollution control which will enable them to critically evaluate and select the best available green technology and practices leading towards sustainable development. Students will apply national laws and legislation concerning sewage and effluent discharge, which directly impact various treatment technologies. Successful environmental practitioners in today's complex technological world must possess an in-depth knowledge of various tools available for abating and/or preventing water contamination. Lecture sessions employ a mixture of lectures and active learning (self and peer discussions). The outcomes shall be assessed through a variety of tools which include the traditional paper examination, tests, a mini project, a written assignment and oral presentation.
Transferable Skills	Analysis skill, Critical thinking skill, Information searching skill
Teaching Methodologies	Lectures, Problem Based Learning (PBL), Discussion, Presentation
CLO	<p>CLO1 Interpret the various types of current technologies and advanced method which are important aspects of water pollution control.</p> <p>CLO2 Apply national laws and legislation concerning sewage and effluent discharge, which directly impact various treatment technologies.</p> <p>CLO3 Analyze the application of water pollution control technologies between different industries.</p> <p>CLO4 Conclude the advantages and limitations of various advanced water pollution control technologies or methods.</p>
Pre-Requisite Courses	No course recommendations
Topics	
1. Introduction to environmental pollution 1.1) Physical, chemical and biological characteristics of impurities in water and wastewaters	
2. Water and Wastewater Regulations 2.1) Malaysian legislation - Environmental Quality Sewage Regulation 2009 2.2) Environmental Quality (Industrial Effluent) Regulations 2009.	
3. Natural Purification and Technological Treatment Unit Processes 3.1) Water Purification in Natural Streams: Self-purification of waste in streams, zones of purification. 3.2) Overview of available technologies: Conventional sewage treatment plant flow sheet, Description of various units in sewage treatment plant.	
4. Pre-treatment Processes 4.1) Methods of waste reduction such as volume and strength reduction, segregation, reuse, recycle, neutralization, equalization, removal of organic and inorganic dissolved solids.	
5. Physical Processes 5.1) Methods for removing suspended solids: screening and grit removal. 5.2) Particle separation processes: particles sedimentation, filtration, coagulation and flocculation.	
6. Physical Processes 6.1) Solute separation processes: adsorption, ion exchange, membrane separations.	
7. Biological Processes 7.1) Microorganisms and growth, suspended and attached/fixed film reactors. Aerobic and anaerobic treatment of wastewater and its applications.	

<p>8. Biological Processes</p> <p>8.1) Nitrogen and phosphorous removal from wastewater</p> <p>8.2) Biological nutrient removal.</p> <p>8.3) New processes and technological advances:</p> <p>8.4) Bioremediation of inorganic and organic contaminants</p> <p>8.5) Catalytic enzyme based treatment and immobilization technology</p>
<p>9. Chemical Processes</p> <p>9.1) Chemical precipitation, oxidation-reduction, advanced oxidation technologies (photo-catalysis, Fenton oxidation, electro-oxidation)</p>
<p>10. Industrial / current issue</p> <p>10.1) Talk/discourse/forum/discussion on water pollution</p>
<p>11. Disinfection</p> <p>11.1) Chemical and non-chemical methods of disinfection</p> <p>11.2) Oxidation of trace organics: ozone, hydrogen peroxide and other oxidants, photochemical methods.</p>
<p>12. Sludge Pollution Control</p> <p>12.1) Sludge treatment technologies; aerobic and anaerobic digestion of sludge, sludge stabilization, sludge dewatering, sludge drying, incineration.</p>
<p>13. Sustainability in Wastewater Treatment Technologies and Water Reuse</p> <p>13.1) Integrated evaluation of the overall sustainability of wastewater treatment technologies.</p> <p>13.2) Direct and indirect Reuse, recovery and conservation methods, water softening, additives, corrosion, control of tastes and odours.</p> <p>13.3) Reuse of Industrial Effluent, Urban Effluent Reuse for Agriculture.</p>
<p>14. Presentation on wastewater related issues</p> <p>14.1) Group presentation</p>

Assessment Breakdown	%
Continuous Assessment	80.00%
Final Assessment	20.00%

Details of Continuous Assessment	Assessment Type	Assessment Description	% of Total Mark	CLO
	Group Project	assignment	40%	CLO2
	Presentation	selected topic	20%	CLO4
	Test	Test 1	20%	CLO1

Reading List	Recommended Text	<ul style="list-style-type: none"> • Hammer M.J. and Hammer M.J. Jr. 2011, <i>Water and Wastewater Technology</i>, 7th ed Ed., Prentice Hall.
	Reference Book Resources	<ul style="list-style-type: none"> • Metcalf and Eddy 2013, <i>Wastewater engineering; treatment, disposal and reuse</i>, 5th ed Ed., McGraw Hill

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