



UNIVERSITI TEKNOLOGI MARA

EVT673: HAZARDOUS WASTE TECHNOLOGY AND MANAGEMENT

Course Name (English)	HAZARDOUS WASTE TECHNOLOGY AND MANAGEMENT APPROVED
Course Code	EVT673
MQF Credit	3
Course Description	This course is intended to provide students with the necessary background and knowledge pertaining to the design of hazardous waste facilities such as the study of the sources, generation rates, and characteristics of hazardous wastes and their regulation, handling, treatment and disposal. Special emphasis is placed on process design of waste handling, treatment and disposal systems.
Transferable Skills	Written report Presentation skill Team work Thinking scientific skill
Teaching Methodologies	Lectures, Blended Learning, Field Trip, Presentation
CLO	CLO1 Develop a working knowledge of environmental technology practice hazardous waste treatments and management. CLO2 Develop an understanding of legislation requirement on hazardous waste treatment and management. CLO3 Describe the principle and design facilities and technology in hazardous waste management. CLO4 Apply the quantitative risk assessment in the hazardous waste management field.
Pre-Requisite Courses	No course recommendations
Topics	
1. Introduction to Hazardous Waste 1.1) 1.1 Waste Characterization 1.2) 1.2 Legal Framework 1.3) 1.1.1 Environmental Quality (Schedule Waste) Regulations 2005 1.4) 1.1.2 EIA Guidelines for Toxic and Hazardous Waste Treatment and Disposal Project 1995 1.5) 1.1.3 Guidelines on import (1993), export and storage (1994)	
2. Principles and Design of Waste Minimization 2.1) 2.1 Principles and techniques of waste minimization 2.2) 2.2 Examples of waste types and phase separation processes 2.3) 2.3 Design criteria and examples	
3. Facility development and operations 3.1) 3.1 Facility types and operations 3.2) 3.2 Site selection and permitting	
4. Physical, Chemical and Biological Treatment Processes 4.1) 4.1 Types, principles, equipment used, application ranges 4.2) 4.2 Comparisons of different treatment facilities	
5. Stabilisation and Solidification 5.1) 5.1 Mechanism and technology of solidification	
6. Principles and Design of Thermal Treatment 6.1) 6.1 Status, types, principles, equipment used, application ranges and comparisons of different thermal treatments technologies 6.2) 6.2 Design of incinerators 6.3) 6.3 Design of other thermal systems	

7. Land Disposal

- 7.1) 7.1 Disposal sites
- 7.2) 7.2 Landfill operation
- 7.3) 7.3 Leachate collection
- 7.4) 7.4 Facilities design and development

8. Principles and Design of Site Remediation Facilities

- 8.1) 8.1 Status, types, principles, equipment used, application ranges and comparisons of different thermal treatments technologies
- 8.2) 8.2 Remedial investigation
- 8.3) 8.3 Soil remediation design examples
- 8.4) 8.4 Groundwater remediation design examples

9. Quantitative Risk Assessment

- 9.1) 9.1 Hazard identification
- 9.2) 9.2 Exposure assessment
- 9.3) 9.3 Toxicity assessment
- 9.4) 9.4 Risk characterization

10. Site visit

- 10.1) Application of hazardous waste management in industry

Assessment Breakdown	%
Continuous Assessment	60.00%
Final Assessment	40.00%

Details of Continuous Assessment	Assessment Type	Assessment Description	% of Total Mark	CLO
	Assignment	Assignment1	10%	CLO1 , CLO2 , CLO3
	Assignment	Assignment2	10%	CLO1 , CLO3 , CLO4
	Discussion	Class discussion/presentation	10%	CLO1
	Presentation	Group presentation	10%	CLO4
	Test	Test1	10%	CLO1 , CLO2
	Test	Test2	10%	CLO3 , CLO4

Reading List	Recommended Text	<ul style="list-style-type: none"> LaGrega M.D., Buckingham, P.L, Evans J.C 2001, <i>Hazardous Waste Management, McGraw-Hill Book Company.</i>
	Reference Book Resources	<ul style="list-style-type: none"> Blackman, W.C. 2001, <i>Basic Hazrdous Waste Management, 3 Ed., , Lewis Publishers, CRC Press, Boca Raton. [ISBN:]</i> , <i>Environmental Quality Act 1974 (Act 127) Subs, Ed., , [ISBN:]</i> Freeman, H.M. 1997, <i>Standard Handbook of Hazardous Waste Treatmen, Ed., , McGraw-Hill, Inc. [ISBN:]</i> Wentz, C.A. 1995, <i>Hazardous Waste Management, Ed., , McGraw-Hill, Inc [ISBN:]</i> Theodore,L. And Reybolds, J.P. 1987, <i>Introduction to Hazardous Inceneration, Ed., , John-Wiley, New York. [ISBN:]</i>
Article/Paper List	This Course does not have any article/paper resources	
Other References	This Course does not have any other resources	