



UNIVERSITI TEKNOLOGI MARA

CMT650: GREEN CHEMISTRY AND TECHNOLOGY

Course Name (English)	GREEN CHEMISTRY AND TECHNOLOGY APPROVED
Course Code	CMT650
MQF Credit	2
Course Description	This course serves as an introduction to green chemistry and technology. Students will define concepts and explain various aspects related to the principle of green chemistry, waste pollution prevention, alternative energy and chemical sources, sustainable biopolymers and environmental sustainability. The outcomes shall be assessed through a variety of tools which include the tests, case studies plant visit/industrial, classroom engagement like student presentation.
Transferable Skills	Analyse the feasibility studies of green development and green development valuation and explore the economic concept to green development process
Teaching Methodologies	Lectures, Case Study, Presentation
CLO	CLO1 Explain the concepts and principles in the green chemistry and technology CLO2 Analyze various types of feedstocks, processes and products in green chemistry and technology CLO3 Demonstrate communication skill in green chemistry technology
Pre-Requisite Courses	No course recommendations
Topics	
1. Introduction to green chemistry 1.1) Basic principles of green chemistry 1.2) Green chemistry for sustainable development	
2. Green chemistry and chemical processes for biomass utilization 2.1) Overview of biomass 2.2) Physicochemical properties of main biomass components 2.3) Separation technology of biomass components 2.4) Green chemicals from biomass – fine chemicals, liquid fuels & gas fuels 2.5) Green chemical conversion of natural oils and fats	
3. Green process and utilization of carbon dioxide 3.1) Properties of CO ₂ 3.2) Separation technology of CO ₂ 3.3) Chemical conversion of CO ₂ 3.4) Utilisation of CO ₂ resources	
4. Green technology in the energy industry 4.1) Solar energy 4.2) Wind energy 4.3) Geothermal energy 4.4) Ocean energy	
5. Green chemistry in practice 5.1) Impact of green technology on the chemical industry 5.2) Catalysis in chemical process 5.3) Renewable feedstocks for production of chemicals	
6. Technology intensification for green chemistry 6.1) Microwave technology 6.2) Ultrasonic technology 6.3) Radiation technology 6.4) Plasma technology 6.5) Other intensification techniques	

7. Assessment of green chemistry and chemical process

7.1) Basic principles of green chemistry assessment

7.2) Life cycle assessment

Assessment Breakdown	%
Continuous Assessment	100.00%

Details of Continuous Assessment	Assessment Type	Assessment Description	% of Total Mark	CLO
	Case Study	n/a	20%	CLO2
	Presentation	n/a	20%	CLO3
	Test	two tests	60%	CLO1

Reading List	This Course does not have any book resources
Article/Paper List	This Course does not have any article/paper resources
Other References	<ul style="list-style-type: none"> • text book Lancaster, M 2002, <i>Green Chemistry an Introductory Text</i>, Royal Society of Chemistry, Cambridge, UK • text book Anastas, P. T.; Warner, J. C 1998, <i>Green Chemistry: Theory and Practice</i>, Oxford University Press, New York • text book Dewulf, J.; Langenhove, H. V., Eds 2006, <i>Renewables-Based Technology: Sustainability Assessment</i>, John Wiley & Sons, Ltd, Chichester, UK • text book Long Zhang, Changsheng Gong, Bin Dai 2018, <i>Green Chemistry and Technologies</i>, Huazhong University of Science & Technology Press • text book James Clark and Duncan Macquarrie 2002, <i>Handbook of Green Chemistry and Technology</i>, Blackwell Science Ltd