



UNIVERSITI TEKNOLOGI MARA

CMT658: ENERGY TECHNOLOGY

Course Name (English)	ENERGY TECHNOLOGY APPROVED
Course Code	CMT658
MQF Credit	3
Course Description	This course focus on the fundamentals of energy and energy conversion as well as it utilisation. The course incorporates fundamentals, process and system's analysis tools in the broad energy area, envisioned to educate future leaders in the field of energy technology. particularly in the area of energy conversion and utilisation.
Transferable Skills	Students will be exposed to macroscopic and microscopic analysis of direct and indirect energy conversion particularly in thermochemical processes as well as its applications. Systems utilising fossil and renewable resources, including catalysis, photovoltaics and combined cycles will be discussed. Large-scale power plants, propulsion devices and other approaches will be used to demonstrate the future trends of energy technology
Teaching Methodologies	Lectures, Case Study, Discussion
CLO	CLO1 Apply and calculate quantitative problems in renewable energy and conventional energy system. CLO2 Discuss renewable energy technology and applications. CLO3 Explain the concepts and principles of renewable energy and conventional energy.
Pre-Requisite Courses	No course recommendations
Topics	
1. Energy resources, consumption and projections 1.1) Introduction 1.2) Growth and consumption, supply and trends 1.3) Energy equivalencies 1.4) Socio-economic and environmental issues and policies 1.5) Malaysian energy scenario	
2. Introduction to renewable energy sources 2.1) Global potential of biomass energy 2.2) Biomass in Malaysia 2.3) World biomass feedstock 2.4) Solar Energy 2.5) Wind Energy 2.6) Hydropower 2.7) Tidal wave Energy 2.8) Geothermal Energy 2.9) Wind Energy 2.10) Integration	
3. Biomass conversion technology 3.1) Conversion technologies 3.2) Thermal conversion method : Combustion/incineratio, Gasification, Pyrolysis 3.3) Other thermal conversion: Hydrothermal upgrading, Hydroprocessing 3.4) Chemical conversion: Anaerobic digestion, Fermentation, Composting 3.5) Other chemical processes : Transesterification	
4. Application of thermal conversion 4.1) Combined heat and power 4.2) Co-firing	

5. Conventional Energy Characterisation

5.1) Proximate analysis: Moisture content, Volatile matter, Fixed carbon, Ash content, Calorific value

5.2)

5.3) Ultimate analysis : Carbon, Hydrogen, Nitrogen, Sulphur, Oxygen

Assessment Breakdown	%
Continuous Assessment	60.00%
Final Assessment	40.00%

Details of Continuous Assessment	Assessment Type	Assessment Description	% of Total Mark	CLO
	Assignment	n/a	20%	CLO3
	Quiz	n/a	20%	CLO1
	Test	n/a	20%	CLO2

Reading List	Recommended Text	Reference Book Resources
	<ul style="list-style-type: none"> • Godfrey, B. (Ed.) 2008, <i>Renewable Energy</i>, Oxford University Press., Oxford University Press • Coulson & Richardson, <i>Chemical Engineering, Volume 1</i>, Pergamon Press. 	<ul style="list-style-type: none"> • Duffie, J.A. and Beckman, W.A. 1991, <i>Solar engineering of thermal processes.</i>, New York: John Wiley and Sons USA. • EUREC Agency 1996, <i>The Future for Renewable Energy: Prospects and Directions.</i>, James & James (Sci. Pubs. Ltd). UK. • Francis, W & Peters, M.C., <i>Fuel and Fuel Technology</i>, Pergamon Press • Gordan, J. (Ed.). 2001, <i>Solar Energy: The State of the Art.</i>, James & James (Sci. Pubs. Ltd). UK.
Article/Paper List	This Course does not have any article/paper resources	
Other References	This Course does not have any other resources	