



UNIVERSITI TEKNOLOGI MARA

CHE685: FUEL AND ENERGY TECHNOLOGY

Course Name (English)	FUEL AND ENERGY TECHNOLOGY APPROVED
Course Code	CHE685
MQF Credit	3
Course Description	This course is a combination of two areas of studies namely fuel technology and energy technology. The fuel technology covers topics required in the conventional sources of energy such as types of fuel and combustion calculations involved in the energy production. The energy technology covers the present form of the world energy consumption and production. The current trends in the global energy needs and its sustainability are particularly highlighted and emphasized also include renewable sources of energy.
Transferable Skills	a. Acquire and apply the knowledge of present energy scenario, the basic energy fundamentals and principles to solve energy related problems b. Discuss and evaluate the various sources of fuel and renewable energy resources, properties and their applications c. Justify and evaluate energy management system for a sustainable future.
Teaching Methodologies	Lectures, Tutorial
CLO	CLO1 1. Identify and acquire knowledge of present energy scenario and the basic energy fundamental and principles to solve energy related problems CLO2 2. apply the knowledge of combustion reaction principles to solve various combustion related problems of fossil fuels CLO3 3. recognize problems arises due to fossil fuels combustions, economy and management and evaluate various alternative environmental friendly energy systems to meet the requirements in terms of economy and environment.
Pre-Requisite Courses	No course recommendations
Topics	1. Introduction to History of Energy, Consumption and Demand 1.1) Overview of the global energy demand and generation, factors for energy demand, energy supply and sources. Also issues on sustainability are 2. Basic Energy Concepts and Terminologies 2.1) Basic concepts, quantities, forms and terms used in the energy technology, energy conversion principles, efficiency, power, first and second law of thermodynamics, thermal energy and heat transfer 3. Conventional Energy System 3.1) Introduction to conventional sources of energy: coal, oil, gas, hydropower, nuclear power, theory of petroleum, natural gas and coal formation, principles of technologies a 4. Fuels Properties 4.1) Classification of fuels: Solid, Liquid, Gas, Gaseous fuels characteristics, CV and bomb calorimeter, combustion properties, calorific value calculations 5. Combustion Calculations 5.1) Basic combustion reactions, calculation of air requirement/theoretical air/stoichiometric air for combustion, excess air definitions, calculation of excess air for combustion, 6. Analysis of Combustion Gaseous Products 6.1) Determination of gases from complete and incomplete combustion, dew point determinations, calculation of quantity of products gas, tutorial for combustion prod 7. Environmental Impacts 7.1) Environmental effects of fossil fuel's combustion, air, water and land pollution, greenhouse effect

8. Introduction to Alternative Energy System

8.1) Sources of alternative energy system: solar, hydro, nuclear, wind, biomass, hydrogen, ocean, tidal, and geothermal, co-generation, tutorial on alternative energy system

9. Electric Power Generation and Transmission

9.1) Electricity generation, transmission (AC/DC conversion) and distributions, electricity wattage calculation, energy storage

10. Optimizing Energy Efficiencies in Industry

10.1) Energy equipment/technology in industries, Energy Management Tools

11. Economics and Environmental Consideration for Energy Production

11.1) Future trends on energy generation and managing climatic changes

Assessment Breakdown	%
Continuous Assessment	40.00%
Final Assessment	60.00%

Details of Continuous Assessment	Assessment Type	Assessment Description	% of Total Mark	CLO
	Assignment	n/a	20%	CLO3
	Test	Test 1	10%	CLO2
	Test	Test 2	10%	CLO2

Reading List	Reference Book Resources
	<ul style="list-style-type: none"> • Hinrichs, R.A 1991, <i>Energy</i>, Saunders College Publishing • Ministry of Energy, Multimedia and Telecommun 2000, <i>National Energy Balance Report 2003</i> • Twidwell, J. and Weir, T 2001, <i>Renewable Energy Resources</i>, McGraw-Hill Publishing C.

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