KOMAR UNIVERSITY OF SCIENCE AND TECHNOLOGY
(KUST)

MULTINATIONAL ENERGY, ENVIRONMENT, TECHNOLOGY AND ETHICS SYLLABUS			
Course Title	Multinational Energy, Environment, Technology and Ethics		
Course Code	PTE4360	**No. of Credits**	3 Credit Hours
Department	Petroleum Engineering	**College**	Engineering
Pre-requisites Course Code	PTE1200	**Co-requisites Course Code**	
Course Coordinator(s)	Hamid Farangis Zadeh		
Email	hamid.zadeh@komar.edu.iq	IP No.	114
Other Course Teacher(s)/Tutor(s)			
Class Hours	Tuesday / Thursday: 12:00 – 13:30, Room: 203		
Office Hours	Monday: 10:00 – 12:00 (on the third floor, Room 308)		
Course Type	College Requirement		
Offer in Academic Year	Fall 2015		

COURSE DESCRIPTION

This course investigates energy use in modern society and the consequences of past, current, and future energy use patterns. In addition, environmental ethics is a new sub-discipline of philosophy that deals with the ethical problems surrounding environmental protection. It aims to provide ethical justification and moral motivation for the cause of global environmental protection.

COURSE OBJECTIVES

The main goal of this course is to provide petroleum engineering students with description of energy consumption and its impact on human life, environment and applied technologies, and to describe how the ethical responsibilities can solve some issues related to the world energy demands. The students will understand the fundamental principles of the multinational secure energy supply, they will learn the basics of sustainability, and how technical and environmental aspects must come under consideration. Besides, the course will clarify the importance of worldwide environmental saving through ethical arguments.

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COURSE LEARNING OUTCOMES

After participating in the course, you should be able to:

1) analyze the need for energy, its resources and efficiency, historical and current energy use, and evolution of energy demand (ABET a, h, j),
2) analyze, explain, and discuss the potential impacts of fossil-fuel combustion on local and global scales (ABET a, h, j),
3) discuss the current and future prospects of renewable energy systems, their potential to contribute to a sustainable energy future (ABET a, e),
4) recognize and solve environmental engineering problems, and propose the best possible energy conversion system based on environment and engineering (ABET e, f),
5) develop a multi-perspective analysis of various modern technologies in terms of their impact on human life, culture, history, and economics within global and international frameworks and limitations (ABET h, j),
6) discuss a comprehensive understanding of the theoretical background that underpins environmental/energy/sustainability issues (ABET f, j), and,
7) analyze ethical conflicts related to energy, environment, and society (ABET e, f, h, j)

*ABET criteria:

http://www.abet.org/eac-criteria-2014-2015/

GUIDELINES ON GRADING POLICY

A	95-100%	**C**	70-74%
A-	94-90%	**C-**	65-69%
B+	87-89%	**D+**	60-64%
B	83-86%	**D**	55-59%
B-	80-82%	**D-**	50-54%
C+	75-79%	**F**	0-49%
W	Withdrawal	**I**	Incomplete

Note: Passing Grade is 65% and above

COURSE CONTENT

1) What is energy?
2) Energy use & demand; past, present & future,
3) Combustion,
4) Energy & technology,
5) Energy production-consumption & environmental impact,
6) Renewable energy,
7) Sustainability,
8) Technology, risk & ethics,
9) Regulations & international laws,
10) Energy, technology & limits.

CLASS REQUIREMENT

1) A scientific calculator, and,
2) Notebook.

COURSE TEACHING AND LEARNING ACTIVITIES

This course will carried out in 3 hours, 2 times lecture per week. The semester has 15-instructional weeks followed by one week of exam. Course instructor will:

- Utilize power point presentation to present the course information.
- The board space to calculate problems with students.
- There will be in class group work, where student will do in class exercises and turn the assignment to the instructor.

COURSE ASSESSMENT TOOLS

Assessment Tool	Description	Weight
Assignment	The assignments will be conducted during the semester; each assignment will be given as scheduled and posted on Google Classroom (ABET a, e, f, h, j).	**10%**
Quizzes	Quizzes are scheduled as shown in the semester schedule. Students will take 4 quizzes; all quiz grades will be counted toward your final grade (ABET a, e, f, h, j).	**10%**
Tests	Two tests will be conducted during the semester and each has 15% of the total grade. The test may include multiple-choice questions, True/False, short answers, and problem solving (ABET a, e, f, h, j).	**30%**
Mid-term Exam	The students should find the mid-term exam easer because it will be similar to the cases studied during the semester, but more updated (ABET a, e, f).	**20%**
Final Exam	The final exam will be designed to cover all the students' learning outcomes for this course. It will be a closed book exam and no materials are allowed except the one that will be given by the instructor (ABET a, e, f, h, j).	**30%**

ESSENTIAL READINGS: (Textbook and References)

Textbooks and references:

- Energy, environment and development, Goldenberg, J. and Lucon, O., 2nd Ed., Earthscan 2010, ISBN 978-1-84407-748-9,
- Race for sustainability : energy, economy, environment and ethics, Hickson, K., World Scientific, 2014, ISBN 978-9814571357,
- International law for energy and the environment, Park. P., 2nd Ed., CRC Press, 2013, ISBN-13: 978-1-4398-7097-6.
- Technology and value, Shrader-Frechette, K. and L. Westra, Rowman & Littlefield, 1997,
- Sustainable energy – without the hot air, MacKay, D. JC., UIT Cambridge Ltd, 2009, ISBN 978-0-9544529-3-3.

COURSE POLICY *(including plagiarism, academic honesty, attendance etc)*

KUST Academic Policy

http://sar.komar.edu.iq/files/Student%20hand%20Book%202013.pdf

Attendance:

- Students are expected to attend all lectures and must attend all examinations, quizzes.
- There is no make-up work for students who miss classes without official permission.
- Student must arrange with the faculty to make-up the missed class.
- Students are subject to the regulation and policies mentioned in the KUST Student Handbook.
- KUST guidelines for lateness are as follows: Three occasions of lateness count as one absence. (You can be considered late the first minute of the lecture time).

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GUIDELINES FOR SUCCESS

1) Work both independently and in groups of your study of peers, who can help you understanding the course material.
2) Pay a full attention in the class when your instructor explain the lesson, if you understand 70% directly from the instructor, then the 30% will be just practice exercises.
3) Understanding more than memorizing will help you a lot in passing exams.
4) Working many problems beyond the assigned homework will help mastering.
5) Ask a question when something is not clear.
6) Finally, attend every lecture and getting missed material is your responsibility.

E-MAILETIQUETTEOF COMMUNICATION

Please note the following in regards to e-mail communication:

1) It is your responsibility to update your Komar-email address daily for course updates. Faculty will not be able to contact you if you fail to have an email address and you could potentially miss important information about the course.
2) Email will only be answered if it comes from Komar-email address. Faculty will not respond to unprofessional email addresses.
3) Mail should have a subject heading which reflects the content of the message.
4) Your message should begin with an appropriate salutation, including the name of the person being addressed, and end with thanks followed by your full name of the sender.
5) Emails that do not follow the above guidelines, or are written in an unprofessional and / or disrespectful manner as well as anonymous emails will not be addressed.
6) Failure to check e-mail or Google Classroom may result in you missing important assignments and subsequently affect your grade.

CELL PHONES

All cell phones and beepers are expected to be switched to vibrating mode if available and turned off completely if this feature is not an option. Disruption of class due to beepers or a cell phone will not be tolerated and the student will be asked to leave class. All other electronic equipment that the faculty member deems not essential to the provision of academic learning is prohibited from being used in class.

REVISIONTO THE SYLLABUS

This syllabus is subject to change. It is the duty of the instructor to inform students of changes in a timely fashion after approval of Quality Assurance Office (QAO).

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Course calendar: Please check the academic calendar for Fall 2015

***Note: any attempt from your side for rescheduling any of the quizzes, exam or even homework is not accepted**

Date	Week	Subject	Activities
28 Sep-01 Oct	**1**	**Ch. 1: Introduction** **What is energy?** Laws of conservation, Intro to Thermodynamics, Basic mechanics	
04 – 08 Oct	**2**	**Ch. 1:**…continue… Electricity & Magnetism, Earth atmosphere, Weather & Meteorology, Solar science	Quiz #1
11 – 15 Oct	**3**	**Ch. 2: Energy use & demand; past, present & future** World energy trend, Lifestyle & consumption patterns	Assignment # 1
18 – 22 Oct	**4**	**Ch. 3: Combustion** Intro to Combustion, Types, Engines	
25 – 29 Oct	**5**	**Test 1 (1, 2, 3)**	
		Ch. 4: Energy & technology Energy efficiency, Power production,	
01 – 05 Nov	**6**	**Ch. 4:**…continue … Transportation, Pollution sources **Ch. 5: Energy production-consumption & environmental impact** Greenhouse effect	Quiz #2
08 – 12 Nov	**7**	**Ch. 5:**…continue… Global warming, Acid rain, Lead abatement, Thermal pollution, Nuclear waste	Assignment # 2
16 – 21 November Midterm Week (1, 2, 3, 4 & 5)			
22 –26 Nov	**8**	**Ch. 6: Renewable energy** Green (renewable) vs Black (fossil), Sources, Advantages,	

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Date	Week	Subject	Activities
29 Nov-03 Dec	**9**	**Ch. 6**:…continue… Availability, Solar, Wind, Geothermal, Hydro, Wave	Quiz #3
06 – 10 Dec	**10**	**Ch. 7: Sustainability** Dimensions: economy/environment/social, Consumption,	Assignment # 3
13 – 17 Dec	**11**	**Ch. 7:**…continue… Population, Intro to ethics	
		Test 2 (6 & 7)	
20 – 24 Dec	**12**	**Ch. 8: Technology, risk & ethics** Historical & modern human attitude toward the environment, Moral Reasoning & ethical theory, Risk assessment & comparisons, Technological vulnerability	
27 – 31 December New Year Holidays			
03 – 07 Jan	**13**	**Ch. 9: Regulations & international laws** Regulation in the energy sector, Carbon Capture & Storage, International environmental law	Quiz #4
10 – 14 Jan	**14**	**Ch. 10: Energy, technology & limits** Forbidding science, Needs for better ethics for emerging technologies, Limitations of energy production, Energy philosophy	Assignment # 4
17 – 21 Jan	**15**	**Review week**	
24 – 31 January Final Exam			