جامعة الملك عبدالله
للعلوم والتقنية
King Abdullah University of
Science and Technology

Course Syllabus: Principles of Env.Sustainability - EnSE 205

Division	Biological and Environmental Sciences & Engineering Division
Course Number	EnSE 205
Course Title	Principles of Env.Sustainability
Academic Semester	Spring
Academic Year	2017/2018
Semester Start Date	01/28/2018
Semester End Date	05/24/2018
Class Schedule (Days & Time)	02:30 PM - 04:00 PM | Sun Thu

Instructor(s)

Name	Email	Phone	Office Location	Office Hours
Kim Choon NG	kim.ng@kaust.edu.sa	+966128084955	4232, 4, Al-Jazri (bldg. 4)	**15.30 to 17.00 pm, Daily.** Note: The first lesson of EnSE 205 begins on the week starting from 1 February, 2017.

Teaching Assistant(s)

Name	Email
Dr Muhammad Wakil Shahzad, Dr Muhammad Burhan.	muhammad.shahzad@kaust.edu.sa; muhammad.burhan@kaust.edu.sa

Course Information

Comprehensive Course Description	The course is general in nature, covering the general understanding of what constitutes to the rates of renewable resource harvest, pollution creation, and non-renewable resource depletion where these processes can be continued indefinitely, i.e., without sacrificing the needs of future generations. It is a course to better equipped students for making informed decisions and taking economically feasible actions now that are in the interests of protecting the natural world. We will be looking into the chronological activities of human activities by examining the quantifiable parameters such as the green-house gases, climate change, loss of agricultural land to erosion, etc. We want to generate awareness to the possible irreversible situations of the fragile world environment, with emphasis on preserving the capability of the environment to recover itself and not causing too much climate changes. Environment sustainability is an important topic at the present time, as seen by the current COP21 that is taking place in Paris in early December, 2015. Based on scientific evidence, we realize that damages to our world can be catastrophic if no appropriate actions are adopted now. For example, many human activities conducted hitherto can potentially be causing (i) damage rainforests and woodlands through logging and agricultural clearing, (ii) seawater pollution (acidification) and over-fishing of oceans, rivers and lakes, (iii) polluting the atmosphere through the burning of fossil fuels, (iv) damaging prime agricultural and cultivated land through the use of unsustainable farming practices, etc. With clear environmental policy and targets (e.g., the 2oC limit for average rise in the ambient temperature), there is a good chance that policy incorporated by countries to individual corporation can ensure indefinite growth in the businesses or economic growth without jeopardizing our environment and all countries can have GDP growth levels that are sustainable. Students are required to conduct three (3) assignments where they can exercise independent studies, either alone or in group of three. In these studies, they will propose solution(s) and articulate methodologies in solving problems of interest to our human activities that currently deemed “unsustainable”. **GOALS AND OBJECTIVES** Impart deeper undertsanding of environmental sustainability - a wiser use of resources in the context of economic, social and environment nexus. **REQUIRED KNOWLEDGE** Basic engineering science knowlwdge, concern for environment, and open mind to project-based learning. **REFERENCE TEXTS** As per prescription during the lectures. METHOD OF EVALUATION Percentages % — Graded content (Assignments, Oral quizzes, Projects, Midterm exam, Final Exam, Attendance and participation, etc) (80%) Assignments (10%) Attendance (10%) Participation in class **COURSE REQUIREMENTS** **Assignments** – A total of 3 assignments will be given. The first assignment is in February, 2nd assignment in March and 3rd assignment in April, 2017. Each assignment must be handed in after 4 weeks from the date of issue. Each assignment report can be based on an individual effort or a combined effort from a group of 2 or 3 students per assignment Reading materials are as prescribed in the lecture slides, open literature, etc. **Course Policies** (Absences, Assignments, late work policy, etc.) Submisssion of assigments must be on time (typically 4 weeks) unless a good reason is offered. **Additional Information** **NOTE** The instructor reserves the right to make changes to this syllabus as necessary.
Course Description from Program Guide	Fundamental aspects of sustainability, energy cycles and accounting. Carbon cycle, emissions and sequestration. Concepts of green design. Life-cycle analysis.

Goals and Objectives	**Course Information** The course is general in nature, covering the general understanding of what constitutes to the rates of renewable resource harvest, pollution creation, and non-renewable resource depletion where these processes can be continued indefinitely, i.e., **without sacrificing the needs of future generations**. It is a course to better equipped students for making informed decisions and taking economically feasible actions now that are in the interests of protecting the natural world. We will be looking into the chronological activities of human activities by examining the quantifiable parameters such as the green-house gases, climate change, loss of agricultural land to erosion, etc. We want to generate awareness to the possible irreversible situations of the fragile world environment, with emphasis on preserving the capability of the environment to recover itself and not causing too much climate changes. Environment sustainability is an important topic at the present time, as seen by the current COP21 that is taking place in Paris in early December, 2015. Based on scientific evidence, we realize that damages to our world can be catastrophic if no appropriate actions are adopted now. For example, many human activities conducted hitherto can potentially be causing (i) damage rainforests and woodlands through logging and agricultural clearing, (ii) seawater pollution (acidification) and over-fishing of oceans, rivers and lakes, (iii) polluting the atmosphere through the burning of fossil fuels, (iv) damaging prime agricultural and cultivated land through the use of unsustainable farming practices, etc. With clear environmental policy and targets (e.g., the 2oC limit for average rise in the ambient temperature), there is a good chance that policy incorporated by countries to individual corporation can ensure indefinite growth in the businesses or economic growth without jeopardizing our environment and all countries can have GDP growth levels that are sustainable. Students are required to conduct three (3) assignments where they can exercise independent studies, either alone or in group of

two or three students. In these studies, they will analyze and propose solution(s), as well as articulate methodologies in solving problems of interest to our human activities that currently deemed “unsustainable”. They are encouraged to conduct economic analysis, either simple life cycle analysis (LCA) or levelized cost, etc.

OALS AND OBJECTIVES
Impart deeper understanding of environmental sustainability - a wiser use of resources in the context of economic, social and environment nexus.

REQUIRED KNOWLEDGE
Basic engineering science knowledge, concern for environment, and open mind to project-based learning.

REFERENCE TEXTS
As per prescription during the lectures.

METHOD OF EVALUATION

Percentages (%) of Graded content
(Assignments, Oral quizzes, Projects, Midterm exam, Final Exam,
Attendance and participation, etc)
(80%) Assignments
(10%) Attendance
(10%) Participation in class

COURSE REQUIREMENTS
Assignments – A total of 3 assignments will be given. The first assignment is in February, 2nd assignment in March and 3rd assignment in April, 2017. Each assignment must be handed in after 4 weeks from the date of issue. Each assignment report can be based on an individual effort or a combined effort from a group of 2 or 3 students per assignment.

Reading materials are as prescribed in the lecture slides, open literature (google, Wikipedia, etc.).

Course Policies (Absences, Assignments, late work policy, etc.)
Submission of assignments must be on time (typically 4 weeks) unless a good reason is offered.

Additional Information
None**.**

NOTE
The instructor reserves the right to make changes to this syllabus as necessary.

Required Knowledge	General readings from open literature.
Reference Texts	No particular text book. Follow th eslides of professor.
Method of evaluation	**10.00**% - Attendance **80.00**% - Homework /Assignments **10.00**% - Active participation
Nature of the assignments	3 written assignments are to be submitted within 3/4 weeks from the date of issue. The report can be an individual effort or a combined effort by a group up to 3 students.
Course Policies	A zero mark will be given to non-submission of written report. (i) Assignment 1 - 25% (2) Assignment 2 - 25% (3) Assignment 3 - 30% Attendance in class (presentation)- 10% Participation in class discussion (oral presentation) - 10%.
Additional Information	None.

Tentative Course Schedule *(Time, topic/emphasis & resources)*		
Week	**Lectures**	**Topic**
1	Sun 01/28/2018 Thu 02/01/2018	Class commences on 28th January, 2018 – Introductory lecture (Chapter 1)
2	Sun 02/04/2018 Thu 02/08/2018	Assignment #1 (Problem statement) / Discussion on Assignment #1
3	Sun 02/11/2018 Thu 02/15/2018	Discussion on Assignment #1./ Chapter 2
4	Sun 02/18/2018 Thu 02/22/2018	Chapter 2 / Presentation of assignment # 1 - 10 minutes per group
5	Sun 02/25/2018 Thu 03/01/2018	Presentation from groups on Assignment # 1. / Chapter 3.
6	Sun 03/04/2018 Thu 03/08/2018	Chapter 3./ Assignment #2 (problem statement)
7	Sun 03/11/2018 Thu 03/15/2018	Discussion of assignment # 2
8	Sun 03/18/2018 Thu 03/22/2018	Chapter 4
9	Sun 03/25/2018 Thu 03/29/2018	Chapter 4/ Presentation of assignment #2
10	Sun 04/01/2018 Thu 04/05/2018	Spring Break
11	Sun 04/08/2018 Thu 04/12/2018	Presentation of assignment #2/ Assignment # 3 (problem statement)
12	Sun 04/15/2018 Thu 04/19/2018	Chapter 5
13	Sun 04/22/2018 Thu 04/26/2018	Chapter 5/ Discussion of assignment #3
14	Sun 04/29/2018 Thu 05/03/2018	Discussion of assignment #3
15	Sun 05/06/2018 Thu 05/10/2018	Group presentation for assignment #3.
16	Sun 05/13/2018 Thu 05/17/2018	Group presentation for assignment #3/ Reflection on what we have learned.
17	Sun 05/20/2018 Thu 05/24/2018	No Class
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Note

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