



Korea University International Summer Campus (KU ISC) 2018

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June 26, 2018 ~ August 2, 2018

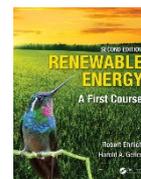
ISC231 – Physics of Planet Earth with Focus on Renewable Energy

I . Instructor

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II. Text and Materials

- Textbook: [Renewable Energy: A First Course – 2nd Edition](#) by Robert Ehrlich and Harold Geller, CRC Press – ISBN 978-1-4987-3695-4
- Scientific Calculator – graphing capabilities will be useful but not required



III. Course Organization

Course Materials and Course Schedule can be found on KU ISC Blackboard which every student will get access to later. The schedule tells you what readings to do, when quizzes are, and when exams are. You will be expected to check this after each class.

IV. Course Description and Objectives

Everything that we are and use first comes from the Earth in the form of natural resources. In the past few centuries, energy has been a natural resource that has driven everything for politics, transportation, education, and now we observe changes in the climate of the planet. Thus, the study of Earth's renewable energy supply is really the study of humanity and how we interact with the planet.

We will learn about the Earth from the perspective of energy resources discussing fossil fuels, the sun, wind, water, nuclear fuels, and biofuels. Essential concepts from physics will be introduced as needed to gain a mature understanding of these resources.

Learning Objectives

1. Learn about the various Earth's natural energy resources and distinguish between non-renewable, renewable, and sustainable
2. Apply basic physics equations to quantify energy resources

- Understand the challenges with human energy production and consumption as well as tools to manage said challenges

IV. Grading

Attendance & Participation	:	0 % - An attendance rate of 70% or higher is required for passing
Homework	:	0% - All assignments must be completed for passing
Quizzes	:	45% - Quizzes will be given at the end of each week and generally take 20-40 minutes
Final Exam	:	55% - A cumulative final exam will be given at the end of the term

Homework Policy: Assignments are for your practice for quizzes and exams. I hope that you use them wisely as such. You are encouraged to work together and even to use solution manual's. I recommend you

- Give the questions your full effort before using solution's manuals
- Test your understanding after studying with a group to make sure you really get it.

Exam Grading: I will probably **not** use multiple choice questions. In general, you will be writing a "mini essay", and it is not sufficient to solve simply solve the algebraic equations needed to reach the answer. For numerical questions, the following *rough* guidelines apply for grading on a scale of 10:

- For full credit, the correct answer and units are **not** sufficient. An explanation of the solution, with the basic equations and important partial results should be presented on the space provided on the exam sheet.
- Unit missing from any value (but otherwise your work is correct): minus 1 point.
- Far too many (or too few) significant digits: minus 1 point
- Correct equations, correct algebra, numerical error (but still a reasonable value): full credit minus 1 point
- Correct equations, correct algebra, numerical error (outside the correct range of magnitude): full credit minus 2 or 3 points
- Correct equations, mistake in algebra or inability to solve equations: half credit plus possible extra points.
- Correct equations, nothing more: 1 point credit, possibly more.
- Correct equations, and a bunch of other formulae with no relevance to the problem: no partial credit.
- Nothing else except graphs or arguments indicating that you understand the basic concept: 1 or 2 points partial credit, possibly more.

It should be emphasized that these are *rough* guidelines. The specific grading criteria for each problem on an exam will depend on its difficulty.

V. Class Outline

Day	Unit	Topic	Book Chapters
June 26 (Tue)	0	<i>Orientation Day</i>	TBA

June 27 (Wed)	0	<i>The Earth's Natural Resources</i>	
June 28 (Thu)	1	<i>The Energetic Earth</i>	
June 29 (Fri)	1	Human Challenges of Energy Use – Quiz 1	
July 2 (Mon)	2a	<i>The Bright Earth - Solar</i>	
July 3 (Tue)	2a	<i>Introduction to Semiconductor Physics</i>	
July 4 (Wed)	2a	<i>Solar energy to electricity</i>	
July 5 (Thu)	2a	<i>Solar energy for direct heating – Quiz 2</i>	
July 9 (Mon)	2b	<i>The Fluid Earth – Fluid Mechanics</i>	
July 10 (Tue)	2b	<i>The Blustery Earth – Wind Energy</i>	
July 11 (Wed)	2b	<i>The Wet Earth – Freshwater Energy</i>	
July 12 (Thu)	2b	<i>The Spinning Earth – Tidal/Ocean Energy – Quiz 3</i>	
July 16 (Mon)	2c	<i>The Nuclear Earth</i>	
July 17 (Tue)	2c	<i>The Internal Earth: Geothermal Energy</i>	
July 18 (Wed)	2c	<i>The Green Earth – Biofuels</i>	
July 19 (Thu)	3	<i>The Connected Earth – The Electric Grid – Quiz 4</i>	
July 23 (Mon)	3	<i>Energy Storage Technologies</i>	
July 24 (Tue)	3	<i>More on Energy Storage</i>	
July 25 (Wed)	3	Earth as a Habitat for Humanity: Energy Use Patterns & Improvements - Buildings	
July 26 (Thu)	3	The Mobile Earth: Energy Use Patterns & Improvements – Industrial & Transportation Quiz 5	
July 30 (Mon)	4	<i>The Complex Earth - Wacky ideas for energy</i>	
July 31 (Tue)	4	<i>Political, Financial, and Environmental topics for renewables</i>	

Aug 1 (Wed)	-	<i>Final Exam</i>	
Aug 2 (Thu)	-	<i>Review of Grades</i>	
