



Systems and Economics Analysis for Food, Energy and Water

T/TH 10:30 AM – 11:45 AM

Classroom: RHPH 164

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Recommended Books: There is no required textbook for this course, but the following are recommended references.

- Sustainable Energy, J.W. Tester, E.M. Drake, M.J. Driscoll, M.W. Golay and W.A. Peters, MIT Press. ISBN: 0-262-20153-4
- The Dynamics of Energy – Supply, Conversion and Utilization, H. Perez-Blanco, CRC Press, ISBN: 978-1-4200-7688-2
- Synthetic Fuels, R.F. Probst, R. Edwin Hicks
- Boardman, Anthony E., David H. Greenberg, Aidan R. Vining, and David L. Weimer. Cost-benefit analysis: concepts and practice. Cambridge University Press, 2017.
- Tietenberg, Thomas H., and Lynne Lewis. Environmental economics and policy. Boston: Pearson Addison Wesley, 2004.

Homework and Exams: The following weightages assigned to homework and exams:

Homework	30%
Exam 1	25%
Exam 2	25%
Project	20%

In order to learn the course, it is essential that you do all the home works.

Homework Policy:

For the first homework that is less than one day late, 30% mark will be deducted. For the second homework that is less than one day late, 50% mark will be deducted. For any other late homework no credit will be given.

Important Dates:

Exam 1 Tuesday 19th, February

Exam 2 Thursday, 11th, April

All the exams will be during the lecture period. Final grading for the course will be done using letter grades A, B, C, D and F.

Project Presentation Dates:

Tuesday, April 16th, 2019

Thursday, April 18th, 2019

Tuesday, April 23rd, 2019

Thursday, April 25th, 2019

Makeup Classes:

Please be aware there is a possibility of makeup classes for this course. The dates and times will be announced in advance if necessary.

Guidelines for Academic Integrity:

All students will conduct according to Purdue's Honor Pledge (<https://www.purdue.edu/provost/teachinglearning/honor-pledge.html>): "As a boilermaker pursuing academic excellence, I pledge to be honest and true in all that I do. Accountable together - we are Purdue." Every student will sign this pledge in their first homework assignment, each exam and project report.

While Students are encouraged to discuss homework problems with each other, the submitted work must be work of the individual and no copying is allowed.

We will enforce the penalty if a student is caught cheating as proposed by Purdue: "Incidents of academic misconduct in this course will be addressed by the course instructor and referred to the Office of Student Rights and Responsibilities (OSRR) for review at the university level. Any violation of course policies as it relates to academic integrity will result minimally in a failing or zero grade for that particular assignment, and at the instructor's discretion may result in a failing grade for the course. In addition, all incidents of academic misconduct will be forwarded to OSRR, where university penalties, including removal from the university, may be considered."

Expected Conduct in the Class:

Avoid being late to the lectures.

Be attentive during lectures.

It is OK to ask clarifying questions during lecture.

Have your cell phone on silent and no texting during lectures. If you must use your cell phone during lecture, please walk outside, make your call and then return to the lecture.

Covered Topics: The following major topics will be covered in the lectures.

Jan. 8th - Feb. 14th (Prof. Rakesh Agrawal):

1. The Energy Landscape
 - a. The current world demand for energy
 - b. The demand projections and associated challenges
 - c. Environmental impact

2. Case for renewable especially solar energy
3. Thermodynamic Laws
 - a. The first law
 - b. The second law
 - c. Concept of exergy and process of efficiencies
4. Resources and their current utilization methods including heat, work and electricity.
Fossil, solar, biomass
5. Chain Efficiencies – from Capture to Utilization
6. A discussion on a possible FEW economy

Feb. 21st - April 9th (Prof. Juan Sesmero):

7. Property rights, externalities, and environmental problems
 - a. Government failures
 - b. Market failures
8. Cost-benefit analysis under uncertainty
9. Methods for economic valuation of the environment and natural resources
10. Policy instruments I: taxes and subsidies
 - a. Equivalence
 - b. Efficiency in resource allocation
11. Policy instruments II: tradable permits and hybrid policies
 - a. Equivalence
 - b. Efficiency in resource allocation
12. Economic analysis of a possible FEW economy

April 16th – April 25th : in-class student presentations (individuals or small groups)

Additional Information:

In the event of a major campus emergency, course requirements, deadlines and grading percentages are subject to changes that may be necessitated by a revised semester calendar or other circumstances beyond the instructor's control. Here are ways to get information about changes in this course.

- Blackboard Learn website: <http://www.itap.purdue.edu/learning/tools/blackboard/>

Purdue University strives to make learning experiences as accessible as possible. If you anticipate or experience physical or academic barriers based on disability, you are welcome to let

me know so that we can discuss options. You are also encouraged to contact the Disability Resource Center at drc@purdue.edu or by phone: 765-494-1247.

In addition to the University policy, the Davidson School of Chemical Engineering has established procedures for students seeking accommodations. These can be found online at the ChE Undergrad Office website. Only those accommodation requests that conform to both University and ChE policy guidelines will be implemented.



EMERGENCY PREPAREDNESS

SYLLABUS ATTACHMENT

EMERGENCY NOTIFICATION PROCEDURES are based on a simple concept – if you hear a fire alarm inside, proceed outside. If you hear a siren outside, proceed inside.

- **Indoor Fire Alarms** mean to stop class or research and immediately evacuate the building.
 - Proceed to your Emergency Assembly Area away from building doors. **Remain outside** until police, fire, or other emergency response personnel provide additional guidance or tell you it is safe to leave.
- **All Hazards Outdoor Emergency Warning Sirens** mean to immediately seek shelter (**Shelter in Place**) in a safe location within the closest building.
 - “Shelter in place” means seeking immediate shelter inside a building or University residence. This course of action may need to be taken during a tornado, a civil disturbance including a shooting or release of hazardous materials in the outside air. Once safely inside, find out more details about the emergency*. **Remain in place** until police, fire, or other emergency response personnel provide additional guidance or tell you it is safe to leave.

**In both cases, you should seek additional clarifying information by all means possible...Purdue Emergency Status page, text message, email alert, TV, radio, etc...review the Purdue Emergency Warning Notification System multi-communication layers at http://www.purdue.edu/ehps/emergency_preparedness/warning-system.html*

EMERGENCY RESPONSE PROCEDURES:

- Review the **Emergency Procedures Guidelines**
https://www.purdue.edu/emergency_preparedness/flipchart/index.html
- Review the **Building Emergency Plan** (available on the Emergency Preparedness website or from the building deputy) for:
 - evacuation routes, exit points, and emergency assembly area
 - when and how to evacuate the building.
 - shelter in place procedures and locations
 - additional building specific procedures and requirements.

EMERGENCY PREPAREDNESS AWARENESS VIDEOS

- "Shots Fired on Campus: When Lightning Strikes," is a 20-minute active shooter awareness video that illustrates what to look for and how to prepare and react to this type of incident. See: <http://www.purdue.edu/securePurdue/news/2010/emergency-preparedness-shots-fired-on-campus-video.cfm> (Link is also located on the EP website)
- All Hazards Online Awareness training video (on Webcert & Blackboard.) A 30 minute computer based training video that provides safety and emergency preparedness information. See the [EP website](#) for sign up instructions.

MORE INFORMATION

Reference the Emergency Preparedness web site for additional information:
https://www.purdue.edu/epps/emergency_preparedness/