

SAMPLE SYLLABUS
CEE 567: Energy Infrastructure Systems

Course Information

Instructor: Prof. Christian M. Lastoskie, Dept. of Civil and Environmental Engineering
180 EWRE, (734) 647-7940, cmlasto@umich.edu

Lectures: Tuesday/Thursday 11:30 a.m. - 1:00 p.m. @ 165 Chrysler -except when otherwise noted on the course syllabus

Course Text: *Renewable and Efficient Electric Power Systems*, by Gilbert M. Masters, Wiley-Interscience, 2004; ISBN 0-471-28060-7.

Other Texts: *Energy for Sustainability: Technology, Planning, Policy*, by John Randolph and Gilbert M. Masters, Island Press, Washington, DC; ISBN 978-1-59726-103-6.

Clean Energy, by R.M. Dell and D.A.J. Rand, Royal Society of Chemistry, 2004; ISBN 0-85404-546-5.

Energy Systems and Sustainability: Power for a Sustainable Future, by Godfrey Boyle, Bob Everett and Janet Ramage, Oxford University Press, 2003; ISBN 0-19-9261279-2.

Powerplant Technology, by M.M. El-Wakil, McGraw-Hill, 2002; ISBN-13. 978-0072-87102-9.

Grading Policy

The course grade will be based on homework sets and two exams, weighted as follows:

Homework sets (~5) 40%

Midterm exam 30%

Final exam 30%

Grading Scale: > 93% A 90-93% A- 87-90% B+ 83-87% B

80-83% B- 77-80% C+ 70-77% C

Homework Policy

You may work with and have discussions with other students in solving the assigned homework problems. However, each student is responsible for submitting their own homework solution. All homework solutions are to be submitted electronically. Exams are to be solved individually.

Course Description

This course is designed to allow students to gain an understanding of how various forms of energy are presently converted into electricity and transportation fuels. Infrastructures that convey electricity and fossil fuels will be reviewed, and new resources for energy production and distribution will be discussed, including renewable generation and demand-side energy services. It is intended that students will develop a more complete appreciation of the energy challenges that confront our present and future society. Students will learn about energy technologies that seek to address these problems, and will consider financial and policy factors that impact the energy sector.

Week Date Topic Assigned Reading

1 Introduction and Course Overview Randolph & Masters, Chps. 1-3

Energy Portfolio: Present and Future

2 Fundamentals of Electromagnetism Masters, Chps. 1 and 2

Fundamentals of Electric Power

3 Electric Power Transmission Masters, Chp. 3.1-3.3; 3.10-3.12

Fundamentals of Thermodynamics

4 Power Cycles Masters, Chp. 3.4-3.5

Thermoelectric Power Generation

5 Boiler and Turbine Design Coal Infrastructure

6 Nuclear Energy Heat Exchange Systems

7 Combined Cycle Plants Masters, Chp. 3.6-3.8

Natural Gas Distribution

8 Integrated Resource Planning Masters, Chp. 3.9, Chp. 4.1-4.2

Reciprocating Engines

9 Distributed Generation Masters, Chp. 5

Energy Economics

10 Concentrating Solar Technologies Masters, Chp. 4.3-4.7

Midterm Exam

11 Wind Power Systems Masters, Chp. 6

12 Solar Energy Resources Masters, Chp. 7

13 Photovoltaic Systems Masters, Chp. 8

14 The Energy/Water Nexus

15 State, U.S. and Global Energy Policy

16 Reading Day/Final Exam