

# PHYSICS 115

## ENERGY

Fall 1997

An introductory course for non-science majors introducing the concept of energy, its technical definition, its importance in our society, limitations pertaining to its use, and the future place of energy use in our technological life style. There are quantitative discussions of examples of energy in our society and the problems, that arise as a result.

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 To Physics Department

## Instructor

Professor D. Reeder, 4287 Chamberlin Hall, 262-8798.  
Feel free to send Email to reeder@wishep.physics.wisc.edu.

Course info is posted to WWW page  
<http://www.physics.wisc.edu/undergrads/courses/115/Syllabus115.html>.

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## Text

*Energy and Problems of a Technical Society, rev. ed.;* Jack J. Kraushaar and Robert A. Ristinien, Wiley 1988.

## Other materials:

(on reserve in Physics Library --- 4220 Chamberlin Hall)

*State of the World 1995 or 1996 version* ; Lester R. Brown et al., Worldwatch Institute.

*The Future of Energy Use* , Robert Hill, Philip O'Keefe and Colin Snope

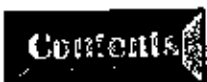
*Energy Factbook*, Dorf, McGraw Hill

*Energy Deskbook*, Glasstone, Van Nostrand

*Energy handbook 2nd. Edition, Lotness, Van Nostyrand*

*Resources, Technology and Society, E. Cassedy and P. Grossman, Cambridge Press*

*Renewable Energy - Sources for Fuels and Electricity, Johansson, Island Press*



## Lectures and Notes

9:55 am M-W-F in 1313 Sterling Hall.

Read the assigned material before lecture.

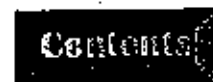
Useful notes concerning the physics concepts and ideas used in the course are available:

Force and Motion	Gravity
Kinetic Energy	Uniform circular motion and orbits
Escape Velocity	Electric Forces and Current
Electrical Potential and Voltage	Magnetism and Electricity
Electrical Power	Laws of Thermodynamics
Thermal Energy	Equilibrium and Temperature
Heat Transport	Entropy and the Second Law
Heat Engines	Atomic Scale
Nuclear Physics	Matter and Energy



## Homework

The completion of the homework extremely useful to you-- the student-- to monitor your understanding of the material and concepts and to gain confidence in the mathematical relationships involved.



## Hour Exams

Hour Exams will be given during the class period as noted in the syllabus.

Wednesday October 15

Friday December 12

The exams will be multiple choice, true/false, definitions and will be closed-book.

## Term Paper

There will be two research papers due (15 October and 14 December). The paper should be about 5-7 pages of double-spaced type with appropriate figures and attribution, either or both a reference list and a reading list. The topic can be of your choice (examples) but it should be as quantitative as you can. Please come and talk to me, if you have questions or difficulties (the earlier the better!).

## Final Exam

There will be no final exam. Your second research paper is due at noon December 14th in my mailbox (or at my office) in Chamberlin Hall

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## Grading

The course grade will be based on evaluation of the following components:

- o Hour exams -- 20 points each
- o Research papers 25 points each
- o Class performance 10 points

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## Office Hours

My office is 4274 Chamberlin you may call or drop by at any time, but the mornings before and after class are most likely.

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## Complaints and Concerns

If you have a non-subject matter question or concern that cannot be resolved by me, contact Jean Buehlman, Instructional Program Manager (afternoons in 2520 Sterling Hall, 262-2629).

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## General Advice

There is no substitute for doing the readings; asking questions and confronting and solving problems.

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# Syllabus

Problems to be handed in as instructed.

Week	Date	Readings	Problems
1	M Sept 1 W Sept 3 F Sept 5	Labor Day Introduction Calculation Appendix A and B	Problem Set I
2	M Sept 8 W Sept 10 F Sept 12	Chapter 1: Forces and Kinetic Energy Gravitational Potential Energy Orbital motion and Gravity	Space waste
3	M Sept 15 W Sept 17 F Sept 19	Conservation of Energy Chemical Energy Problem Session (Group)	National use
4	M Sept 22 W Sept 24 F Sept 26	Electricity and Magnetism Electrical Machines and circuits I Electrical machines and circuits II	
5	M Sept 29 W Oct 1 F Oct 3	Chapter 3: Heat Engines Entropy and Efficiency Refrigerators	
6	M Oct 6 W Oct 8 F Oct 10	Electromagnetic Radiation Chapter 6: Solar Energy Utilization of Solar Energy	
7	M Oct 13 W Oct 15 F Oct 17	Direct Conversion Techniques HOUR EXAM Chapter 6: Energy Transport	

8	M Oct 20 W Oct 22 F Oct 24	Chapter 8: Storage of Energy Chapter 6: Solar Energy Solar Energy Utilization
9	M Oct 27 W Oct 29 F Oct 31	Photosynthesis Energy and Agriculture Energy and water
10	M Nov 3 W Nov 5 F Nov 7	Chapter 2: Fossile Fuels I Fossile Fuels II Fossile Fuels III
11	M Nov 10 W Nov 12 F Nov 14	Energy and Transportation Nuclear Processes Radiation and Man I
12	M Nov 17 W Nov 19 F Nov 21	Radiation and Man II Nuclear Reactors I Nuclear Reactors II
13	M Nov 24 W Nov 26 F Nov 28	Nuclear Waste Nuclear Waste Thanksgiving recess
14	M Dec 1 W Dec 3 F Dec 5	Risk and risk management I Risk and risk management II Energy policy -- sustainable alternatives
15	M Dec 8 W Dec 10 F Dec 12	Governmental policy and the The Future Review HOUR EXAM: