Grant MacEwan College

Physics of Energy
Phys 261 - sections 270 / 568

Fall 2008

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Web Page(s): www.artsci.gmcc.ab.ca/courses/phys261eh
Or log on to www.mymacewan.ca and select Distance & Online Learning

Office Hours: Wednesday 9 – 10 AM and 12:30 – 2:30 PM
Friday 9:30 – 10:30 AM

Lecture Time: TR 12:30PM – 2:00 PM

Lecture Room: Room 5 – 253A

Course Hours: **Lecture 3.0/wk** **Lab** NA **Seminar** NA

Course Description: This course first identifies the various forms of energy consumed by modern society. The conversion of energy is traced from natural resources to usable forms considering both the fundamental laws of thermodynamics and the practical concerns of cost and environmental consequences. Next, the benefits and drawbacks of non-renewable energy sources such as fossil fuels and nuclear power are discussed and compared to renewable sources such as hydroelectric and solar power. Finally, the development of alternative energy resources is discussed.

Course Prerequisite: Phys 108/109 or Phys 124/126 or Phys 144/146

Course Co-requisite: None

Required Textbook: *Energy, Physics and the Environment*, 3rd edtion, by E.L. McFarland, J.L. Hunt and J.L. Campbell, Thomson Learning (2007)

Seminars, Assignments and/or Reports: There will be approximately 5 assignments due this term. Assignments will be handed in by the end of class (2:00 PM) on the due date. They can be submitted in class or to the drop box in the hallway just outside of 6 – 168. The first assignment will be due on Thursday September 18th. Problems assigned and the dates of further assignments will be given in class and posted on the course webpage, www.artsci.gmcc.ab.ca/courses/phys261eh. Late assignments will not be accepted.

Grade Evaluation:

Midterm Exam(s)	30%
Final Exam	50%
Assignments / Reports	20%
	100%

Exam Dates:

Midterm 1 Tuesday, October 28th , in class
Final Exam Tuesday, December 9th, 1 – 4 PM

(Note: Students are responsible for verifying the date of the final exam when the final exam schedule is posted later in the term.)

Final Grade:

A+	95 - 100
A	90 - 95
A-	85 - 89
B+	80 - 84
B	75 - 79
B-	70 - 74
C+	65 - 69
C	60 - 64
C-	55 - 59
D+	50 - 54
D	45 - 49
F	< 45

Please Note:

1. Official final grades can be accessed through Web Advisor. Grant MacEwan College adheres to the Alberta Common Grading Scheme, which is a letter grade system. While instructors may use percentages to aid in their grade development, only the letter grade will appear on transcripts.

2. A minimum grade of C- is required to receive transfer credit or to satisfy a prerequisite for a higher level course.

Student Responsibilities:

Students are expected to be aware of their academic responsibilities as outlined in the Students' Rights and Responsibilities section in the College Calendar.

1. **ACADEMIC INTEGRITY:** All forms of student dishonesty are considered unacceptable. MacEwan's Academic Integrity policy (C1000) promotes honesty, fairness, respect, trust, and responsibility in all academic work. According to the policy, "Academic dishonesty involves participating in acts by which a person fraudulently gains or intentionally attempts to gain an unfair academic advantage thereby compromising the integrity of the academic process". All incidents of academic dishonesty are reported and recorded by the Office of Academic Integrity. The penalties and sanctions for academic dishonesty can include the following: a mark reduction up to zero on a piece of academic work, a grade reduction up to an F in the course, and suspension or expulsion (with transcript notation) from the College. Please see the academic policy at www.macewan.ca/academicintegrity for more details. You are responsible for understanding what constitutes academic dishonesty.

2. **REGISTRATION STATUS:** You are responsible for your registration status at the College. Program Advisors may assist you with the process of registration, including adding or dropping of courses, but it is your responsibility to verify that these changes have been officially completed. This verification can be done at any time using Web Advisor. You should check your official registration status before the last date to officially withdraw from the course.

3. **WITHDRAWING FROM THE COURSE:** If you stop attending class you must complete a Course Drop Form, have it signed by a Science Program Advisor, and submit it to the Registrar's Office by the last day to withdraw as provided in the Academic Schedule in the College Calendar. Failure to officially withdraw will result in a grade being assigned based on course work completed. Late withdrawals are only allowed for exceptional circumstances.

4. **EXAMS:** Your student photo I.D. is required at exams. It is at the discretion of the instructor whether you will be allowed to write the exam if you arrive over 15 minutes after the exam has begun. You must remain in the exam room for at least 20 minutes from the time it commenced. Electronic equipment (iPods, cell phones, etc.), other than calculators that have been approved by the instructor, is not allowed to be used during exams. Permission to use the washroom during exams is at the discretion of the instructor and may require accompaniment.

5. **MISSED TERM EXAMS:** If you miss a term exam you must provide the instructor with an explanation within 24 hours or a grade of zero may be given. Notification may be provided through email, voice mail, or direct contact with the instructor. Official documentation as to why the exam was missed will be needed to assess whether a make-up exam or pro-rating of the course grade will be allowed. Medical excuses must include the date you were examined, the specific dates for the period of the illness, a clear statement indicating that the severity of the illness prevented you from attending school or work, and the signature of the examining physician (a signature by office staff on behalf of the physician is not acceptable). Medical notes obtained subsequent to the date of the exam are generally not accepted. A grade of zero will be given if the instructor considers the excuse inappropriate or inadequately substantiated.

6. **DEFERRED FINAL EXAMS:** A deferred exam will be granted if you miss the final lecture exam for reasons considered by the Science Department to be unavoidable (deferred exams do not apply to term or lab exams). An application for a deferred exam must be provided to the Science Department within 48 hours from the date of the missed final exam. Application forms are available from the Science Department Office and must be submitted with appropriate documentation. You should advise the instructor prior to the exam if you know beforehand that you will be unable to attend the scheduled exam time. Deferred exams are granted by a Chair in the Science Department, not by the course instructor.

7. **LATE ASSIGNMENTS:** Late assignments will not be accepted.

8. **CELL PHONES:** Cell phones are to be turned off during lectures, labs, seminars, and exams (except under exceptional circumstances in which approval has been given by the instructor).

9. **STUDENTS WITH DISABILITIES:** Students with disabilities who may have special requirements in this course are advised to discuss their needs with Services to Students with Disabilities located in the Student Resource Centre. You should advise the course instructor(s) of any special needs that are identified. See Policy E3400 Students with Disabilities.

10. **STUDENT APPEALS:** The College has a policy regarding Student Appeals (E3103). You should access this policy to become aware of the deadlines and guidelines that need to be followed if you are appealing a grade or other College assessment.

Disclaimer: The information in this Course Outline is subject to change; any changes will be announced and distributed to the class or, if applicable, in the laboratory.

Lecture Topics:

1.0 Energy Use and Supplies at Present [1.5 weeks]

1.1 Measurement of Energy and Power (Chapter 1 in *McFarland et al*)
1.2 Energy Consumption and Sources
1.3 Rate of Energy Consumption and Reserves (Chapters 2 & 3 in *McFarland*)

2.0 Sources of Energy [6 weeks]

2.1 Fossil Fuels
- 2.1.1 Health and Environmental Impacts (Chapter 5 in *McFarland*)
- 2.1.2 Greenhouse effect and Climate Change (Chapter 6 in *McFarland*)

2.2 Hydroelectric Power (Chapter 9 in *McFarland*)

2.3 Nuclear Power
- 2.3.1 Theory of Nuclear Reactions (Chapter 10 in *McFarland*)
- 2.3.2 Nuclear Power Reactors (Chapter 11 in *McFarland*)
- 2.3.3 Health and Environmental Impacts (Chapter 12 in *McFarland*)
- 2.3.4 Advanced Fuel Cycles and Fusion (Chapter 13 in *McFarland*)

2.4 Wind Energy (Chapter 14 in *McFarland*)
2.5 Tidal Power and Geothermal Power
2.6 Solar Energy (Chapter 15 in *McFarland*)

3.0 Energy Transfer and Storage [2 weeks]

3.1 Heat, Temperature and Thermodynamics (Chapter 4 in *McFarland*)
3.2 Efficiency and Heat Engines
3.3 Electricity (Chapters 7, 8 and 9 in *McFarland*)
- 3.3.1 Simple Circuits
- 3.3.2 A.C. Power Generation and Transmission
- 3.3.3 Batteries and Fuel Cells

4.0 Uses of Energy [1.5 weeks]

4.1 Heating (Chapter 16 in *McFarland*)
4.2 Industrial Uses
4.3 Efficiency and Conservation
4.4 Transportation (Chapter 17 in *McFarland*)
- 4.4.1 Fossil Fuels
- 4.4.2 Hybrid and Electric Vehicles
- 4.4.3 Hydrogen Fuel Cells

5.0 New Energy Technologies [1 week] (Chapter 18 in *McFarland*)

5.1 Hydrogen
5.2 Synthetic Fuels
5.3 Carbon Dioxide Capture and Storage