Description
Energy is the greatest challenge facing humanity in the 21st century. The course will cover the historical aspects of energy conversion and use by humans, the types of energy available (including both renewable and non-renewable), their conversion to useful forms of energy for the society, conversion efficiency, and cost of conversion. A very important aspect of the course is the environmental effect of energy conversion. The atmospheric pollution by greenhouse gases as well as conventional pollutants during energy conversion will be discussed. The main methods of pollution reduction by power industries will be presented.

Prerequisite
CBE 2224a/b

It is the student's responsibility to ensure that all Prerequisite and Corequisite conditions are met or that special permission to waive these requirements has been granted by the Faculty. It is also the student's responsibility to ensure that they have not taken a course listed as an Antirequisite. The student may be dropped from the course or not given credit for the course towards their degree if they violate the Prerequisite, Corequisite or Antirequisite conditions.

Corequisites
None

Antirequisites
GPE 3385a/b

Contact Hours
3 lecture hours, 1 tutorial hour 0.5 course

Instructor
Dr. D. Karamanev (TEB 445) 519-661-2111 ex: 88230, email: dkaraman@uwo.ca

Undergraduate Assistant
Lisa Drysdale (TEB 477) Telephone: 519-661-2111 ex: 82131 email: cbeundergraduate@uwo.ca
Required Texts
none

Course Notes
To be provided in class

Laboratory Notes
none

Reference Texts

Units:
SI will be used for this course.

General Learning Objectives

<table>
<thead>
<tr>
<th>A knowledge base for engineering</th>
<th>Individual and team work</th>
<th>Economics and project management</th>
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<tbody>
<tr>
<td>Problem analysis</td>
<td>Communication skills</td>
<td>Life-long learning</td>
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<td>Investigation</td>
<td>Professionalism</td>
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<td>Design</td>
<td>Impact of engineering on society and the environment</td>
<td>A</td>
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<td>Use of engineering tools</td>
<td>Ethics and equity</td>
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Key:
B: evaluated at introductory level
I: evaluated at intermediate level
A: evaluated at advanced level
n.e.: not evaluated

Specific Learning Objectives
1. Thermodynamic basics of energy – definition, forms, units, conversion.
2. Historical aspects and current energy conversion and use. Relationship between energy consumption and development of society.
3. Primary energy sources on Earth and their availability.
4. Map of energy conversion. Primary, intermediate, end-use forms of energy. Life cycle analysis of energy conversion.
5. Technologies for energy conversion.
7. Stationary power generation.
8. Powering transportation.
10. The future of energy in the society.
Evaluation
The final course mark will be determined as follows:

Assignments 20%
Mid-term exam 30%
Final exam 50%

Notes
1. Students must pass the final examination to pass this course. Students who fail the final examination will be assigned 48% if the aggregate mark is higher than 50%, or the aggregate mark.
2. Assignments are to be handed into CBE 4485 locker located in the Thompson Engineering building on the specified due date provided by the Instructor.

Use of English
In accordance with Senate and Faculty Policy, students may be penalized up to 10% of the marks on all assignments, tests, and examinations for the improper use of English. Additionally, poorly written work with the exception of the final examination may be returned without grading. If resubmission of the work is permitted, it may be graded with marks deducted for poor English and/or late submission.

Attendance
Attendance in lectures, tutorials and laboratories is mandatory. Any student who, in the opinion of the instructor, is absent too frequently from class or laboratory periods in any course, will be reported to the Chair of the department, after due warning has been given. On the recommendation of the Department concerned, and with permission of the Associate Chair, appropriate action will be taken, with the possibility of course failure.

Cheating
University policy states that cheating is a scholastic offense. The commission of a scholastic offense is attended by academic penalties, which might include expulsion from the program. If you are caught cheating, there will be no second warning.

Plagiarism
University policy states that plagiarism is a scholastic offense. Plagiarism is defined as appropriating and passing off writings or ideas of another person’s as one’s own. Penalties may include failure or automatic withdrawal from the course. Students must write their essays and assignments in their own words. Whenever students take an idea or a passage of text from another author, they must acknowledge their debt both by using quotation marks where appropriate and by proper referencing such as footnotes or citations. Plagiarism is a major academic offence.
The University of Western Ontario has software for plagiarism checking. Students may be required to submit their work in electronic form for plagiarism checking.

For further information on plagiarism, consult the Scholastic Offence Policy in the Western Academic Calendar.

**Sickness and Other Problems**
Please contact the course instructor if you require material in an alternate format or if any other arrangements can make this course more accessible to you. You may also wish to contact Services for Students with Disabilities (SSD) at 661-2111 x 82147 for any specific questions regarding an accommodation.

Students should immediately consult with the instructor or Undergraduate Chair if they have any problems that could affect their performance in the course. The student should seek advice from the Instructor or Undergraduate Chair regarding how best to deal with the problem. Failure to notify the Instructor or Undergraduate Chair immediately (or as soon as possible thereafter) will have a negative effect on any appeal.

**Notice**
Students are responsible for regularly checking their email and notices posted on Instructors' doors.

**Consultation**
Office hours will be posted. Individual consultation may be arranged by appointment with the instructor.

**Accreditation Units**
- Engineering science = 80%
- Engineering design = 20%