ENGINEERING 9614: Special Topics In Environmental Engineering: Renewable Energy and Resource Conservation

Instructor	**Cynthia Coles**	**Teaching Assistants**
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Office Hours	**Tu, Th, 1:20-1:45 p.m.** **Fr, 1:10-2:00 p.m.**	**Office Hours**

Website **http://www.engr.mun.ca/~ccoles/**

Communication *The best way to reach the professor is at the above MUN email address. The professor may post notices for the students on the above website.*

COURSE DESCRIPTION:

Maximizing energy efficiency, harnessing renewable energies, optimizing resource conservation, and controlling population growth are necessary to address climate change and will be studied in this course. Long term planning, scientific and ethical decision making, and linkages between energy and resources will be stressed.

PREREQUISITES: Engineering or Science undergraduate degree

SCHEDULE: LECTURE: Wed. & Fri. 11:45 a.m. -1:00 pm Room: EN 4020

CREDIT VALUE: 3 credits

RESOURCES:

TEXT BOOK

- *Renewable Energy and Climate Change, V. Quaschning, Wiley, 2010 (TJ 808 Q36513 2010)*

REFERENCES - BOOKS

- *Natural Resource Conservation: Management for a Sustainable Future, 10th Edition, D.D. Chiras and J.P. Reganold, Prentice-Hall, 2010 (2010, S938 O87 2010)*
- *The Leap: How to Survive and Thrive in the Sustainable Economy, 2011, C. Turner, Random House Canada (some energy related details, HC 79 E5 T84 2011)*
- *Simon & Schuster Handbook for Writers, Fourth Canadian Edition, 2005, L. Q. Troyka and D. Hesse, Prentice Hall (for help with your writing, PE 1408 T696 2006)*

REFERENCES - OTHER

MAJOR TOPICS:

- Introduction, saving energy at home, in transportation, and by the consumer, carbon footprints calculation, becoming carbon free, renewable energy potential, human population growth and control, overpopulation, earth's carrying capacity, challenges
- Photovoltaic energy, semiconductors, solar cells, modules, island and grid systems, development potential
- Solar thermal energy, absorbers and collectors, systems, supplying hot water and heating
- Large scale solar electric plants from solar thermal and solar photovoltaic systems, parabolic trough plants, tower plants, dish-Sterling plants, solar chimneys, concentrating photovoltaic plants
- Wind power, chargers and grid connected systems, turbines, onshore and off-shore wind farms, wind data, development potential
- Hydropower plants, types of water turbines, run-of-river plants, storage and pumped storage plants, tidal, wave and ocean current plants, global development status
- Geothermal energy, heat plants, power plants, hot dry rock (HDR) power plants, costs, development, heat pumps, operation, compression heat pumps, economy and ecology of use
- Biomass heating, biofuels and controversy
- Hydrogen fuel cell technology
- Tools for a sustainable future, sustainable economics, sustainable ethics, critical thinking, support for protected areas
- Soil characteristics and formation, soil erosion and conservation, sustainable agriculture, sustainable pest control, minerals conservation, sustainable mining
- Fisheries conservation, favourable and limiting conditions, sustainable freshwater fisheries management methods, marine fish detection, harvesting and problems, sustainable marine fisheries management requirements, precautionary approach, protected areas

LEARNING OUTCOMES:

Upon successful completion of ENGI 9601, the student will be able to:

1. Be familiar with the forms of renewable energy available and in use
2. Understand the potential for future use of these forms of renewable energy
3. Identify and use valid sources of information
4. Know about more ways to be able to conserve resources
5. Source, read and understand academic articles on renewable energy and conservation

6. Appreciate the value of lifelong learning and ever-evolving environmental issues
7. Have insight into the ethical issues of conservation
8. Have a simple understanding of the concept of external costs and true economics
9. Communicate technical information in a clear and effective manner in writing and orally

ASSESSMENT:

		Due Dates
Renewable energy paper	25%	Friday, Oct. 11, at 11:45 a.m.
Assignments in class	10%	
Presentations and Class Participation	20%	Presentations Oct. 18 and Nov. 27
Conservation Paper	25%	Wednesday, Nov. 20, at 11:45 a.m.
Final exam	20%	Monday Dec. 9 to Wednesday Dec. 18

No new work will be assigned after Wednesday Nov. 20
Last day of class is Dec. 4

The final exam will be closed book. Electronic word document files for the papers are to be received by the Professor at 11:45 a.m. on the due date. A late submission will result in a 5% deduction and every day late beyond that will incur an additional 5% deduction.

ACADEMIC INTEGRITY AND PROFESSIONAL CONDUCT:

Students are expected to conduct themselves in all aspects of the course at the highest level of academic integrity. Students are encouraged to consult Memorial University's Code of Student Conduct at http://www.mun.ca/student/conduct/

Students may also consult the PEG-NL code of ethics at http://www.pegnl.ca/ under "About Us" in the left hand column. This site is also accessible from the Faculty of Engineering and Applied Science home page and it is the second to last item in the left column.

Any student found to commit an academic offence will be dealt with according to the practices as outlined by the School of Graduate Studies. The related calendar information is available at http://www.mun.ca/regoff/calendar/sectionNo=GRAD-0029

INCLUSION AND EQUITY:

Students who require physical or academic accommodations are encouraged to speak privately to the instructor so that appropriate arrangements can be made to ensure your full participation in the course. All conversations will remain confidential.

The university experience is enriched by the diversity of viewpoints, values, and backgrounds that each class participant possesses. In order for this course to encourage as much insightful

and comprehensive discussion among class participants as possible, there is an expectation that dialogue will be collegial and respectful across disciplinary, cultural, and personal boundaries.

STUDENT ASSISTANCE: Student Affairs and Services offers help and support in a variety of areas, both academic and personal. More information can be found at www.mun.ca/student.

One specific resource provided to students is assistance in writing. Please contact the Writing Centre at http://www.mun.ca/writingcentre/about/ to find out more. (It is at SN 2053. Call 864-3168 or email vryan@mun.ca for an appointment or drop in to the QEII Library Commons.)

ADDITIONAL INFORMATION:

The professor's office hours and teaching schedule are as show below.

FALL 2013 SCHEDULE, Dr. C. A. Coles

TIME	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
9:00 9:50					
10:00 10:50					
11:00 11:50					
12:00 12:50		ENGI 9601 12:00 noon – 1:15 pm EN 4008	ENGI 9614 11:45 a.m. – 1:00 p.m. EN 4020	ENGI 9601 12:00 noon – 1:15 pm EN 4008	ENGI 9614 11:45 a.m. – 1:00 pm EN 4020
1:00 1:50		Office Hour EN 3004 1:20 pm – 1:45 pm		Office Hour EN 3004 1:20 pm – 1:45 pm	Office Hour EN 3004 1:10 p.m. – 2:00 pm
2:00 2:50					
3:00 3:50					
4:00 4:50					

Engi 9601: Environmental Pollution and Mitigation
Engi 9614: Special Topics in Environmental Engineering: Renewable Energy and Resource Conservation