



**I. COURSE DESCRIPTION:**

Students will examine the principles and practices of solid, liquid and gaseous biofuel production and usage for heating, power generation and transportation. The opportunities and challenges of biofuels will be discussed in regards to environmental impacts, quality, cost, and performance issues.

**II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:**

Upon successful completion of this course, the student will:

1. Understand the scientific basis for the greenhouse effect, and evaluate scientific evidence that relates climate change to the accumulation of greenhouse gases in the atmosphere.
2. Understand the evolution and direction of the Canadian biofuel industry, including public and private sector initiatives and incentives designed to promote its development.
3. Be familiar with the processes and technologies used to convert biomass feedstocks to solid, liquid and gaseous biofuels and how they are used for heating, power generation and transportation.
4. Understand the known and potential economic and environmental costs and benefits of biofuels relative to fossil fuels.

**III. TOPICS:**

1. The energy situation in Canada and the Canadian biofuels industry
2. Biomass feedstocks, conversion pathways and technologies, quality, cost and performance issues relating to solid, liquid and gaseous biofuels
3. Environmental impacts and sustainability of biofuels
4. Climate and biofuel technology policies

**IV. REQUIRED RESOURCES/TEXTS/MATERIALS:**

There is no textbook for this course. Students will be directed to recommended readings throughout the course.

**V. EVALUATION PROCESS/GRADING SYSTEM:**

- A quiz will be delivered at the beginning of each lecture on material presented in the previous lecture and/or on recommended readings.
- Laboratory reports must be completed for each of the 4 hands-on labs.
- The mid-term exam is a closed-book exam covering lecture and reading materials from the first half of the semester.
- The class debate will address a relevant topic in the Canadian biofuels industry. Groups of students will be assigned roles such as government representatives, scientists or sector experts, industry lobbyists, environmental activists, and others. The roles will be researched in advance and each student will be assessed by the instructor and their peers.
- Groups of students will select a topic and work together to prepare a research paper. Student groups will also present their research paper to the class.
- The final exam is a closed-book exam covering lecture and reading materials from the entire semester, with an emphasis on the second half of the semester.

In-class quizzes	10%
Lab exercises	10%
Mid-term exam	20%
In-class debate	10%
Group research paper	10%
Group presentation	10%
<u>Final exam</u>	<u>30%</u>
<b>Total</b>	<b>100%</b>

The following semester grades will be assigned to students:

<b>Grade</b>	<b><u>Definition</u></b>	<i>Grade Point Equivalent</i>
A+	90 – 100%	4.00
A	80 – 89%	3.00
B	70 - 79%	2.00
C	60 - 69%	1.00
D	50 – 59%	0.00
F (Fail)	49% and below	
CR (Credit)	Credit for diploma requirements has been awarded.	
S	Satisfactory achievement in field /clinical placement or non-graded subject area.	
U	Unsatisfactory achievement in	

	field/clinical placement or non-graded subject area.
X	A temporary grade limited to situations with extenuating circumstances giving a student additional time to complete the requirements for a course.
NR	Grade not reported to Registrar's office.
W	Student has withdrawn from the course without academic penalty.

## VI. SPECIAL NOTES:

### Attendance:

Sault College is committed to student success. There is a direct correlation between academic performance and class attendance; therefore, for the benefit of all its constituents, all students are encouraged to attend all of their scheduled learning and evaluation sessions. This implies arriving on time and remaining for the duration of the scheduled session.

## VII. COURSE OUTLINE ADDENDUM:

The provisions contained in the addendum located on the portal form part of this course outline.