



**Selkirk  
College**

**School of Renewable Resources  
Certificate in Renewable Energy**

**RNW 117  
Math & Computer Applications for Renewable Energy**

Course Outline  
Fall, 2009

**Instructor**

Robert M. Macrae  
Office: A-37, Castlegar campus  
telephone: 250.365.1441  
e-mail: [rmacrae@selkirk.ca](mailto:rmacrae@selkirk.ca)

**Instructor's Office Hours**

TBA

Hours / Week

3

Time

9:00 - 12:00

Room

SK-116

Credit

3 semester hours

---

**Course Description:**

This course is specifically for the Certificate in Renewable Energy program. It covers concepts related to renewable energy including units for energy and power, unit conversion, and dimensional analysis; equations for estimating energy input, output, efficiency, and losses for renewable energy technologies; simple project budgets showing estimated revenue, expenses, depreciation, and future value; and creation of charts illustrating relationships like peak loads or power versus wind speed. Students will estimate solutions, write full solutions using a scientific calculator, and create spreadsheets to solve problems.

**Prerequisites:**

English 12 or equivalent, Principles of Math 11 with a C+ or Math Applications 11 with a B are required for CRE program admission or permission of the Chair of the School of Renewable Resources.

**Transfer Credit:**

Selkirk College has negotiated articulation agreements with several universities whereby graduates from the School of Renewable Resources are able to receive credit towards the completion of other post-secondary programs. Please contact a Selkirk College counsellor or the Chair of the School of Renewable Resources for more information regarding transfer credit. Past transfer credit is no assurance of credit that may currently be obtained. For students wishing to obtain transfer credit, retain this course outline, completed and graded assignments and academic transcripts. Use these documents to support requests for transfer credit.

## **Course Outcomes:**

This course is an integral part of the Certificate in Renewable Energy program: a post-secondary, college-level program. Renewable Energy Certificate program graduates who complete this course will be able to demonstrate knowledge or skills listed at a level consistent with expectations for entry-level renewable energy technicians.

## **Educational Outcomes:**

Graduates will be able to:

- Use the equations with trigonometric functions to calculate height and horizontal distance given slope distance and top and bottom angle with angles expressed in either degrees or percent (%).
- Define and differentiate between energy and power, identify common SI and non-SI units for energy and power, and apply dimensional analysis to convert between units.
- Calculate area and volume of common two and three dimensional objects and apply these calculations to renewable energy systems.
- Define mass, volume, density and differentiate between fresh versus dry mass, bulk density, and energy density and apply these concepts to solving renewable energy problems.
- Estimate energy input, output, efficiency, and losses for renewable energy technologies.
- Prepare simple project budgets showing estimated revenue, expenses, depreciation, and future value.
- Create charts illustrating renewable energy relationships like peak loads versus time, power versus wind speed, or temperature versus depth.
- Use spreadsheets to record and analyze data, as templates, and databases.

## **Textbooks / Supplemental Materials:**

**Required Texts:** **Manual for Technical Math with Computer Applications for Renewable Energy (RNW 117)** 2009 edition by Robert M. Macrae.

## **Required Supplies:**

- notebook
- pen, pencil, eraser and ruler
- a scientific calculator like a Sharp EL-520V or equivalent

### Evaluation:

In class assignments (5 @ 10%)	50%
Midterm exams (2 @ 15%)	30%
Final Exam	10%
Professionalism (punctual, regular attendance, prepared, equipped and contributing to personal and team success)	10%
Total	<u>100%</u>

### Grading:

A+	95% to 100%	= 4.00	B+	80% to 84%	= 3.33	C+	65% to 69%	= 2.33
A	90% to 94%	= 4.00	B	75% to 79%	= 3.00	C	60% to 64%	= 2.00
A-	85% to 89%	= 3.67	B-	70% to 74%	= 2.67	C-	55% to 59%	= 1.67
						P	50% to 54%	= 1.00
						F	Less than 50%	= 0.00
						DNW	Did not withdraw	= 0.00

### Evaluation Methods:

Professionalism will be evaluated on the basis of punctuality, regular attendance, preparation, completion of assignments as scheduled, courtesy during classes and other educational activities, helping classmates to learn course material, respect for college property, public and private property visited while on field trips. These are qualities that employers seek in renewable energy technicians and are therefore behaviors that are encouraged and entitled to recognition. These qualities are not easily measured and require discretion in their evaluation on the part of the instructor.

### Assignments

There will be time each week to complete in class assignments. You are encouraged to work with your classmates on these assignments, but discouraged from simply copying the work of others. Each student must submit a completed assignment before leaving class to receive a grade for the assignment.

## Additional Relevant Information/Course Expectations:

### Attendance and Late Assignments:

Students are expected to make every reasonable effort not to miss examinations and to submit assignments on time. Compassionate excuses will be considered only if documented. Students must advise the instructor *before* assignment deadlines or examinations if they are unable to meet the schedule. Otherwise *late assignments will not be accepted for grading nor will examinations be rescheduled.*

The academic policies of the School of Renewable Resources and Selkirk College will be observed. For more information on these policies refer to the School of Renewable Resources Academic Policies and the Selkirk College Calendar at <http://ecampus.selkirk.ca/> or visit the Certificate in Renewable Energy program web site at <http://selkirk.ca/programs/rr/academicprograms/renewableenergy/>

### Course Schedule:<sup>1</sup>

week	Date (date)	Topic or activity	Assignment
1	Sept. 7 – 11	No classes this week Labour day Sept. 7	
2	Sept. 14 – 18	Introduction and lesson 1	
3	Sept. 21 – 25	Lesson 2	in class assignment 1
4	Sept. 28 – Oct. 2	Lesson 3	
5	Oct. 5 – 9	Lesson 4	in class assignment 2
6	Oct. 12 – 16	No classes Oct. 12, Thanksgiving Lesson 5	
7	Oct. 19 – 23		Midterm exam 1
8	Oct. 26 – 30	Lesson 6	
9	Nov. 2 – 6	Lesson 7	in class assignment 3
10	Nov. 9 – 13	No classes Nov. 11, Remembrance Day Lesson 8	in class assignment 4
11	Nov. 16 – 20	Lesson 9	
12	Nov. 23 – 27		Midterm exam 2
13	Nov. 30 – Dec. 4	Lesson 10	in class assignment 5
14	Dec. 7 – 11		Final Exam
15			

<sup>1</sup> Course schedule is subject to change without notice.