Sustainable Energy

This section presents the requirements for programs in:

- M.A. Sustainable Energy
- M.A.Sc. Sustainable Energy
- M.Eng. Sustainable Energy

Program Requirements

M.A. Sustainable Energy (5.0 credits)

M.A. Sustainable Energy (5.0 credits)		
1. 2.0 credits in:		2.0
SERG 5002 [0.5]	Sustainable Energy Engineering for Policy Students	
SERG 5003 [0.5]	Energy Evaluation and Assessment Tools	
SERG 5004 [1.0]	Applied Interdisciplinary Project	
2. 0.0 credit in:		0.0
SERG 5800 [0.0]	Sustainable Energy Seminar	
3. 0.5 credit in:		0.5
PADM 5121 [0.5]	Policy Analysis: The Practical Art of Change	
4. 0.5 credit in:		0.5
PADM 5510 [0.5]	Energy Economics	
5. 0.5 credit in:		0.5
PADM 5515 [0.5]	Sustainable Energy Policy	
or PADM 5615 [0.5]	Politics and Policy of Energy in Canada	
6. 1.5 credits from Sustainable Energy Policy courses listed below		1.5
Total Credits		5.0

Notes:

1. Courses must be appropriate to the student's qualifications and selected with the approval of the student's program supervisor.

Co-op Option for M.A. Sustainable Energy

A co-op option is available to full-time students in the M.A. program. Students admitted to this option must satisfactorily complete at least two work terms in order to graduate with a co-op designation on their transcripts and diplomas. These work terms are four months in duration and locate students in government departments or other organizations in order to work at a junior officer level. They provide students with opportunities to integrate the theoretical and practical aspects of public administration. During a work term, students will register in PADM 5913 [0.0] Co-operative Work Term. While on a work term, students are limited to an additional 0.5 credit course. It should be noted that most co-op positions in the federal public service are restricted to Canadian citizens.

M.A.Sc. Sustainable Energy (5.0 credits)

M.A.Sc. Sustainable Energy (5.0 credits)		
1. 1.0 credit in:		1.0
SERG 5001 [0.5]	Sustainable Energy Policy for Engineers	
SERG 5003 [0.5]	Energy Evaluation and Assessment Tools	
2. 0.0 credit in:		0.0
SERG 5800 [0.0]	Sustainable Energy Seminar	
3. 1.5 credits from the Mechanical Energy Conversion courses (below), or from the Efficient Electrical Energy Systems courses (below), or from the Sustainable Energy Policy courses. A maximum of 0.5 credits in Sustainable Energy Policy courses will be allowed.		1.5
4. 2.5 credits in M.A.Sc. thesis:		2.5
MECH 5909/SYSC 5909/ELEC 5909 [2.5]		
Total Credits		5.0

M.Eng. Sustainable Energy (5.0 credits)

Requirements:		
1. 2.0 credits in:		2.0
SERG 5001 [0.5]	Sustainable Energy Policy for Engineers	
SERG 5003 [0.5]	Energy Evaluation and Assessment Tools	
SERG 5004 [1.0]	Applied Interdisciplinary Project	
2. 0.0 credit in:		0.0
SERG 5800 [0.0]	Sustainable Energy Seminar	
3. 1.5 credits in:		1.5
Mechanical Engineering focus:		
1.5 credits in Mechanical Energy Conversion courses (listed below), or Sustainable Energy Policy courses. A maximum of 0.5 credits in Sustainable Energy Policy courses will be allowed.		
or		
Electrical Engineering focus:		
1.5 credit in Efficient Electrical Energy Systems courses (listed below) or Sustainable Energy Policy courses. A maximum of 0.5 credits in Sustainable Energy Policy courses will be allowed.		
4. 1.5 credits in:		1.5
Mechanical Engineering focus:		
Graduate-level MECH courses		
or		
Electrical Engineering focus:		
Graduate level ELEC, SYSC or EACJ courses		
Total Credits		5.0

Courses - Mechanical Energy Conversion	
MECH 5009 [0.5]	Environmental Fluid Mechanics Relating to Energy Utilization
MECH 5201 [0.5]	Methods of Energy Conversion
MECH 5203 [0.5]	Nuclear Engineering
MECH 5204 [0.5]	Fundamentals of Combustion
MECH 5205 [0.5]	Building Performance Simulation
MECH 5402 [0.5]	Gas Turbines
ENVE 5101 [0.5]	Air Pollution Control
ENVE 5102 [0.5]	Traffic-Related Air Pollution
ENVE 5103 [0.5]	Air Quality Modeling
ENVE 5104 [0.5]	Indoor Environmental Quality
SERG 5906 [0.5]	Directed Studies in Sustainable Energy
With the approval of the Department, the following courses may be included in the above list:	
MECH 5800 [0.5]	Special Topics in Mechanical and Aerospace Engineering
MECH 5801 [0.5]	Special Topics in Mechanical and Aerospace Engineering

MECH 5802 [0.5]	Special Topics in Mechanical and Aerospace Engineering	
MECH 5803 [0.5]	Special Topics in Mechanical and Aerospace Engineering	
MECH 5804 [0.5]	Special Topics in Mechanical and Aerospace Engineering	
MECH 5805 [0.5]	Special Topics in Mechanical and Aerospace Engineering	
MECH 5806 [0.5]	Special Topics in Mechanical and Aerospace Engineering	
MECH 5807 [0.5]	Special Topics in Mechanical and Aerospace Engineering	
MECH 5808 [0.5]	Special Topics in Mechanical and Aerospace Engineering	
MECH 5809 [0.5]	Special Topics in Mechanical and Aerospace Engineering	

Courses - Efficient Electrical Energy Systems

ELEC 5200 [0.5]	Advanced Topics in Integrated Circuits and Devices	0.5
ELEC 5302 [0.5]	Renewable and Distributed Energy Resource Technologies	0.5
ELEC 5405 [0.5]	Advanced Linear and Nonlinear Circuit Theory and Applications	0.5
ELEC 5509 [0.5]	Integrated Circuit Technology	0.5
ELEC 5707 [0.5]	Microsensors and MEMS	0.5
ELEC 5808 [0.5]	Signal Processing Electronics	0.5
ELEC 5900 [0.5]	Engineering Project I	0.5
SYSC 5001 [0.5]	Simulation and Modeling	0.5
SYSC 5004 [0.5]	Optimization for Engineering Applications	0.5
SYSC 5006 [0.5]	Design of Real-Time and Distributed Systems	0.5
SYSC 5103 [0.5]	Software Agents	0.5
SYSC 5104 [0.5]	Methodologies For Discrete-Event Modeling And Simulation	0.5
SYSC 5105 [0.5]	Software Quality Engineering and Management	0.5
SYSC 5207 [0.5]	Distributed Systems Engineering	0.5
SYSC 5401 [0.5]	Adaptive and Learning Systems	0.5
SERG 5906 [0.5]	Directed Studies in Sustainable Energy	0.5

Courses - Sustainable Energy Policy

PADM 5511 [0.5]	Energy Management
PADM 5512 [0.5]	International Politics of Sustainable Energy
PADM 5572 [0.5]	Policy Seminar (Sustainable Energy)
PADM 5611 [0.5]	Science and Technology Policies
PADM 5612 [0.5]	Industrial Policy, Innovation and Sustainable Production
PADM 5613 [0.5]	Science, Risk and Evaluation
PADM 5614 [0.5]	Natural Resource Management
PADM 5616 [0.5]	Environmental Policy
PADM 5617 [0.5]	Implementing Sustainable Development in Industrialized Countries
PADM 5618 [0.5]	Environmental and Ecological Economics
PADM 5619 [0.5]	Urban Sustainability
PADM 5620 [0.5]	The Science, Politics and Economics of Global Climate Change
PADM 5908 [1.0]	Research Essay
SERG 5906 [0.5]	Directed Studies in Sustainable Energy
Other courses as approved by the MA supervisor		

Regulations

See the General Regulations section of this Calendar.

Academic Standing

A grade of B- or better must be obtained in each course counted towards the master's degree.

Full-time Continuation

Students will be required to withdraw from the program if their weighted grade point average falls below 7.0 (B-) after two terms of full-time study (or equivalent), or if they receive a grade of less than B- in any two courses they have registered in.

Part- time Continuation

Students will be required to withdraw from the program if their weighted grade point average falls below 7.0 (B-) after completing 2.0 credits, or if they receive a grade of less than B- in any two courses they have registered in.

Regulations

See the General Regulations section of this Calendar.

Academic Standing

A grade of B- or better must be obtained in each course counted towards the master's degree.

Full-time Continuation

Students will be required to withdraw from the program if their weighted grade point average falls below 7.0 (B-) after two terms of full-time study (or equivalent), or if they receive a grade of less than B- in any two courses they have registered in.

Part-time Continuation

Students will be required to withdraw from the program if their weighted grade point average falls below 7.0 (B-) after completing 2.0 credits, or if they receive a grade of less than B- in any two courses they have registered in.

Regulations

See the General Regulations section of this Calendar.

Academic Standing

A grade of B- or better must be obtained in each course counted towards the master's degree.

Full-time Continuation

Students will be required to withdraw from the program if their weighted grade point average falls below 7.0 (B-) after two terms of full-time study (or equivalent), or if they receive a grade of less than B- in any two courses they have registered in.

Part-time Continuation

Students will be required to withdraw from the program if their weighted grade point average falls below 7.0 (B-)

after completing 2.0 credits, or if they receive a grade of less than B- in any two courses they have registered in.

Regularly Scheduled Break

For immigration purposes, the summer term (May to August) for the M.Eng. Sustainable Energy (coursework and project pathways only) is considered a regularly scheduled break approved by the University. Students should resume full-time studies in September.

Admission

Applicants must have a bachelor's degree (or equivalent), with an average of B+ or higher. The level of academic performance and potential demonstrated within the degree is more important than the discipline; students may enter the program from a wide variety of academic backgrounds in the social sciences, humanities, sciences and engineering. Mid-career applicants who do not have a bachelor's degree, but who have demonstrated professional excellence over a number of years of work in the public sector will also be considered.

All applicants must have completed 1.0 credit in university-level micro- and macroeconomic theory (ECON 1000 [1.0] or the equivalent)

0.5 credit in PSCI at the 2000-level or higher, dealing with institutions and processes by which governments legitimize and exercise power, ideally in a Canadian setting (PSCI 2003 or equivalent).

A working knowledge of algebra is also expected.

In some cases, applicants may be admitted to the program despite not having completed one of these prerequisite courses in economics or political science, on the condition that the course be completed with a grade of B- or higher in the first year of the program. It is strongly recommended that students complete the prerequisites before starting the program, to ensure that their progress through the core courses is unimpeded.

Students whose first language is not English or who have not completed a previous degree at an English speaking university must demonstrate an adequate command of English by attaining, at least, a TOEFL score of 237 CBT (computer-based test) or 580 (written); or 86 IBT overall with a minimum score in each component of: writing: 22; speaking: 22; reading: 20; and listening: 20, or a CAEL score of 70, or an IELTS score of 7.0.

Admission

Applicants must have a bachelor's degree (or equivalent) in a discipline relevant to engineering disciplinary foundations.

Normally, an average of B+ or higher is required for admission.

Admission

Applicants must have a bachelor's degree (or equivalent) in a discipline relevant to engineering disciplinary foundations.

Normally, an average of B+ or higher is required for admission.

Co-operative Education

For more information about how to apply for the Co-op program and how the Co-op program works please visit the Co-op website.

All students participating in the Co-op program are governed by the Graduate Co-operative Education Policy.

Graduate Co-operative Education Policy

Admission and Participation Requirements

For co-op admission and participation requirements please visit: http://calendar.carleton.ca/grad/gradregulations/administrationoftheregulations/#14.

Master of Engineering, Sustainable Energy: Co-op Admission and Continuation Requirements

A co-op option is available to full-time students in the M.Eng. program. Students admitted to this option must satisfactorily complete at least two work terms in order to graduate with a co-op designation on their transcripts and diplomas.
These work terms are four months in duration and locate students in government departments or other organizations in order to work at a junior level. They provide students with opportunities to integrate the theoretical and practical aspects of engineering and public administration. During a work term, students will be registered in SERG 5913. While on a work term, students are limited to an additional 0.5 credit course, which must be taken outside of work hours. It should be noted that most co-op positions in the federal public service are restricted to Canadian citizens.

Admission Requirements

Students who are interested in admission into the co-op education option and who anticipate meeting the admission requirements outlined below by the end of their second term of academic study must apply by the end of their first term of
academic study.

To be eligible for admission to the co-op option, students must:

a. be registered in the M.Eng. Sustainable Energy program;
b. have successfully completed, before the start of their first work term, a minimum of 2.0 credits towards the M.Eng. program (of which 0.5 credits must be SERG 5001), with a minimum GPA in the program of 9.0;
c. be eligible to work in Canada (for off-campus work placements).

Meeting the preceding requirements only establishes eligibility for admission to the co-op option – the prevailing job market may limit enrolment in it. Students should also note that hiring priority is given to Canadian citizens for co-op positions under the auspices of the Public Service Commission. Every effort will be made to find a work placement for each student admitted into the co-op program, but there are no assurances that a co-op position will be found. Students with high CGPA, enthusiasm,

and potential, however, will have a competitive edge in securing co-op employment. Students will be assisted by the Carleton University Co-op Office to find work term positions.

Graduation

Students must successfully complete two work terms with a grade of SAT for each, in addition to the M.Eng. degree requirements, to successfully graduate and receive a co-op designation on their final transcript and diploma.

Work Term Course:

SERG 5913 [0.0]	Co-operative Work term	0.0

Students who are accepted into the Co-op Education Option will be registered in SERG 5913 each time they secure a work term. In order to make it possible to complete their program no later than one study term after their two work terms, a student should also register in SERG 5004 during their fall work term.

Sustainable Energy (SERG) Courses

SERG 5001 [0.5 credit]
Sustainable Energy Policy for Engineers
This course introduces engineering students to the policy world by examining political and policy institutions, and covering basic principles of policy analysis, as they relate to the energy realm.

SERG 5002 [0.5 credit]
Sustainable Energy Engineering for Policy Students
This course introduces policy students to fundamental principles of engineering, particularly as they relate to energy production, transformation and consumption.

SERG 5003 [0.5 credit]
Energy Evaluation and Assessment Tools
Introduction to principles and tools for financial and performance analysis of energy projects, systems and technologies, and their application. Topics may include: probability theory, regression analysis, cost-benefit analysis, life cycle analysis, carbon accounting and emissions modeling, and other techniques particular to the energy field.

SERG 5004 [1.0 credit]
Applied Interdisciplinary Project
Application of assessment tools, energy evaluation methods, engineering, economics and policy studies to actual sustainable energy projects.
Includes: Experiential Learning Activity
Precludes additional credit for SERG 5000 (no longer offered).
Prerequisite(s): SERG 5003 and one of SERG 5001 or SERG 5002.

SERG 5800 [0.0 credit]
Sustainable Energy Seminar
A series of seminars presented by researchers and practitioners in the area of sustainable energy. To complete this course, a student must attend at least ten seminars during their program.

SERG 5906 [0.5 credit]
Directed Studies in Sustainable Energy
A directed course on selected subjects related to sustainable energy as approved by a course supervisor.

SERG 5913 [0.0 credit]
Co-operative Work term
Includes: Experiential Learning Activity