



1. Will this new course affect a current program? Yes  No   
 If "yes", has a Program Revision Form been submitted concurrently? Yes  No

2. Teaching Department:

3. Administering Faculty/Unit:

6. Responsible Instructor

4. Campus (Downtown, Macdonald, Off Campus, Distance Ed, Other – specify)

5. Effective Term of Implementation (Ex. Sept. 2004 = 200409)

Term:

7. Course Title (Limit 30 Characters) - required for all courses:

9. Course Title to Appear in the Calendar (optional) (Limit 59 characters):  
 Note: This can ONLY be an expansion of word(s) abbreviated in the 30 character course title above.

10. Credit Weight (or CEU's for non-credit CE courses):

8. Course Number(s)  
 Indicate course number & the number of terms spanned: (tick all that apply)

Subject/course number:

- Course(s) Span:
- 1 term
  - 2 consecutive terms (D1, D2)
  - 2 non-consecutive terms (N1, N2)
  - 3 consecutive terms (J1, J2, J3)

11. Rationale for new course

12. Course Description (as it will appear in the Calendar [maximum 50 words]):  
**(N.B. Faculty of Medicine must append complete course outline)**

13. Supplementary information to appear in the Calendar in addition to the course description.  
 Such as: equivalent course(s), contact hours, enrolment limitations, language of instruction etc.  
 Please enter the information as it should appear in the calendar notes.

14. Schedule Types(s):  
 (Enter all that apply – see course guidelines for a complete list.)  
 (i.e. Lecture, Labs, Tutorial)

Hours per Week	Hours per Week	Hours per Week
_____ <input style="width: 50px; height: 20px;" type="text"/>	_____ <input style="width: 50px; height: 20px;" type="text"/>	_____ <input style="width: 50px; height: 20px;" type="text"/>
_____ <input style="width: 50px; height: 20px;" type="text"/>	_____ <input style="width: 50px; height: 20px;" type="text"/>	_____ <input style="width: 50px; height: 20px;" type="text"/>
		Total Hours per Week: <input style="width: 50px; height: 20px;" type="text"/>
		Total Number of Weeks: <input style="width: 50px; height: 20px;" type="text"/>

15. Projected Enrolment:

16. Required text and/or preliminary reading list sent to library?

Yes  No

17. Prerequisite(s) (Courses or Tests)  
 Specify course number(s) or name(s) of test(s):

If the student does not have a prerequisite should web registration be blocked?

Yes  No

If "Yes" complete A and B:

A. Indicate minimum grade or test score(s) the student must attain in prerequisite course(s) or test(s):

B. Can the prerequisite course(s) or test(s) be taken in the same term as this course?

Yes  No

18. Corequisite(s) Course Number(s):  
 Specify course number(s) and title(s):

If the student does not register for the corequisite in the same term should web registration be blocked?

Yes  No

19. Restriction(s):

20. Consultation Reports Attached

Yes  N/A

21. Additional Course Charges (must be approved by the Fee Policy Committee)

Description of Fee (e.g. screening fee)	Amount
<input style="width: 95%; height: 20px;" type="text"/>	<input style="width: 95%; height: 20px;" type="text"/>

22. Requires Teaching, Physical, or Financial Resources Not Currently Available (attach explanation)

Yes  No

INFORMATION FOR ADMISSIONS, RECRUITMENT & REGISTRAR'S OFFICE		
<i>To be completed by the Faculty</i> Slot Course: <input type="checkbox"/> Yes <input type="checkbox"/> No  Thesis Component: <input type="checkbox"/> Yes <input type="checkbox"/> No	<i>To be completed by ARR</i> CIP Code <div style="border: 1px solid black; height: 20px; width: 100%; margin-top: 5px;"></div>	<i>For Continuing Education Use</i> CE Admin. Unit : <div style="border: 1px solid black; width: 100%; height: 20px; margin-top: 5px;"></div> CE Non-Grant Courses: <div style="border: 1px solid black; width: 100%; height: 20px; margin-top: 5px;"></div> Flat Rate: CdnFlat Rate: <input type="checkbox"/> Yes <input type="checkbox"/> N/A

23. Approvals:						
Routing Sequence	Departmental Meeting	Departmental Chair	Other Faculty	Curric/Academic Committee	Faculty	SCTP
Name	<div style="border: 1px solid black; width: 100%; height: 20px;"></div>	<div style="border: 1px solid black; width: 100%; height: 20px;"></div>	<div style="border: 1px solid black; width: 100%; height: 20px;"></div>	<div style="border: 1px solid black; width: 100%; height: 20px;"></div>	<div style="border: 1px solid black; width: 100%; height: 20px;"></div>	<div style="border: 1px solid black; width: 100%; height: 20px;"></div>
Signature	<div style="border: 1px solid black; width: 100%; height: 20px;"></div>	<div style="border: 1px solid black; width: 100%; height: 20px;"></div>	<div style="border: 1px solid black; width: 100%; height: 20px;"></div>	<div style="border: 1px solid black; width: 100%; height: 20px;"></div>	<div style="border: 1px solid black; width: 100%; height: 20px;"></div>	<div style="border: 1px solid black; width: 100%; height: 20px;"></div>
Date	<div style="border: 1px solid black; width: 100%; height: 20px;"></div>	<div style="border: 1px solid black; width: 100%; height: 20px;"></div>	<div style="border: 1px solid black; width: 100%; height: 20px;"></div>	<div style="border: 1px solid black; width: 100%; height: 20px;"></div>	<div style="border: 1px solid black; width: 100%; height: 20px;"></div>	<div style="border: 1px solid black; width: 100%; height: 20px;"></div>
Departmental Contact Person (name/phone/email)	<div style="border: 1px solid black; width: 100%; height: 20px;"></div>					

## ARCTIC CLIMATE AND CLIMATE CHANGE ATOC 373

- Instructor:** **Bruno Tremblay**  
Burnside Hall BLDG room 823  
514.398.4369, [bruno.tremblay@mcgill.ca](mailto:bruno.tremblay@mcgill.ca)
- Prerequisites:** McGill students require two courses from the following list:  
ATOC214, ATOC215, ATOC219, GEOG203, GEOG 205, GEOG272,  
GEOG372, ENVR200, ENVR202, EPSC203, EPSC210, EPSC212,  
EPSC220, EPSC233, , SOIL300  
Nunavut Arctic College Environmental Technology Program students need to have completed at least of Year 1 of the program
- Content:** This course introduces students to the principals of Arctic climate and climate change with a special focus on the Canadian Arctic. The primary objectives of the course are to develop 1- an understanding of the present-day high latitude climate, including the atmosphere, the ocean and the sea ice, 2- an understanding of the role of the polar regions in the global climate and climate change, and 3- to introduce students to field methods of polar research including ice coring, sea-ice buoys installation and data analysis, atmospheric measurements (radiative and turbulent heat fluxes), and ocean hydrographic measurements (e.g. CTD, nets).
- Format:** 10-14 days of a field course based in an Arctic locality. Each day will have two hours of morning lectures and five hours of afternoon fieldwork. Lectures may take place in a building, shelter, or in a field camp.
- Text:** The majority of the course material will be presented during lectures and a booklet of all course lectures and materials will be provided to all students. A small library of relevant articles and books will be available throughout the course.
- Evaluation:** Midterm exam on lecture material (20%); final exam on lecture material (30%); group projects on sea ice, ocean and atmosphere measurements and analysis of data collected, presentation (20%), and written report (30%) to be completed by the end of the course.
- Equipment:** All course materials and equipment will be provided. Personal equipment such as sleeping bags, field clothing and toiletries will be the responsibility of the student. An equipment list students are required to bring will be provided and will vary with the location of the course.

"McGill University values academic integrity. Therefore, all students must understand the meaning and consequences of cheating, plagiarism and other academic offences under the Code of Student Conduct and Disciplinary Procedures (see [www.mcgill.ca/integrity/](http://www.mcgill.ca/integrity/) for more information)."

*"In accord with McGill University's Charter of Students' Rights, students in this course have the right to submit in English or in French any written work that is to be graded."*

## Course schedule

### **Classes**

Lecture 1	History of arctic exploration
Lecture 2	Introduction to the Earth's radiation budget
Lecture 3	Introduction to global atmosphere/ocean circulation
Lecture 4	Global atmosphere/ocean circulation – pt 2
Lecture 5	Sea ice: large scale circulation
Lecture 6	Sea ice dynamics
Lecture 7	Sea ice thermodynamics and brine dynamics
Lecture 8	The surface heat budget of the Arctic
Lecture 9	The freshwater budget of the Arctic
Lecture 10	The Arctic Ocean ecosystem
Lecture 11	Polar amplification – arctic climate change
Lecture 12	Synthesis

### **Fieldwork**

Fieldwork 1	Snow density, depth and conductivity measurements
Fieldwork 2	Snow salinity measurements
Fieldwork 3	Ice coring and ice salinity measurement
Fieldwork 4	Ice salinity measurement
Fieldwork 5	Ice mass balance buoy installation
Fieldwork 6	Hydrography –temperature, depth and salinity measurements
Fieldwork 7	Hydrography –temperature, depth and salinity measurements con't
Fieldwork 8	Analysis of hydrographic data
Fieldwork 9	Surface flux measurement – radiative and turbulent fluxes
Fieldwork 10	Surface flux measurement – radiative and turbulent fluxes con't
Fieldwork 11	Analysis of IMB data
Fieldwork 12	Project presentations and peer review