Course Syllabus

Course description:
3 hours of lecture (Mon, Tues, Fri) and 3 hours of laboratory (Thursday) per week
(held in room C4011 in the Physics Chemistry Building on campus)

The course explores the effects of air-sea interaction on large scale marine ecosystem domains, with a special focus on assessing the impact of climate change on global fisheries and aquaculture production. The course uses a blend of lectures and computer simulation laboratories to familiarize students with current research on climate and seafood production. Students will explore biogeochemical oceanographic models coupled to atmospheric circulation models that predict the effects of anthropogenic global warming on fisheries. Students will learn to code marine ecosystem models using Microsoft Excel software.

Evaluation

First quiz ........................................... 20% of final grade
Second quiz (there is no Final Exam) ...... 20%
Class presentation ............................. 30%
Computer Lab Assignments .................. 30%

Reference material supporting lectures will be available in the Brightspace course shell. There is no textbook for the course.

Should the course be disrupted due to COVID-19, some assignments may be cancelled and evaluation methods modified. Students will be notified of changes through student’s MUN email sent by the instructor.

All computer laboratories will be posted with examples in the Brightspace course shell, and explained on Thursdays 2-5 pm by the instructor in person in room C4011 at scheduled lab times. Once posted, the laboratories will be continuously available to the student.
The six laboratory segments for the course will explore increasingly complex marine ecosystem models. The more complex laboratory segments will take two lab class periods. All labs are computer models run using Microsoft Excel software which is freely available to students at Memorial University. Students will learn to code and run the model on their personal laptop or a desktop computer at home. Each student will write a laboratory report, due at the time of the next laboratory segment. Alternatively, two (no more) students can work together and submit one report. Laboratory reports will be evaluated by the instructor. Each of the six laboratory reports will be worth 5%, for a total of 30% toward the final grade.

**Computer Laboratory Schedule**
*(held in room C4011 in the Physics Chemistry Building on campus)*

**Thursday 15 September** Lab #1 - Using Microsoft Excel to solve equations

**Thursday 22 September** Lab #2 - Simple marine ecosystem models with analytical solutions

*Lab 1 Report due*

**Thursday 29 September** Lab #3 - Analytical sensitivity analyses of simple plankton models

*Lab 2 Report due*

*(FRIDAY 30 September – National Day for Truth and Reconciliation – NO CLASSES)*

**Thursday 6 October** NO LAB

*(MONDAY 10 October - TUESDAY 11 October - SEMESTER BREAK – NO CLASSES)*

**Thursday 13 October** NO LAB

*Lab 3 Report due*

**Thursday 20 October** Lab #4 – Empirical sensitivity analyses of the Schaefer model

**Thursday 27 October** NO LAB

**Thursday 3 November** Lab #5 – Fishing fleet dynamics model

*Lab 4 Report due*

**Thursday 10 November** NO LAB (lectures follow Friday schedule)

*(FRIDAY 11 November - Remembrance Day - NO CLASSES)*

**Thursday 17 November** Lab #6 – Earth systems model limitations in predicting fisheries production

*Lab 5 Report due*
Thursday 1 December NO LAB

Lab 6 Report due

Here are the seven criteria used for evaluating a student’s Lab Report (each lab report is worth 5% of the final grade):

1. Did the report follow the **style of scientific writing** (Title page with student’s name and date, Purpose of the lab, Methods, Results (the graphs), Discussion and References)? (0.5 point)
2. Was the report of **adequate length**? Use **Times New Roman with 12-point font** for the text. (0.5 point)
3. Was the report **clearly written, free of grammatical errors and spelling mistakes**? (0.5 point)
4. Was (Were) the **model equation (equations)** given? (0.5 point)
5. Was the **purpose** of the lab clearly stated? (1 point)
6. Were the **axes and curves in the graphs properly labeled** (showing which parameter values generated each curve)? (1 point)
7. Was there **sufficient thought in the Discussion**? Be careful not to plagiarize. (1 point)

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**LECTURES**

(held in room C4011 in the Physics Chemistry Building on campus)

Lectures will be delivered by the instructor in person, unless there is a return to remote learning at MUN. In person lectures will be supported with asynchronous lectures using Power Point slides. If MUN returns to remote learning during the fall semester, lectures will only be the videos posted on the Brightspace course shell.

Asynchronous lectures will be posted at the lecture schedule times, Monday, Tuesday, and Friday at 2 pm. These videos will be posted under Course Content, Lecture Topics. Each Lecture Topic will take several scheduled lecture periods, hence a number of videos.

**Lecture Topic 1**  Large-scale marine ecosystem domains and fisheries resources
References available on Brightspace

Historical global distribution of demersal fish catches, coastal pelagic fish catches, catches of tuna-like fishes and crustacean catches

**Lecture Topic 2**  Present state of the world fisheries and a changing climate
References available on Brightspace

**FIRST QUIZ – in classroom C4011 in the Physics Chemistry Building (or take-at-home if MUN returns to remote learning)**
Lecture Topic 3 Natural climate fluctuations cause marine ecosystem regime shifts
ENSO, PDO, NAO and AO oscillations
References available on Brightspace

Implications of natural climate fluctuations for fisheries management

Lecture Topic 4 Anthropogenic climate change
References available on Brightspace

Climate change legislation and geo-engineering

Lecture Topic 5 Rapid warming and cooling of regional marine areas
References available on Brightspace

Potential surprises: Tipping Points

SECOND QUIZ – in classroom C4011 in the Physics Chemistry Building (or take-at-home if MUN returns to remote learning)

Lecture Topic 7 Evaluating predictions of the impact of climate change on fisheries
References available on Brightspace

CLASS PRESENTATION

The student will choose a topic of personal interest and approved by the instructor. The student will present the topic to the entire class in room C4011 during the last two weeks of the Fall 2022 Semester. The oral presentation should be no longer than 20 minutes, followed by Q and A.
If MUN returns to remote learning, the class presentation will not be available. A written term paper must then be submitted. The term paper must be no longer than 5 pages, double spaced with Times New Roman 12 point font. Due no later than Friday 2 December, when the Fall 2022 Semester ends.

Classroom etiquette and Memorial University Policies relevant to this course:
Lectures by PowerPoint slides and Computer Laboratories are copyright of the instructor. Student must not record, publish, send, post on an internet site, sell, rent or otherwise distribute these works without the expressed permission of the instructor.

Memorial University provides a safe learning environment to all students, regardless of religious, linguistic and economic backgrounds, lifestyle choices, gender, nationality, physical ability or learning differences.

Memorial University is committed to supporting inclusive education based on the principles of equity, accessibility and collaboration. Accommodations are provided within the scope of the University Policies for the Accommodations for Students with Disabilities. Students who may need an academic accommodation are asked to initiate the request with the Glenn Roy Blundon Centre (www.mun.ca/blundon).

Students are expected to adhere to those principles which constitute proper academic conduct. A student has the responsibility to know which actions, as described under Academic Offences in the University Regulations, could be construed as dishonest or improper. For more information regarding this policy, students should refer to the University Regulations for Academic Misconduct (Section 6.12) in the University Calendar.

Land Acknowledgement, Memorial University:
We acknowledge that the lands on which Memorial University’s campuses are situated are in the traditional territories of diverse Indigenous groups, and we acknowledge with respect the diverse histories and cultures of the Beothuk, Mi’kmaq, Innu, and Inuit of this province.