
We acknowledge with great respect that The University of Manitoba campuses are located on original lands of Anishinaabeg, Cree, Oji-Cree, Dakota, and Dene peoples, and on the homeland of the Metis Nation.

AGEC 2370 - Principles of Ecology
Faculty of Agricultural and Food Sciences
Fall 2023

Instructor:

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Office hours:

After lecture or by appointment

Course Description: The course will cover at a basic level ecologically important aspects of the environment and interactions between these and organisms in the environment, factors that influence the dynamics of populations, the effect of interactions on populations and communities, characteristics of ecosystems, cycles of energy and materials within ecosystems, and how ecological data is acquired, processed and interpreted.

Description in Aurora: AGECE 2370 - Principles of Ecology (Lab required) Principles of ecology at the individual, population, community, and ecosystem levels. May not be held with BIOL 2300 or BIOL 2301 or BIOL 2390. Prerequisite: BIOL 1030 (BIOL 1031) or BIOE 2590.

Lectures: T R, 1:00-2:15 pm, **136 Frank Kennedy Centre**

Laboratories: T or W or F, 2:30-5:25 PM, **203 Animal Science/Entomology Building** and various field sites

Labs begin September 12 – attend the section in which you are registered! (see detailed lab schedule)

Instructional Methods

This course combines lectures, demonstration of field data collection and laboratory work, analysis and interpretation of ecological data, in class discussions, and written assignments (laboratory reports).

Course Philosophy

Course goals:

- Demonstrate knowledge of basic principles of ecology including population growth, ecological interactions, succession, and evolutionary change
- Evaluate current global threats to the environment caused by food production demand, habitat loss, overpopulation, pollution, resource consumption, and climate change
- Understand principles of scientific research applied to ecological questions

Expected learning outcomes:

- Apply ecological theories to explain patterns observed in biological systems
- Devise potential solutions for ecological problems using scientific reasoning and ecological principles
- Understand basic data collection and management in ecological studies
- Understand the design, execution and analysis of ecological experiments with testable hypotheses
- Search, find and utilize current literature in ecological journals to augment discussion of ecological studies conducted in class
- Produce reports of ecological studies in a clear, precise, and succinct way.

I Expect you to...

approach this course with academic integrity, take responsibility for your actions and honor your academic commitments. Regular attendance to lectures and labs is essential for success in this course. You are encouraged

to ask for assistance whenever you feel it is necessary. You should treat your fellow students with respect and foster a cooperative learning environment where other's ideas are heard and discussed.

You can expect from me...

to be available to help you understand course concepts, materials and assignments. I value your ideas and I will encourage questions and answers to develop them. I do not expect perfection in your answers during class or laboratory discussions, they are meant to foster critical thinking and develop your own understanding of the concepts.

I view the diversity that the students bring to class as a strength and benefit to all. I will strive to present materials and activities that are respectful of diversity: gender identity, sexuality, disability, age, socioeconomic status, ethnicity, race, nationality, religion, and culture. It is my intent that students from all diverse backgrounds and perspectives benefit from this course by embracing a diverse learning environment. Your suggestions about how to improve any aspects of the course are encouraged and appreciated. (Adopted and modified from <https://www.brown.edu/sheridan/teaching-learning-resources/inclusive-teaching/statements>)

Suggested Textbook: Bowman, WD and SD Hacker. 2020. Ecology, 5th edition. Oxford University Press. 594 pp. (previous editions and similar books also work fine; check also eBook rental costs for more affordable options)

Letter Grade Equivalency:

A+ = >90%; A=80-89%; B+ =75-79%; B=70-74%; C+=65-69%; C=60-64%; D=50-59%; F=<50%.

Course Evaluation:

Mid Term Test (75 min) 20%
Laboratory Data and Reports 36%
Attendance and Participation (iClicker) 10%
Final Examination (2 hrs.) 34%

Attendance and Participation: Active participation in lectures and labs will be used to assess class participation. Attendance to laboratories **is required** to receive lab report marks. Class participation is an essential part of this course and will be assessed using the iClicker. In most lectures there will be iClicker questions, and they will be worth 10% of the final grade. For each response received, students will receive one mark for responding. Please see *iClicker_First_Day_of_Class_RGS.pptx* for detailed instructions. **iClicker code:** <https://join.iclicker.com/HCJU>

Schedule for Examinations:

- **Mid-term** Tuesday, October 24, 2023, 1:00 – 2:15 pm, 136 Frank Kennedy Centre
- **Final Exam** time and location TBA, scheduled by the Registrar's Office.

Note: To pass the course, students must complete **all three** items below:

- a) obtain an **overall passing mark** in the course
 - b) submit papers for the **midterm** exam and the **final exam**
 - c) obtain a passing grade (**50%**) **on the lab report portion.**
- Late lab reports are subject to a deduction of 10% for each day late.
 - The final exam is cumulative and will include up to 20% of the material previously tested in the midterm exam.
 - If the mid-term exam is missed for a verifiable and accepted reason (e.g. Medical emergency), with prior written approval from the instructor the marks allocated for the mid-term exam will be added to the total for the final examination (which is cumulative).

Important Dates <http://umanitoba.ca/student/records/deadlines/>

| | |
|---|--------------------|
| First day of course | Sept. 07, 2023 |
| National Day of Truth and Reconciliation (U closed) | Oct. 2, 2023 |
| Thanksgiving Day (U closed) | Oct. 9, 2023 |
| Fall Term Break..... | Nov. 13 – 17, 2023 |
| Voluntary withdrawal date (VW) | Nov 21, 2023* |
| Final day of course | Dec 11, 2023 |
| Exam period..... | Dec 12 – 22, 2023 |

* Grades for the midterm and laboratory reports 1-3 will be available before the Voluntary withdrawal date.

UM Learn (<https://universityofmanitoba.desire2learn.com/d2l/login>): Course materials (i.e. lecture notes, laboratory handouts, etc.) will be uploaded to UM Learn, it is your responsibility to learn how to access this page.

Class Communication: You are required to obtain and **use your U of M email account** for all communication between yourself and the university. The University requires all students to activate an official University email account. For full details of the Electronic Communication with Students please visit:

<https://tinyurl.com/2dm8jxvv>. Please note that all communication between you as a student and myself must comply with the electronic communication with student policy.

Important: in all your communications by email (to the instructor or TAs), please include in the subject line **AGEC 2370, lab day, group number (example: AGEC 2370-Tue-3, request to meet)** to ensure a timely response. I will try to reply to emails within 48 hours, however, questions about information that is in the syllabus, announced during lectures or labs, or can be found in handouts on UML may result in a delayed response.

Lecture notes and other written documents: Lecture notes and other materials will be posted as pdf files on UML. The purpose of the notes is to facilitate keeping up with presentation of class material; notes are not a substitute for class attendance. Notes will usually be posted shortly before the day of the class. The lecture schedule indicates the chapter in the textbook that is associated with each topic. Students should read the chapter concerned at about the time the topic is being presented in class. The lectures will highlight important material from the chapter, but supporting information in the chapter will assist with understanding.

Lecture Outline

Introduction to Ecology

| | |
|---|-----------|
| What is ecology? | Chapter 1 |
| Adaptation, evolution & experimental design | Chapter 1 |

The Physical Environment

| | |
|---------------------------------|-----------|
| Climate | Chapter 2 |
| The Biosphere | Chapter 3 |
| Temperature and water variation | Chapter 4 |
| Energy variation | Chapter 5 |

Populations

| | |
|---|------------|
| Evolution and Ecology | Chapter 6 |
| Life history | Chapter 7 |
| Behavioral Ecology | Chapter 8 |
| Distribution and abundance | Chapter 9 |
| Life tables, population growth and regulation | Chapter 10 |
| Population dynamics | Chapter 11 |

Population Interactions

| | |
|-------------|------------|
| Competition | Chapter 12 |
| Predation | Chapter 13 |
| Parasitism | Chapter 14 |
| Mutualism | Chapter 15 |

Communities

| | |
|---------------------------|------------|
| Community characteristics | Chapter 16 |
|---------------------------|------------|

| | |
|--------------------------------|------------|
| Succession | Chapter 17 |
| Biogeography | Chapter 18 |
| Species diversity and richness | Chapter 19 |
| Ecosystems | |
| Production | Chapter 20 |
| Energy flow and food webs | Chapter 21 |
| Nutrient cycling | Chapter 22 |
| Landscape ecology | Chapter 24 |
| Conservation biology | Chapter 23 |

Note: Tentative schedule subject to modification. Chapters in the textbook cover some topics in more or less detail than will be discussed in lectures, although reading the entire chapter is helpful and those students who do so tend to have a better understanding of the material and do better on exams. **Testing will be based on material, verbal or written, presented in class and in lab.**

Recording of Classes: Alejandro Costamagna and the University of Manitoba hold copyright over the course materials, presentations and lectures, which form part of this course. No audio or video recording of lectures or presentations is allowed in any format without Alejandro Costamagna's permission. Course materials, including lab reports, both paper and digital, are for the participant's private study and research only and are not to be shared by any media or posted online.

Academic Integrity

Plagiarism or any other form of cheating in assignments, examinations, term tests or any academic work is subject to serious academic penalty. Cheating in examinations or tests may take the form of copying from another student or bringing unauthorized materials into the exam room. Exam cheating can also include exam impersonation. A student found guilty of contributing to cheating in examinations or term assignments is also subject to serious academic penalty. Electronic detection tools may be used to screen assignments in cases of suspected plagiarism. You should acquaint yourself with the University's policy on plagiarism, cheating, and examination impersonation as detailed in the General Academic Regulations and Policy section of the University of Manitoba Undergraduate Calendar. Visit http://umanitoba.ca/student/resource/student_advocacy/ and <http://umanitoba.ca/student-supports/academic-supports/academic-integrity> for more information.

Laboratory Information

Laboratory Objectives:

- To provide experience with techniques for measuring a range of ecological variables
- To provide exposure to the problems associated with measuring ecological variables
- To illustrate selected ecological principles
- To introduce the process of scientific research and the primary literature generated

Lab Location: Some labs are held outdoors at various field sites. We will assemble in **203 Animal Science/Entomology Building** prior to all outdoor labs for a pre-lab talk. These talks will be short and will start promptly at 2:30 pm. Students must be on time for these pre-lab talks or they will miss valuable information concerning lab procedures and may also miss the departure to the field location. We will return to campus by 5:25 pm.

Lab handouts: There is no lab manual. Information for each lab will be available on-line and **should be read in advance to the lab**. The general instructions for lab reports are in the "**Laboratory Report Format Handout**".

Equipment: Most equipment will be provided; however, students may find it useful to have a basic dissection kit (scissors, a ruler, forceps, and a probe), a clipboard or other hard writing surface, squared paper for data sheets and field notes, a pencil or other waterproof writing utensil for taking notes and data in the field. A clear plastic bag that your data sheets fit into is useful to keep them dry while still recording data. Appropriate outdoor clothing such as raingear, gloves, hat and boots would be wise, since **field trips will take place regardless of the weather**.

Working Groups: Students will work in groups of 4-5. All group members must attend and participate in labs. If there is a problem with any particular member not co-operating then feel free to contact the teaching assistant or the instructor. Students will be randomly assigned to a group during the first lab and you will remain in the same group of students throughout the term. You will need to keep a record of who is in your group and their contact information. **Please record your group number and your lab day on all written work.**

Laboratory Exercises: There will be six exercises (*see lab schedule*). All six lab exercises must be written up and submitted for grading. Keep a copy of all material submitted. Although you will carry out the exercises in groups, each student will submit an individual report. Each student is responsible for obtaining all the relevant data from other group members. To that end, students should be sure that they know how to contact their lab partners outside of class time. For some exercises, the data for the entire section or entire class may be pooled.

Laboratory Preparation: Before each laboratory, read the appropriate sections of the textbook. Then read the handout describing the exercise to be sure that you know what is expected of you and that you are ready at the beginning of the lab period to ask questions about anything you need clarified. The introductory lab talk will not go through all the information already available in the handout, so be sure you have **read through the exercise and watch instructional videos (if available) before your lab period.**

Laboratory Reports: A report for each exercise must be written up **by each student**. Keep a copy of all material submitted. The due dates for each report may be found in the attached lab schedule and are typically one week after the completion of all data collection for an exercise. Lab reports will normally take 10-14 days to mark, and once reports have been handed back, no other late reports will be accepted. **There will be lab questions on the midterm and final exam.**

See the “Laboratory Report Format Handout” and individual “lab handouts” for more details on each lab activity and associated lab report.

Laboratory Schedule

| Week | Lab | Topic | Lab report due | % |
|------------------|-----|--|-------------------|-----------|
| 11-Sep-23 | 1 | Dandelions | | |
| 18-Sep-23 | 2 | Trees & Shrubs | Dandelions | 4.1 |
| 25-Sep-23 | 3 | Aquatic sampling I | | |
| 2-Oct-23 | 4 | Human Life Tables I (Introd.) & Competition I (set up) | Trees & Shrubs | 4.1 |
| 9-Oct-23 | 5 | Aquatic identification II | | |
| 16-Oct-23 | | NO LAB | | |
| 23-Oct-23 | | NO LAB | Aquatic | 5.3 |
| 30-Oct-23 | 6 | Human Life Tables II | | |
| 6-Nov-23 | 7 | Mark-Recapture | Human Life Tables | 7.5 |
| 13-Nov-23 | | Fall Break (NO LAB) | | |
| 20-Nov-23 | 8 | Competition II (harvest plants) | Mark-Recapture | 7.5 |
| 27-Nov-23 | | NO LAB | Competition | 7.5 |
| | | | <i>total % =</i> | <i>36</i> |

For general University and Faculty regulations and Resources for students please refer to **Schedule A: Student Resources and Support** available at the course UML site.