

ZO 225
Aquatic Organisms
3 Credits

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ZO 225 Version: 13



Aquatic Organisms

Calendar Description

This course covers the identification, biology, ecology, physiology, and behaviour of freshwater invertebrates. Students are introduced to techniques and equipment used in the collection of invertebrate organisms from both lakes and rivers. Laboratory work emphasizes the identification of freshwater invertebrates using the appropriate taxonomic keys.

Rationale

This is a required course for Wildlife and Fisheries Conservation students. The course introduces students to the identification, characteristics, and biology of non-vertebrate aquatic organisms. In so doing, this course prepares the student for work in the fields of bio-monitoring, conservation and management of aquatic habitats, and the analysis of aquatic habitats in relation to fisheries management.

Prerequisites

BI205

Co-Requisites

None

Course Learning Outcomes

Upon successful completion of this course, students will be able to

1. identify and use various equipment for the collection of freshwater organisms.
2. properly prepare and label samples of aquatic organisms collected in the field for subsequent laboratory analyses.
3. collect representative samples of aquatic organisms from lentic and lotic systems.
4. identify aquatic organisms using the appropriate taxonomic keys.
5. properly store and display freshwater organism specimens collected in the field.
6. list the various groups of freshwater aquatic organisms, and describe their distinguishing features.

7. identify different freshwater habitats, and explain habitat requirements and relationships among the various groups of freshwater organisms.
8. explain the function of various structures found in freshwater organisms.
9. explain the life cycles of various aquatic organisms and identify the different life stages.
10. describe the biology and ecology of the various aquatic organism groups.

Essential Employability Skills

Essential employability skills are critical for workplace success and lifelong learning. Lakeland College prepares its graduates for the workplace and lifelong learning by integrating and promoting essential employability skills development in its curricula. Each credit course offered at Lakeland College emphasizes one or more of the following five essential employability skills:

- A. **Communication Skills** that enable individuals to listen, interpret, express, and convey knowledge and ideas so that they are received and understood.
- B. **Teamwork Skills** that enable individuals to respect the thoughts and opinions of others as they work together to plan activities, meet deadlines, complete projects, and contribute to an organization's goals.
- C. **Critical Thinking Skills** that enable individuals to conceptualize and analyze issues from various perspectives while rationally evaluating the strengths and limitations of each perspective and deciding what action to take.
- D. **Adaptability Skills** that enable individuals to respond quickly, willingly, and positively to new conditions and changing times.
- E. **Positive Attitude and Behavioural Skills** that enable individuals to be confident about themselves and to deal with people, problems, and situations with honesty, integrity, and personal ethics.

Please refer to the Knowledge/Skills Matrix of this course outline to review the essential employability skills emphasized in this course.

Resource Materials

Required Text:

None

Required Materials:

Students are required to provide a dissecting kit.

Reference Text:

Clifford, H.F. 1991. Aquatic invertebrates of Alberta. The University of Alberta Press, Edmonton, AB.

Pennak, R.W. 1989. Freshwater invertebrates of the United States, Protozoa to Mollusca. 3rd ed. John Willey and Sons, New York.

Conduct of Course

The course is conducted using a combination of lectures and laboratory/field exercises (3-0-2). Students are encouraged to ask questions and participate in discussion throughout the course.

Evaluation Procedures

Lecture exams may contain discussion-type, short answer, true/false justify, and/or multiple choice questions. There is a final practical laboratory exam and laboratory assignments. The final grade for the course is weighted according to the following schedule:

Midterm Exam	30%
Final Exams	
Written	30%
Laboratory	25%
Laboratory Assignments	<u>15%</u>
Total	100%

To obtain credit in this course, all assignments must be completed and handed in on time. Late assignments are not marked, and a grade of "0" is assigned. All marks are awarded on a 0 to 4 basis as outlined in the Lakeland College Calendar.

Major Laboratory Assignment

Each student prepares (i.e. correctly identify, label, and preserve) an individual collection of freshwater organisms consisting of a minimum of 15 different invertebrate animals collected during field trips conducted during this course. Identification is to the lowest taxonomic level possible and is based on the classification found in *Aquatic Invertebrates of Alberta*, by Clifford, H. F. (1991).

Knowledge/Skills Matrix

Students apply and demonstrate their knowledge and skills to use

A. Communication Skills

A1. by listening, reading, interpreting information, and communicating effectively
Evaluation(s)/Goal(s): Midterm and Final Exams; Goals 1, 2, 4, 5, 6, 7, 8, 9, 10; Laboratory Assignments Labs 1, 3, 4, 5
A2. by using written, spoken, and/or visual formats and media to communicate and meet needs of each particular audience
Evaluation(s)/Goal(s): Midterm and Final Exams; Goals 1, 2, 5, 6, 7, 8, 9, 10; Laboratory Assignments Labs 1, 2, 3, 5
A3. by using libraries, internet, technical publications, journals and other sources to find pertinent information
Evaluation(s)/Goal(s): Midterm and Final Exams; Goals 4; Laboratory Assignments Labs 4

B. Teamwork Skills

B1. by using interpersonal skills to create an atmosphere that maximizes the strengths of group members to accomplish tasks
Evaluation(s)/Goal(s): Goals 3, 4, 5; Laboratory Assignments Labs 1, 4
B2. by using interpersonal skills to resolve conflict, relate to others, and assist others
Evaluation(s)/Goal(s): Goals 3, 4, 5; Laboratory Assignments Labs 1, 4
B3. by contributing and listening to others as group determines realistic objectives, prioritizes tasks, and identifies resources and timelines
Evaluation(s)/Goal(s): Goals 3, 4, 5; Laboratory Assignments Labs 1, 4
B4. by treating other members of the group open-mindedly and fairly
Evaluation(s)/Goal(s): Goals 3, 4, 5; Laboratory Assignments Labs 1, 4
B5. by developing tactics/strategies to accomplish tasks
Evaluation(s)/Goal(s): Goals 3, 4, 5; Laboratory Assignments Labs 1, 4

C. Critical Thinking Skills

C1. by seeing critical thinking as a lifelong process of self assessment
Evaluation(s)/Goal(s): Midterm and Final Exams; Goals 1, 2, 4, 5, 6, 7, 8, 9, 10; Laboratory Assignments Labs 1, 3, 4, 5
C2. by examining problems closely
Evaluation(s)/Goal(s): Midterm and Final Exams; Goals 1, 2, 3, 4, 5, 7, 8, 9, 10; Laboratory Assignments Labs 1, 3, 4, 5
C3. by examining beliefs, assumptions, and opinions, and weigh them against the facts
Evaluation(s)/Goal(s): Midterm and Final Exams; Goals 4, 6, 7, 8, 9, 10; Laboratory Assignments Labs 4
C4. by seeking out the truth
Evaluation(s)/Goal(s): Midterm and Final Exams; Goals 1, 4, 6, 7, 8, 9, 10; Laboratory Assignments Labs 4
C5. by finding solutions; make decisions
Evaluation(s)/Goal(s): Midterm and Final Exams; Goals 1, 2, 3, 4, 5, 7; Laboratory Assignments Labs 1, 2, 3, 5
C6. by incorporating new ideas that may not necessarily agree with previous thought on the topic
Evaluation(s)/Goal(s): Midterm and Final Exams; Goals 4, 6, 7, 8, 9, 10; Laboratory Assignments Labs 4
C7. by seeing connections between topics and use knowledge from other disciplines to enhance reading and learning experiences
Evaluation(s)/Goal(s): Midterm and Final Exams; Goals 1, 7, 8, 9, 10; Laboratory Assignments Labs 1, 3, 5

D. Adaptability Skills

D1. by working independently or as part of team
Evaluation(s)/Goal(s): Midterm and Final Exams; Goals 1, 2, 3, 4, 5, 6, 7, 8, 9, 10; Laboratory Assignments Labs 1, 2, 3, 4, 5
D2. by carrying out multiple tasks or projects
Evaluation(s)/Goal(s): Midterm and Final Exams; Goals 1, 2, 3, 4, 5; Laboratory Assignments Labs 2, 3, 4, 5
D3. by being innovative and resourceful: identify and suggest alternative ways to get the job done
Evaluation(s)/Goal(s): Goals 1, 3, 5; Laboratory Assignments Labs 2, 3
D4. by being open and respond constructively to change and uncertainty
Evaluation(s)/Goal(s): Goals 3; Laboratory Assignments Labs 2, 3

E. Positive Attitude and Behavioural Skills

E1. by dealing with people, problems, and situations with honesty, integrity, and personal ethics
Evaluation(s)/Goal(s): Midterm and Final Exams; Goals 1, 2, 3, 4, 5, 6, 7, 8, 9, 10; Laboratory Assignments Labs 2, 3, 4, 5
E2. by showing interest, initiative, and effort
Evaluation(s)/Goal(s): Midterm and Final Exams; Goals 1, 2, 3, 4, 5, 6, 7, 8, 9, 10; Laboratory Assignments Labs 1, 2, 3, 4, 5
E3. by affirming the need for positive solutions and encourage positive interaction and feedback
Evaluation(s)/Goal(s): Goals 3, 4; Laboratory Assignments Labs 2
E4. by balancing personal and family activities with job-related activities
Evaluation(s)/Goal(s): Laboratory Assignments Labs 2

Grade Equivalents and Course Pass Requirements

A minimum grade of D (50%) (1.00) is required to pass this course.

Letter	F	D	D+	C-	C	C+	B-	B	B+	A-	A	A+
Percent Range	0-49	50-52	53-56	57-59	60-64	65-69	70-74	75-79	80-84	85-89	90-94	95-100
Points	0.00	1.00	1.30	1.70	2.00	2.30	2.70	3.00	3.30	3.70	4.00	4.00

Students must maintain a cumulative grade of C (GPA - Grade Point Average of 2.00) in order to qualify to graduate.

Attendance

Classroom and laboratory attendance is considered vital to the learning process and as significant to the students' evaluation as examinations and reports, therefore absenteeism is recorded.

- a. Students having a combination of excused and/or unexcused absence of 20 percent or higher for the scheduled course hours can be required to withdraw and would then automatically receive a "RW" (required withdrawal) for the course, regardless of any other evaluation results. (RW is a failing grade).
- b. An excused absence is one that is verified with your instructor. Verification should be prior to the absence or the next class day following the absence. Verification of the absence may take the form of a note from your doctor/College nurse regarding illness, or a note from another instructor regarding a field trip or other activity, or authorization by your instructor following an in-person meeting. Be sure to contact your instructor and ask what they will require from you as verification of each absence. An unexcused absence is anything NOT verified by the instructor prior to the absence or the next class day following the absence.

NOTE: Any exceptions to the above attendance policy (e.g. timetable conflicts, work-related issues) must be approved in writing by the Department Chair prior to the beginning of the course.

It is the students' responsibility to know their own absentee record.

Normal hours are 8:30 a.m. to 6:30 p.m., with potential for evening courses, exams or extended field trips. Students are expected to be available for classes during these times.

Course Units/Topics

Lectures

1. Freshwater habitats and appropriate sampling techniques for invertebrates
2. Proper collection, identification, and storage of freshwater invertebrate samples
3. Characteristics, biology, ecology and classification of freshwater invertebrate organisms
 - a) Phylum Arthropoda - with emphasis on the Classes Insecta and Crustacea
 - b) Phylum Mollusca
 - c) Phylum Annelida
 - d) The Phyla Protozoa, Porifera, Coelenterata, Platyhelminthes, Nematoda and Rotifera

Laboratories/Field Material

1. Introduction to field sampling equipment and proper quantitative and qualitative sampling techniques for non-vertebrate aquatic organisms
2. Field trips to lentic and lotic systems to collect samples of aquatic invertebrates
3. Introduction to proper techniques for handling, storing, and subsequent analyses of samples of aquatic organisms collected in the field
4. Organisms collected in the field are identified in the laboratory using the appropriate taxonomic keys
5. Introduction to proper techniques for handling, storing, and displaying samples of aquatic organisms in the laboratory



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