ZO213

Fisheries Biology & Techniques

3 Credits

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Fisheries Biology & Techniques

Calendar Description

This course covers the ecology, anatomy, physiology, and behaviour of fishes. Emphasis is on freshwater fish species. Students are also introduced to various techniques and equipment used in the collection of fish and fisheries data through lecture and the practical application of these techniques during labs conducted out in the field.

Rationale

This is a required course for Wildlife and Fisheries Conservation students and emphasizes information and techniques necessary for the proper collection of fisheries data and identification of local fish species. The course is designed to introduce the student to various aspects of fish biology that are relevant to proper fisheries management and conservation practices.

ZO213 is a prerequisite for ZO410, Fisheries Management.

Prerequisites

BI205 and ZO120

Co-Requisites

None

Course Learning Outcomes

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

1. describe and use various netting and trapping techniques and equipment used in the field to sample and collect fish.
2. describe electrofishing techniques, how they are used to collect data, and the safety considerations associated with electrofishing.
3. use backpack electrofishing techniques to sample fish, and obtain electrofishing certification (WorkSafeBC approved training).
4. collect various morphometric data and structures for aging from samples of fish.
5. identify fish by sight or by using the appropriate taxonomic key.

6. describe habitat requirements and relationships among various groups of freshwater fishes.
7. explain the function of various anatomical structures found in freshwater fishes.
8. explain the reproductive biology, behaviour, and requirements of various fishes.
9. describe various aspects of the ecology, behaviour, and physiology of fishes.

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*:**

Students are required to provide a dissecting kit.

***Reference Texts*:**

Although not required, acquisition of one of the following text/identification books

is strongly recommended:

Scott, W.B., and E.J. Crossman. 1973. Freshwater fishes of Canada (Bulletin 184).

Fisheries Research Board of Canada, Ottawa, ON.

Nelson, J.S., and M.J. Paetz. 1992. The fishes of Alberta. 2nd ed. University of

Alberta or Calgary Press, Edmonton or Calgary, AB.

Joynt, A., and M.G. Sullivan. 2003. Fish of Alberta. Lone Pine Publishing, Edmonton.

Conduct of Course

The course is conducted using a combination of lectures and laboratory/field exercises (3-0-3). Students are encouraged to ask questions and participate in discussion throughout the course. Some of the field exercises where fish collection techniques are demonstrated and used may require students to be away from the College in a field-camp setting for extended periods of time, including some weekends.

Evaluation Procedures

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

Midterm Exam	35%
Final Exam	35%
Laboratory Tests and Assignments	30%
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.

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 Exam; Goals 1, 2, 3, 4, 5, 6, 7, 8, 9; Laboratory Assignments Labs 1, 2, 3, 4; Oral Presentation
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 Exam; Goals 1, 2, 5, 6, 7, 8, 9; Laboratory Assignments Labs 2; Oral Presentation
A3. by using libraries, internet, technical publications, journals and other sources to find pertinent information
Evaluation(s)/Goal(s): Midterm and Final Exam; Goals 4; Laboratory Assignments Labs 2, 4; Oral Presentation

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; Laboratory Assignments Labs 1, 3

B2. by using interpersonal skills to resolve conflict, relate to others, and assist others
Evaluation(s)/Goal(s): Goals 3, 4; Laboratory Assignments Labs 1, 3
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; Laboratory Assignments Labs 1, 3
B4. by treating other members of the group open-mindedly and fairly
Evaluation(s)/Goal(s): Goals 3, 4; Laboratory Assignments Labs 1, 3
B5. by developing tactics/strategies to accomplish tasks
Evaluation(s)/Goal(s): Goals 3, 4; Laboratory Assignments Labs 1, 2, 3

C. Critical Thinking Skills

C1. by seeing critical thinking as a lifelong process of self assessment
Evaluation(s)/Goal(s): Midterm and Final Exam; Goals 1, 2, 4, 5, 8; Laboratory Assignments Labs 1, 2, 3, 4; Oral Presentation
C2. by examining problems closely
Evaluation(s)/Goal(s): Midterm and Final Exam; Goals 1, 2, 3, 4, 5, 6, 7, 8, 9; Laboratory Assignments Labs 1, 2, 3, 4; Oral Presentation
C3. by examining beliefs, assumptions, and opinions, and weigh them against the facts
Evaluation(s)/Goal(s): Midterm and Final Exam; Goals 5, 6, 7, 8, 9; Laboratory Assignments Labs 4; Oral Presentation
C4. by seeking out the truth
Evaluation(s)/Goal(s): Midterm and Final Exam; Goals 4, 5, 6, 7, 8, 9; Laboratory Assignments Labs 1, 2, 3, 4
C5. by finding solutions; make decisions
Evaluation(s)/Goal(s): Midterm and Final Exam; Goals 1, 2, 3, 4, 5; Laboratory Assignments Labs 1, 2, 3, 4
C6. by incorporating new ideas that may not necessarily agree with previous thought on the topic
Evaluation(s)/Goal(s): Midterm and Final Exam; Goals 6, 7, 8, 9; Laboratory Assignments Labs 1, 2, 3, 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 Exam; Goals 5, 6, 7, 8, 9; Laboratory Assignments Labs 1, 2, 3

D. Adaptability Skills

D1. by working independently or as part of team
Evaluation(s)/Goal(s): Midterm and Final Exam; Goals 1, 2, 3, 4, 5; Laboratory Assignments Labs 1, 2, 3, 4; Oral Presentation
D2. by carrying out multiple tasks or projects
Evaluation(s)/Goal(s): Midterm and Final Exam; Goals 3, 4; Laboratory Assignments Labs 1, 2, 3, 4
D3. by being innovative and resourceful: identify and suggest alternative ways to get the job done
Evaluation(s)/Goal(s): Goals 1, 2, 4; Laboratory Assignments Labs 1, 2, 3
D4. by being open and respond constructively to change and uncertainty
Evaluation(s)/Goal(s): Goals 3; Laboratory Assignments Labs 1, 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 Exam; Goals 1, 2, 3, 4, 5, 6, 7, 8, 9; Laboratory Assignments Labs 1, 2, 3, 4
E2. by showing interest, initiative, and effort
Evaluation(s)/Goal(s): Midterm and Final Exam; Goals 1, 2, 3, 4, 5, 6, 7, 8, 9; Laboratory Assignments Labs 1, 2, 3, 4; Oral Presentation
E3. by affirming the need for positive solutions and encourage positive interaction and feedback
Evaluation(s)/Goal(s): Goals 3, 4; Laboratory Assignments Labs 1, 3
E4. by balancing personal and family activities with job-related activities
Evaluation(s)/Goal(s): Laboratory Assignments Labs 1, 3

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. Techniques and equipment used in the collection of fish and fisheries data
2. Speciation, use of common versus scientific names, phenotypic variation and hybridization
3. Habitat requirements and factors influencing the distribution of fishes
4. Aspects of fish biology and physiology including: (a) sensory structures, (b) skin and skeletal structures, (c) circulation and respiration, (d) buoyancy, and (e) osmoregulation
5. Aspects of feeding, nutrition, and growth in fish
6. Aspects of fish reproduction

Laboratories/Field Material

1. Field trips to various lentic and lotic systems to:
   a. Learn how to properly and safely operate a boat and outboard motor
   b. Collect data used in fisheries management and scientific research using electrofishing techniques and equipment
   c. Learn how to use gill nets, fish traps and beach seines in the collection and/or sampling of fish.
   d. Collect data used in fisheries research and management from the fish collected in the field.
2. Analysis and interpretation of the fisheries data collected in the field.
3. Identification of various non-sport fish species by sight or using appropriate taxonomic keys.

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