



COURSE OUTLINE: NRT228 - ICHTHYOLOGY

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Approved: Karen Hudson, Dean, Community Services and Interdisciplinary Studies

Course Code: Title	NRT228: ICHTHYOLOGY
Program Number: Name	5214: FISH/WILD CONSERVATN
Department:	NATURAL RESOURCES PRG
Academic Year:	2024-2025
Course Description:	This course concentrates on fundamental aspects of anatomy, physiology, ecology and natural history of fishes of the Great Lakes Region. Lab sessions will develop skills in the identification and classification of freshwater fishes.
Total Credits:	3
Hours/Week:	3
Total Hours:	42
Prerequisites:	There are no pre-requisites for this course.
Corequisites:	There are no co-requisites for this course.
Vocational Learning Outcomes (VLO's) addressed in this course:	5214 - FISH/WILD CONSERVATN
Please refer to program web page for a complete listing of program outcomes where applicable.	VLO 1 Demonstrate clear, concise and industry appropriate written, spoken and visual communication skills
	VLO 2 Identify, discuss, organize and assess common flora and fauna species found throughout Ontario, including biological characteristics
	VLO 4 Demonstrate the correct use of standard laboratory equipment and skills required to carry out experiments and study various organisms.
	VLO 6 Understand the importance of managing fish and wildlife resources in Ontario and related federal, provincial and municipal legislation.
	VLO 9 Safely operate and maintain equipment used in Fish and Wildlife Conservation.
Essential Employability Skills (EES) addressed in this course:	EES 1 Communicate clearly, concisely and correctly in the written, spoken, and visual form that fulfills the purpose and meets the needs of the audience.
	EES 2 Respond to written, spoken, or visual messages in a manner that ensures effective communication.
	EES 4 Apply a systematic approach to solve problems.
	EES 5 Use a variety of thinking skills to anticipate and solve problems.
	EES 7 Analyze, evaluate, and apply relevant information from a variety of sources.
	EES 9 Interact with others in groups or teams that contribute to effective working relationships and the achievement of goals.
	EES 10 Manage the use of time and other resources to complete projects.
General Education Themes:	Science and Technology



Course Evaluation: Passing Grade: 50%, D
 A minimum program GPA of 2.0 or higher where program specific standards exist is required for graduation.

Other Course Evaluation & Assessment Requirements: Academic success is directly linked to attendance. Missing more than 1/3 of the course hours in a semester shall result in an `F` grade for the course.

Books and Required Resources: Freshwater Fishes of Canada by Scott, W.B. and E.J. Crossman
 Field Guide to Freshwater Fishes of Ontario by Holm, E, N. Mandrak and M. Burrige

Course Outcomes and Learning Objectives:

Course Outcome 1	Learning Objectives for Course Outcome 1
1. Identify freshwater fishes from the Great Lakes basin to the family level based on taxonomic characteristics. Locate and identify internal and external anatomical features of Great Lakes fishes.	1.1 Correctly identify both external and internal anatomical structures of a fish. 1.2 Correctly demonstrate the use of meristics and morphometrics in fish classification. 1.3 Recognize common fish families given key characteristics. 1.4 List the major fish orders and their associated families with species representatives for each family. 1.5 Demonstrate effective use of a bifurcated (dichotomous) fish key for identification to family level.
Course Outcome 2	Learning Objectives for Course Outcome 2
2. Identify freshwater fishes from the Great Lakes basin to the species level based on taxonomic characteristics.	2.1 Identify to species Ontario`s important sports and commercial fishes. 2.2 Correctly identify to species juvenile Salmonids and larval Lamprey found in Ontario. 2.3 Demonstrate effective use of a bifurcated(dichotomous)fish key for identification to species level.
Course Outcome 3	Learning Objectives for Course Outcome 3
3. Demonstrate an understanding of the morphological and physiological adaptations of freshwater fishes to the aquatic environment.	3.1 Discuss the relative proportions of marine versus freshwater species as well as the significance of fish relative to other vertebrates. 3.2 Explain the characteristics of water and its influence on fish design. 3.3 List the six (6) basic fish body shapes and key features for each. 3.4 Discuss the function of external/internal structures and basic physiology of a generalized fish including respiration, circulation, buoyancy and thermal regulation, osmoregulation, growth, nervous and endocrine systems and reproduction. 3.5 Differentiate between anadromous and catadromous fishes, giving examples of each. 3.6 Discuss the various reproductive strategies of fish and their relative success.
Course Outcome 4	Learning Objectives for Course Outcome 4
4. Outline the biology and ecology of selected	4.1 Discuss the stages of fish development from egg to adult. 4.2 Demonstrate an understanding of terminology specific to

	<p>freshwater fishes of Ontario. the Salmon family and to the Lamprey family.</p> <p>4.3 Summarize the biology of significant Ontario fish species based on classification, range, description, habitat, food habits, reproduction and importance.</p> <p>4.4 Outline the life cycle and discuss the importance of common parasites in Ontario.</p>
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Evaluation Process and Grading System:

Evaluation Type	Evaluation Weight
Assignments	10%
Lab Assignments	20%
Lab Tests	30%
Lecture Tests	30%
Online Quizzes	10%

Date: June 21, 2024

Addendum: Please refer to the course outline addendum on the Learning Management System for further information.