# COURSE OUTLINE: NET200 - AQUATIC ECOSYS SURV

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Approved: Sherri Smith, Chair, Natural Environment, Business, Design and Culinary

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| **Course Code: Title** | NET200: AQUATIC ECOSYSTEM SURVEYS |
| **Program Number: Name** | 5214: FISH/WILD CONSERVATN<br>5220: NAT ENVIRONMENT TN<br>5221: NAT ENVIRONMENT TY |
| **Department:** | NATURAL RESOURCES PRG |
| **Semesters/Terms:** | 20F |
| **Course Description:** | This is a field course designed to provide students with practical, hands-on instruction to assess the physical, chemical and biological parameters of lake and stream ecosystems. Surveys conducted will follow provincial protocols such as the Ontario Benthos Biomonitoring Network (OBBN) and the Ontario Stream Assessment Protocol (OSAP) to assess ecosystem condition. In addition, students will conduct a creel survey to determine fishing pressure on the St. Marys River during the salmon run. Various Ontario index netting programs will be discussed as methods of providing an unbiased index of abundance as well as collecting biological information on important fish species. A freshwater invertebrate collection of 20 identified specimens is required for submission. |
| **Total Credits:** | 3 |
| **Hours/Week:** | 3 |
| **Total Hours:** | 45 |
| **Prerequisites:** | There are no pre-requisites for this course. |
| **Corequisites:** | There are no co-requisites for this course. |
| **Substitutes:** | NRT246 |
| **Vocational Learning Outcomes (VLO's) addressed in this course:**<br>**Please refer to program web page for a complete listing of program outcomes where applicable.** | **5214 - FISH/WILD CONSERVATN**<br>VLO 1 Demonstrate clear, concise and industry appropriate written, spoken and visual communication skills<br>VLO 2 Identify, discuss, organize and assess common flora and fauna species found throughout Ontario, including biological characteristics<br>VLO 3 Demonstrate the ability to follow standardized protocols to collect field data on fish and wildlife populations in a variety of weather and site conditions.<br>VLO 4 Demonstrate the correct use of standard laboratory equipment and skills required to carry out experiments and study various organisms.<br>VLO 6 Understand the importance of managing fish and wildlife resources in Ontario and related federal, provincial and municipal legislation.<br>VLO 7 Recognize the contributions and applications of various science disciplines in the understanding of natural environments.<br>VLO 8 Demonstrate an understanding of sustainable development and apply these principles to the natural environment. |

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VLO 9 Safely operate and maintain equipment used in Fish and Wildlife Conservation.

VLO 10 Evaluate and apply current technologies and mathematical concepts used to collect, manage and analyze data.

VLO 11 Analyze, evaluate and apply subjective and objective safety considerations.

**5220 - NAT ENVIRONMENT TN**

VLO 1 Collect data from representative biological and environmental samples using routine test procedures.

VLO 2 Utilize natural resources equipment and technology to accurately identify ecosystem components for purposes of conserving and managing natural resources.

VLO 3 Apply the basic concepts of science to natural resource conservation and management.

VLO 4 Conduct natural environment assessments according to standard field survey methods, including the use of appropriate equipment and materials.

VLO 6 Practice principles and ethics associated with natural resource conservation and management issues.

VLO 7 Work safely in adherence to occupational health and safety standards.

VLO 8 Complete all work in compliance with applicable municipal, provincial and federal standards and guidelines.

VLO 11 Communicate technical information accurately and effectively in oral, written and visual forms.

**5221 - NAT ENVIRONMENT TY**

VLO 1 Collect, analyze, interpret and report on data from representative biological and environmental samples.

VLO 2 Utilize natural resources information technology equipment to assemble, analyze and present identified ecosystem components for purposes of conserving and managing natural resources.

VLO 3 Apply the basic concepts of science to natural resource conservation and management.

VLO 4 Plan, design, implement and participate in the maintenance of natural environment assessments.

VLO 6 Practice principles and ethics associated with natural resource conservation and management issues.

VLO 7 Ensure all work is safely completed in adherence to occupational health and safety standards.

VLO 10 Communicate technical information accurately and effectively in oral, written, visual and electronic forms.

VLO 11 Develop and present strategies for ongoing personal and professional development to enhance performance as an environmental technologist.

**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.

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| | EES 3 Execute mathematical operations accurately.<br>EES 4 Apply a systematic approach to solve problems.<br>EES 5 Use a variety of thinking skills to anticipate and solve problems.<br>EES 6 Locate, select, organize, and document information using appropriate technology and information systems.<br>EES 7 Analyze, evaluate, and apply relevant information from a variety of sources.<br>EES 8 Show respect for the diverse opinions, values, belief systems, and contributions of others.<br>EES 9 Interact with others in groups or teams that contribute to effective working relationships and the achievement of goals.<br>EES 10 Manage the use of time and other resources to complete projects.<br>EES 11 Take responsibility for ones own actions, decisions, and consequences. |
| **Course Evaluation:** | Passing Grade: 50%, D<br><br>A minimum program GPA of 2.0 or higher where program specific standards exist is required for graduation. |
| **Other Course Evaluation & Assessment Requirements:** | Attendance during field trips is MANDATORY. Students missing field trips without a valid, documented reason will risk repeating the course.<br>A. First missed field outing will result in a 5% loss to your final grade<br>B. Second missed field outing will result in a 15% loss to your final grade.<br>C. Third missed field outing will result in an F Grade for the course.<br><br>Overall Attendance Policy: 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. |
| **Course Outcomes and Learning Objectives:** | |

| **Course Outcome 1** | **Learning Objectives for Course Outcome 1** |
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| 1. Using computer software, prepare a field map of a lake to be surveyed. | 1.1 Using appropriate software, determine the location data for the study lake including local name, topographical map name, district, township, lot & concession, elevation, GPS coordinates, watershed code and access.<br>1.2 Accurately determine lake perimeter, surface area and percentage of crown vs. patent land.<br>1.3 Create a 1:10 000 scale lake basin outline on 8.5 x 11 paper including inlets, outlets, trails, roads, power lines, buildings, access point(s), and north arrow to be used in the field. |
| **Course Outcome 2** | **Learning Objectives for Course Outcome 2** |
| 2. Conduct a stream survey using standard equipment and methodology. | 2.1 Demonstrate in the field the effective and safe use of a backpack electro-fishing unit in sampling fish communities in streams as outlined in the Ontario Stream Assessment Protocol (OSAP).<br>2.2 Discuss the effect on fish physiology, the mechanics and safety considerations when operating an electro-fisher.<br>2.3 Properly process and document fish samples.<br>2.4 Correctly conduct point-transect sampling for channel structure, substrate and bank conditions using the Ontario |

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| | Stream Assessment Protocol (OSAP) under test conditions.<br>2.5 Conduct an Ontario Benthos Biomonitoring Network (OBBN) survey including sampling processing and identification of invertebrates to the minimum required taxonomic detail.<br>2.6 Demonstrate the effective use of the Travelling-Kick-and-Sweep-Transect-Method as a sampling method to collect aquatic invertebrates. |
| **Course Outcome 3** | **Learning Objectives for Course Outcome 3** |
| 3. Document, display, analyze and interpret survey field data including lake bathymetry. | 3.1 Construct a lake physical features map based on shore cruise data using ArcMap.<br>3.2 Construct a lake contour map based on lake bathymetry data using Arc/Info.<br>3.2 Calculate volume, mean depth and shoreline development factor (S.D.F.) for the study lake.<br>3.4 Correctly complete Ontario Benthos Biomonitoring Network (OBBN) and Ontario Stream Assessment Protocol (OSAP) standardized field forms.<br>3.5 Compile all lake survey field data including fish vital statistics, water chemistry and shore cruise data into a comprehensive technical report including summary statistics. |
| **Course Outcome 4** | **Learning Objectives for Course Outcome 4** |
| 4. Conduct a creel survey and estimate sports fishing pressure and harvest rates by species. | 4.1 Explain the objectives of conducting a creel survey and describe the two design types and the calculation differences for each in determining C.P.U.E. and harvest.<br>4.2 Properly interview anglers, process fish, complete field records and input data as part of a creel survey. |
| **Course Outcome 5** | **Learning Objectives for Course Outcome 5** |
| 5. Document, process and correctly identify 20 freshwater invertebrates for presentation. | 5.1 Properly collect, preserve and document aquatic invertebrates.<br>5.2 Use effectively a binocular microscope and reference keys to correctly identify 20 aquatic invertebrates to family.<br>5.3 Submit an invertebrate collection as outlined with specimen collection records, index and references included. |
| **Course Outcome 6** | **Learning Objectives for Course Outcome 6** |
| 6. Describe various methods used in Ontario to assess the status of a fish population. | 6.1 Describe common fish tagging and marking techniques and their limitations in estimating species abundance.<br>6.2 Discuss the indicators of overexploitation.<br>6.3 Describe Ontario`s provincial index netting standards (such as: Spring Littoral Index Netting, Brook Trout Index Netting, Fall Walleye Index Netting, and Nearshore Community Index Netting) to assess relative abundance. |

**Evaluation Process and Grading System:**

| Evaluation Type | Evaluation Weight |
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| Exams | 40% |
| Field Test & Quiz | 10% |
| Major Assignments | 35% |

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| | Participation/Field Sheets \| 15% |
| **Date:** | June 17, 2020 |
| **Addendum:** | Please refer to the course outline addendum on the Learning Management System for further information. |

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