

# **IBIO\*4100 (F 1.0) – *Interpreting Biodiversity II* Course Outline**

*Department of Integrative Biology, College of Biological Science*

## **Course description:**

*Interpreting Biodiversity II* is the second of two courses that explore global and local issues in biodiversity as a capstone experience for biodiversity majors. The overall goal of the course is to provide opportunities for BDIV students to apply their knowledge and skills to complex problems and issues involving biodiversity in academic, government, or industry spheres. The pedagogical approach utilizes “student centred service learning” where students will engage in a key uncertainty in biodiversity with an external “client,” who has a need to resolve such issues. The client may be a private company, a government agency or municipality, a lab or institute on campus, or an NGO. Students will work independently and as a group with the guidance of a course instructor and a TA. Assignments will include authentic assessment of fieldwork, data collection, analysis of diversity data, an oral presentation and written research report. Faculty with relevant expertise for various parts of the project may participate as guest lecturers or faculty advisors. As a capstone experience for BDIV majors, the course will embrace a broad view of biodiversity that encompasses not only taxonomic diversity and abundance, but also ecological, evolutionary, and physiological aspects. This course also provides opportunities for undergraduates and benefit from direct project involvement with the University of Guelph’s world class Biodiversity Institute of Ontario (BIO) and the Centre for Biodiversity Genomics (CBG).

## **Learning Outcomes:**

At the end of this course, students should be able to:

1. Describe, comprehend and evaluate issues in biodiversity within the context of the major concepts in biodiversity at various spatial (global/local) and temporal scales (historical/future predictions).
2. Identify variation in species at the research site through the use of biodiversity sampling methods and analysis of species data from the research project.
3. Describe the biodiversity of the study area at several scales and describe in detail the biodiversity of the taxon, area, or process on which their group focused.
4. Apply critical thinking, analysis, and independent inquiry skills to complex and interdisciplinary issues.
5. Critically contrast ideas within a team toward a common goal of solving a current biodiversity issue for an external client.
6. Synthesize knowledge and effectively communicate in both written and oral forms about a specific biodiversity issue for their client.
7. Evaluate key uncertainties and propose effective solutions for their client.

## **Format:**

In-class Interactive Lectures (one 80 min. sessions/wk)

This course will not include lectures in the traditional sense. Instead, in-class interactions with the instructor and guest speakers will mainly function to guide students through the analysis of issues and concepts in biodiversity. These will be made as interactive as possible, using specimens and data as “learning objects” from current

research projects that the quest speakers will present. Issues and concepts in biodiversity will be selected that involve complex biological problems, which allow for the exploration of key concepts in evolution, ecology, and organismal biology.

#### Labs (1 – 3 hour session per week)

These Labs will address learning outcomes in both “Analyzing” and “Evaluating” biodiversity. Labs will include field and lab work that will represent a forum for student-directed discovery involving small group interaction with TAs and faculty. These will involve discussions of ideas and issues arising through group projects and critical evaluation of peer-reviewed research. They will also provide an engaging environment in which to carry out a group-based project (which will also involve interaction outside of the lab). Skills that will be developed on-line will be reinforced during the labs.

#### On-Line independent learning (weekly on-line assignments)

In addition to the lecture and lab components, students will engage in activities aimed at promoting self-assessment, skills development, background concepts and independent learning. These include the use of on-line tool such as D2L, Wiki, and concept mapping. Throughout the course, students will be encouraged to developing concept maps related to their project and the major learning outcomes\* in the course. Concept mapping is a “learning object” that provides a mechanism of engagement in learner-centredness for complex learning outcomes making this an ideal tool of a senior course with many complex concepts. The University of Guelph Teaching Support Services (TTS) has adopted on-line software that will be available for the students. This is the same software used in first biology BIOL 1070 and therefore reinforces this skill.

The in-class interactions will focus on biodiversity issues that explore both skills and major concepts. The lab will emphasize skills development and small group interactions.

### **Central Concepts:**

**I. UNDERSTANDING BIODIVERSITY:** Describe, comprehend and evaluate issues in biodiversity within the context of the major concepts in biodiversity at various spatial and temporal scales.

**II. ANALYZING BIODIVERSITY:** Identify variation in species and perform biodiversity sampling methods and analysis utilizing data from real collections or surveys.

**III. EVALUATING BIODIVERSITY:** Evaluate key uncertainties and propose and effective solutions within a student centred service/experiential learning project. Describe the biodiversity of the study area at several scales and describe in detail the biodiversity of the taxon, area, or process on which their group focused. Apply critical thinking, analysis, and independent inquiry skills to complex and interdisciplinary issues. Synthesize knowledge and effectively communicate in both written and oral forms about a specific biodiversity issue to the client.

### **Skills:**

The course has the following as primary goals with respect to the development of specific skills:

1. To develop a productive philosophy for learning.
2. To develop capabilities for independent study and research, including the use of library, primary literature, and online resources.
3. To develop the ability to critically assess and analyze issues in biodiversity.
4. To develop skills for interpreting biodiversity including expertise in specific taxonomic groups of interest and methods for measuring and analysing diversity.
5. To develop expertise for working in groups cooperatively and efficiently.
6. To develop effective communication skills (written and oral).
7. To develop a level of comfort with the complexity and uncertainty inherent in biological science.
8. To develop the ability to design a project that provides solutions for an external client who is dealing with a specific biodiversity issue.

### Assessment:

Evaluation Criteria	WEIGHT (%)
	Fall Semester
Data Collection	15
Data Analysis and Interpretation	15
Authentic Assessment (Cumulative–Evaluating biodiversity scenarios)	15
Biodiversity Project Oral Presentation	25
Biodiversity Project Written Report	30