



**BELIZE PROGRAM:
ECOSYSTEMS AND CULTURES
Summer 2023
June 23-August 5**

ACADEMIC SYLLABUS

Faculty: Dina Roberts, Ph.D.

Contact Hours: We will be in close contact for the duration of the course, and there will be plenty of opportunities for students to meet with the faculty. Additionally, there will be a number of “check-in days”, where we will arrange student-faculty meetings. Students are encouraged to engage with faculty to discuss assignments or any other personal issues or concerns as needed.

Class Meetings: The Wildlands Studies Program in Belize involves seven days per week of instruction and field research with only a few days or partial days off during the six weeks. Faculty and staff work directly with students 6-10+ hours a day and are available for coursework discussion before and after scheduled activities. The daily schedule will fluctuate but typically we will begin before 8 am, with breaks for meals. Some days may start as early as 5 am (for bird-related activities) and end later (night data collection activities), so flexibility is requisite while on the program. Scheduled activities will include a variety of modes of learning, including but not limited to lectures, discussions, guided hikes, independent projects, participation in monitoring and conservation projects, and field research. Students should also expect to spend a few hours a day studying, writing in their journals, working on assignments and completing readings. It is necessary to be flexible and able to accommodate a variety of class times, activities, and independent study times.

Course Credit: Students enrolled in a Wildlands Studies Program receive credit for three undergraduate courses. These three courses have distinct objectives and descriptions, and we integrate teaching and learning through formal learning situations (lectures and seminars), fieldwork, field surveys and hands-on activities. Academic credit is provided by Western Washington University. Extended descriptions follow in the course description section of this syllabus.

1. **ESCI 437A, Environmental Wildlands Studies (5 quarter units / 3.35 semester credits)** – Field study of environmental problems affecting the natural and human-impacted ecosystems of our study region, including the role of human interactions.
2. **ESCI 437B, Environmental Field Survey (5 quarter units / 3.35 semester credits)** – In this field-based course we conduct on-site examinations and analyses of environmental problems affecting wildlands and wildlife in our study region.
3. **ESCI 437C, Wildlands Environment and Culture (5 quarter units / 3.35 semester credits)** – Field studies course involving on-site research in our field location, studying the relationships among cultural groups and the environment. Using region- and culture-specific case studies, students assess historical and current cultural and environmental uses of wildland and/or wildlife communities. Course examines outcomes of environmental policies and wildland/wildlife management, including both sociological and natural consequences.

Readings: Students will be required to complete readings from a Course Reader. Each student is individually responsible for bringing a printed copy of the reader with them to Belize. Please print double-sided and have the reader bound (spiral bound works best). It is not advisable to bring electronics, such as a tablet, as the humidity and rain of the tropics are hard on electronics. Field guides and textbooks to supplement the Reader will be available in a reference library for student use. The reference library will travel with us throughout the course.

Contents of this syllabus:

- I. Program Overview
- II. Learning Objectives
- III. Course Descriptions
- IV. Assessment
- V. Grading Scheme
- VI. General Reminders
- VII. Academic Schedule

I. Program Overview

Tropical regions house a majority of Earth's biological diversity and cultural diversity. The regions are also highly impacted by globally driven factors that lead to environmental degradation and historical events that have caused ongoing injustices. Global warming and acidifying oceans are causing periodic bleaching events across coral reef ecosystems, including those of Central America. The challenges are real, but innovation and opportunity guided by scientific research and traditional ecological knowledge provide reasons for hope and action. The assemblages of species we will encounter during the course are unique and form some of the most biologically rich and fascinating ecosystems on the planet.

Belize is part of a series of larger, continuous ecosystems of Central America and is extraordinarily diverse given its relatively small size, smaller than the state of New Hampshire. Belize houses over 4000 species of flowering plants, over 1000 species of vertebrates, including 598 birds, and thousands of invertebrate species. Belize is in the Selva Maya (Maya Forest), the largest remaining forest area in the Neotropics outside of the Amazon Basin. Three major bird migration flyways cross through Belize and are a vital component of the Mesoamerican Corridor System. The Maya Corridor project is part of a larger, international effort to maintain ecosystem connectivity of habitat for large carnivores such as jaguars and cougars, as well as provide protection for biodiversity and ecosystem services.

Belize is home to the second-largest coral reef ecosystem on the planet, the Mesoamerican Reef. In 1996, the reef was designated a UNESCO World Heritage Site due to its staggering biodiversity and vulnerable state. The reef contains over 100 species of coral, 500 species of fish, 250 plant species, and an incredible 350 mollusk species. Most of the reef remains unexplored and an estimated 20% of the reef species are known.

Historically, in contrast to other Central American countries, Belize has a lower human population and less pressure on natural resources with 60% of the land area still covered in native forests. However, that is changing and Belize now has the fastest-growing population in Latin America. Expanding populations put pressure to increase the exploitation of natural resources and convert wildlands to grazing and agricultural land. The effects of climate change are also growing and may impact ecosystem function due to a combination of stresses. Issues that plague the oceans, such as increased acidity, warming, overharvesting, plastic pollution, and invasive species, are constant threats to reef ecosystems in Belize and globally. An ongoing movement toward protection, conservation and management of the diverse environmental systems has been impressive for a country that gained independence from Great Britain on September 21, 1981. At the recent COP26 Climate Conferences in Glasgow, Belize progressively negotiated to relieve its international debt to reallocate that money to permanently protect 30% of coastal and reef ecosystems. We will meet with various people directly involved in the next wave of progressive, sustainable development in Belize.

During our program, we will explore Belize's diverse ecosystems, including dry to moist tropical forests, savannas, wetlands, tropical rainforests, and the second-largest coral reef system in the world, all at the edge of the deep blue Caribbean Sea. We will be observing and interacting with a myriad of plants, wildlife, and invertebrate diversity, learning about their biology and ecology. We will also meet and interact with the many blended cultures that comprise modern-day Belize. Through open-minded and guided discussions, we will gain an understanding of their histories, customs, economic and daily activities, and challenges of life in a developing country.

We will study and gain experience in three main inter-related academic domains: 1) principles of tropical ecosystems and their ecologies, such as why there are so many species in the tropics, and studying focal wildlife species and their habitats, 2) field research methods through hands-on instruction and practice of ecological and biological field sampling techniques, and 3) wildlife conservation, natural resource, and protected area management, and sustainable development, with particular attention to the relationship between society and the natural environment.

We will approach our field studies through a variety of formats. There will be introductory lectures, micro-field lectures, group discussions of readings, small group projects, and individual work completing journal and fieldwork assignments. Students should come prepared to work individually as well as in group settings. Working collaboratively and cooperatively are important skill sets for any career, particularly in the science fields and in conservation practice. Because teamwork is so highly emphasized in this program, each student will be expected to fully prepare for each day's activities, including completing reading assignments, coming prepared to ask questions and contribute thoughts and ideas during discussions, and understanding and functioning as a full member of the larger group activities. This also includes being prepared for a full day as soon as we leave our campsite each day, often requiring preparation the evening prior to departing for the field or a new location.

II. Learning Objectives

These thematic topics will be addressed through classroom and field lectures and group discussions, field activities, visits and guest lectures by local experts, exposure to ongoing monitoring and research projects, and field research practicums and projects. Students will have the opportunity to participate in ecosystem monitoring and complete small group and independent rapid research projects. Students will gain extensive knowledge of tropical ecology and environmental science issues that relate to Belize, Central America, and global ecosystems. Upon completion of the program, students will have a working knowledge of and firsthand experiences with the following areas:

1. The Ecosystems and Biodiversity of Belize: including flora, fauna, ecological processes, trophic dynamics, threats to ecosystem function and ongoing ecosystem change. Tropical regions are the most diverse ecosystems, and their distribution and function are driven by a combination of environmental factors and human land-use practices. Students will learn why and how tropical ecosystems maintain so many species, as well as the historical and current threats to Belize's diverse ecosystems, including terrestrial, freshwater and saltwater environments. Species identification is essential to managing and understanding the interwoven communities of tropical ecological communities and for identifying any change over time. Through a series of lectures, field exercises, workshops, independent projects, and field notebook assignments, students will learn techniques for keying out and identification of plant and animal groups (to various taxonomic levels) using field guides and taxonomic keys.

2. Critical Reading and Thinking, Interpretation, and Discussion of Primary Literature in Tropical Ecology, Conservation Biology, and Social Science. Throughout the Belize program, we rely on primary literature in lieu of a textbook. Thus, students will gain substantial experience reading and critically analyzing complex issues as presented in the scientific and conservation primary literature. In addition to completing reading for group discussions, each student will find (prior to arrival in Belize) and read at least two pieces of primary literature on an agricultural crop grown in Belize or in another Central American country and give a 10-minute presentation on that topic to their peers during the program. When possible, students will also be selected to lead group discussions of papers from the Course Reader.

3. Knowledge and Practice of Field Research Methods and Equipment Used to Study Tropical Taxa in the context of Belize's National Protected Area Network, including Monkey Bay National Park.

Students, through hands-on field experiences, will be introduced to techniques and methods used to study birds, amphibians, plants, small and large mammals, aquatic invertebrates, and coral reef communities. Students will collect data during BioBlitz events, using camera traps, and participate with experts demonstrating mist-netting to assess bird and bat site diversity and abundance, and during multiple field excursions.

4. How to Design a Field Research Project, Collect Field Data, Manage, Synthesize and Convey Findings in Written and Presentation Forms. Students will gain experience in designing and conducting tropical field research and wildlife studies research through a field project at active research stations. Students will be working in small groups to collect, manage, interpret and present their research findings to their peers and faculty.

5. Understand and Articulate the Primary Threats to Belize Ecosystems; Identify Biodiversity and Conservation Challenges and Opportunities to Conserve Ecosystems; Explore Cultural Responses to Threats. Through first-hand experiences, lectures, and discussions with community leaders, students will gain an advanced understanding of the threats to Belize's diverse ecosystems and how conservation and management practitioners are overcoming these challenges in order to maintain ecosystem function and ecosystem services.

6. Gain Insight and Experience into Cultural, Political and Social Science Aspects with Regard to Agricultural Production, Diverse Conservation Practices, and Management Approaches to Community Development in Belize. Through field excursions, guest lectures, and interactions with local communities during cultural visits, students will have a chance to learn directly from diverse communities in Belize, from Mayan villages, Garifuna, Latino, and Creole communities, and others. Students will also read from the primary literature and visit cultural community centers to learn about the practices of various indigenous and cultural communities. Students are expected to keep a language dictionary and complete journal entries that describe cultural practices observed in various communities. Where possible, students will learn to conduct ethnographic interviews with communities.

7. Use Field Observation Skills and Learn Methods for Documenting and Sharing Observations. Field observation skills and note-taking are integral parts of documentation across fields of science. Learning to collect information in appropriate formats promotes knowledge acquisition and sharing of that knowledge. A major focus of the course is learning how to keep good field notes and how to transfer these later into a field journal. Following an introduction of techniques for recording and presenting information (e.g., natural history sketching, species descriptions, recording diagnostic characteristics, and landscape or habitat characteristics), students will gain a variety of techniques for recording field observation. Students will produce a record that serves not only as a timeless memento of their travels but also as a document of considerable scientific value.

8. Understand and Apply Key Ecological Concepts to Conservation Issues and Practice. Ecological concepts are at the foundation of all conservation strategies. We will apply various concepts that guide conservation efforts. Concepts we will cover in this course: island biogeography, succession, fragmentation, gene flow, population dynamics, intermediate disturbance, types of diversity, trophic cascades, niche and guild space, GIS and remote sensing of tropical areas to assess land use and land change.

Our overarching goal is to have students leave the program with extensive knowledge of Belizean ecosystems and those of the greater Central American region. Students will also develop a greater understanding of the unique methods for studying tropical ecology, wildlife studies, conservation and social science in tropical countries such as Belize. Students will gain broader skills and understanding of ecological and social science issues, allowing them to critically evaluate information in other settings in their future lives and careers. ***Note that prior field research experience is not required. All necessary skills will be taught on-site.*** Our primary requirement is that you are enthusiastic, adaptable, open-minded, ready and willing to learn in a field setting. We look forward to you joining us and sharing this once-in-a-lifetime experience together.

III. Course Descriptions

We teach these three courses in an integrated format in the field. However, students will receive transcript credit for the following three courses, as introduced on page 1.

ESCI 437A, Environmental Wildlands Studies (5 quarter credits) – A field study of environmental challenges and opportunities of Belize’s hyper-diverse natural and human-impacted ecosystems.

This course will introduce students to the ecology and biodiversity of tropical ecosystems (mountain pine ecosystems, dry to wet tropical rainforests, savannahs, wetlands, riparian forests, mangrove forests, seagrass beds and coral reefs) found in Belize. Students will learn what factors influence the distribution of these ecosystems and how they are interconnected hydrologically, genetically, and biogeochemically. This course will cover ecological concepts that provide the basis for conservation planning across Belize and beyond, and how these principles are applied in ongoing efforts to protect and recover these ecosystems.

Experiences/Activities: Students will study first-hand the characteristics of Belize’s ecosystems and examine the flora and fauna they support. Through observation and rigorous field note-taking skills, students will participate in natural history investigations and rapid research biological assessments across the sites visited. Students will use a combination of field guides, scientific literature, direct field observations, and assessments, and rely on the knowledge of local guides, and at times, assistance with identification using phone apps to build our collective knowledge of Belizean biodiversity and ecology. Through direct observation and pilot study, students will learn how to formulate interesting and testable questions using the scientific process.

Outcomes: Students will understand the factors that drive the distribution of ecosystems and global biodiversity patterns. Students will acquire the skills to recognize and differentiate among many different ecosystem types and learn how these ecosystems are interconnected from the mountain ridges and watersheds to the coral reefs. Students will be able to extrapolate these ideas and concepts to their own ecological landscapes or in future studies wherever they are. Through direct experience, our participants will gain a better appreciation and understanding of why biodiversity matters and develop advanced knowledge about the function and form of evolutionary processes that drive speciation and connectedness that characterizes life in the tropics.

Evaluation/Assessment:

Daily Field Journal	20%
Field Quizzes	20%
Topic Presentation	10%
Participation & Engagement	20%
Mid-term	15%
Final Exam	15%

ESCI 437B, Environmental Field Survey (5 quarter credits) - Field studies focused on field survey methods used for tropical wildlife studies, on-site biodiversity analysis and assessment as part of individual and group research.

In this field-based course, students will investigate a research question, conduct data collection, and analyze and present findings to the class. Moreover, as a group, we will conduct rapid research assessments and BioBlitz surveys of habitats visited during the program. Students will learn methods and techniques used to assess biodiversity characteristics across a variety of spatial and temporal scales in tropical landscapes, and learn what types of analyses are utilized by scientists and managers to protect and restore diversity in protected as well as human-dominated landscapes.

Experiences/Activities: Through hands-on learning opportunities, at research stations and in conjunction with land managers, students will learn ecological field techniques to study and to assess tropical ecosystems and the species housed therein. We will learn the importance of proper experimental design, data collection techniques, analysis of field data, and report writing. Taught in conjunction with ESCI 437A and ESCI 437C.

Outcomes: Students will gain experience and skills in field studies research, including observation, collection, identification, data management and analysis of data. Students will also learn to communicate their research through writing and an oral presentation to their peers and faculty. During field outings and workshops, students will learn the necessity of using various methods of recording field observations, including field guides, sketching, descriptive text, photography, mapping, field notetaking, and use of local knowledge of species by guides when assessing hyper-diverse tropical ecosystems.

Evaluation/Assessment:

Field Journal Species Lists	20%
Field Biodiversity Inventories	10%
Camera Trap Research Project	15%
Project Write-Up/Presentation	15%
Workshops and Field Methods	20%
Participation and Engagement	20%

ESCI 437C, Wildlands Environment and Culture (5 quarter credits) – Field-based examination and critical analysis of how human activities at both local and global scales affect landscapes and wildlife populations in Belize. Using region and culture-specific case studies, students assess historical and current culturally specific uses and relationships with Belizean ecosystems and wildlife populations.

This course provides an introduction to the diverse ethnic groups of Belize (including Maya, Yucateco, Mopan, Kriol (Creole), Mestizo, Garifuna, East Indian, Taiwanese, Mainland China, North American including Mennonite, European, and Latino). We will be selecting case studies from specific groups to allow for a deeper understanding of how cultural and environmental uses of land and wildlife relate to natural resource conservation.

Experiences/Activities: Due to the traveling nature of the course, our students will interact with cultural groups across Belize. Interactions with local groups will be both structured and formal, including dinners, visits to cultural museums, presentations by community leaders, and ethnographic surveys, to more informal activities, including cooking and drum classes, casual conversations and volunteer opportunities. Students will examine many social, economic, and environmental issues specific to a culture. Students will learn the economic uses of local natural resources (crops, species, traditional medicines, building materials, culturally significant plants and animals) and compare the cultural differences or similarities. Each student will record culturally specific words and their meanings during inter-cultural exchanges, collectively contributing to a group language dictionary. Students will observe and discuss the cultural, social, economic and environmental impacts (both positive and potentially negative) of the tourist industry on Belizean communities. Students will prepare and lead a group discussion on a specific case study provided by faculty. Taught in conjunction with ESCI 437A and ESCI 437B.

Outcomes: Students will gain a better understanding of the relationship between society and the environment through in-depth exploration of cultural literature on Belize from ancient Maya to modern-day and by engaging with communities on an individual, local, and country-wide level.

Evaluation/Assessment:

Reading Discussion Prompts	30%
Language Dictionary Entries	20%
Opinion Piece/Essay	10%
Participation and Engagement	20%
Case Study Presentation	20%

IV. Assessment

An overview of the academic requirements for the program are listed below. Some of the assignments are ongoing (journaling, field quizzes and preparing for discussions of readings) and some will be given specific due dates. Due dates are subject to adjustment in response to unplanned events and circumstances. Final grades for each course listed above will be based on the following items:

Course Number	Assessment Item		Date Due	Percent of Grade
ESCI 437A	Daily Field Journal Natural History and Activity Entries		weekly	20%
	Field Quizzes		weekly	20%
	Midterm Exam		Week 3	15%
	Topic Presentation		staggered	10%
	Active Participation and Engagement		ongoing	20%
	Final Exam		Week 6	15%
ESCI 437B	Field Journal Species Lists		ongoing	20%
	Field Biodiversity Inventories		ongoing	20%
	Camera Trap Research Project	Proposal and Data Collection	Week 1, ongoing	15%
		Final Report and Presentation	Week 6	15%
	Rapid Research and Field Practicums		ongoing	10%
	Active Participation and Engagement		ongoing	20%
ESCI 437C	Readings Discussion Prompts and Contribution		ongoing	30%
	Language Dictionary Entries (in Field Journal)		ongoing	20%
	Opinion Piece/Essay		Week 4	10%
	Active Participation and Engagement		ongoing	20%
	Case Study Presentation		Week 5	20%

Daily Field Journal Entries – Applies to all three courses (ESCI 437A, ESCI 437B, and ESCI 437C) –

****Please plan to keep several pages in the front open so that you can create and maintain a running table of contents including the page numbers so entries can be more easily located. Also, put your name, address, and email in the front. Keep your journal on your person or in your day pack at all times during the course. The contents of the journal are irreplaceable and a permanent record of your work.

The field journal is a critical component of this program and helps to hone observational and descriptive skills, encourages thought and reflection, and provides a record of your experiences and irreplaceable species lists and natural history observations. A journal is different from a lecture notebook (you will want to bring a different notebook for lecture notes).

The field journal is a key grade component for all three courses and should be regarded as an academic and professional undertaking throughout the program. Journals include field observations, thoughts and ideas related to field activities, drawings, sketches, maps, and other relevant information. Develop a habit of making journal entries while you are at a site, or if difficult, as soon as possible afterward.

**** **The selection of the right journal is important.** As we will be traveling and working in the tropics, I recommend finding a *Rite in the Rain* hardcover notebook and buying a pen with indelible ink (*Rite in the Rain* all weather pen). You will want to purchase a notebook larger than a 3" x 5 ". *Rite in the Rain* makes a hardcover field notebook that is 6.75" x 8.75 ", which I recommend.

- **Two larger durable notebooks—** We strongly recommend *Rite in the Rain* notebooks: Hardcover products: #370F or #370G LG, <https://www.riteintherain.com/4-75x7-5-hard-cover-book> or <https://www.riteintherain.com/6-75x8-75-hard-cover-book>
- **Smaller durable notebooks** for taking notes during lectures and while in the field. For your smaller notebooks, we recommend *Rite in the Rain* pocket books (<http://www.riteintherain.com/pocket-sized-field-flex-books>). If you tend to write large, or take a lot of notes, consider bringing 2-3 small field notebooks. All notebooks are available directly from *Rite in the Rain* or Forestry Suppliers and sometimes at your university bookstore.

Journal Grading Criteria:

- **Orienting Information:** All entries need orienting information, even for multiple entries on the same day.

- Always enter the date, and time (using a 24-hour clock format (e.g. 0830 for 8:30 a.m. 1330 or 1:30 p.m.).
- Always enter the location (with arrival and departure times) right below the date.
- Give route traveled to location if the area is not an obvious route.
- Describe weather (including temperature wind, precipitation type, cloud cover, etc.)
- Describe ecosystem and give specific habitat and vegetation type as well as land use when appropriate.
- Species lists when doing biodiversity assessments should begin after the orienting information is entered.
- Make any drawings or sketches as neatly as possible and add notes or comments to drawings.
- Record information about photographs that you take at each site.

- **Consistency of entries:** This refers to regular and consistent use of the journal.

- **Organized:** You should be able to use your journal as a reference. Information should be accessible and related to specific dates and locations. Include a table of contents in the beginning so we can find specific assignments.

- **Neatness/Readability:** Someone else should be able to use your journal as a reference (or grade it).

- **Diversity of Expression:** We encourage you to use a diversity of journaling techniques, and we will discuss options.

- **Detailed Observation:** Attention to detail will improve your observation skills.

- Record standard questions when giving an ethnographic interview and then list the name (at least first name) and description of the person you are interviewing.
- Record your general observations, comments and reflections, using concise and complete sentences when possible.

- **Invested Effort:** We expect your field journal to improve throughout the course, and will assess this accordingly.

Details on specific assessments per course are as follows:

ESCI 437A, Environmental Wildlands Studies (5 quarter credits):

1) Daily Field Journal – 20%

Give a daily record of your travel and experiences during the six-week field study, including a description of each of the ecosystems and habitat types visited, approximate distances traveled and important details of the landscape and cultural information observed along the route to the destination. Describe specific activities, observations, and experiences and name the person or persons with you and leading the group. Note the most important details and try to keep entry times to 15-20 minutes, depending on the circumstances. Besides the orienting information, include information about each ecosystem we encounter.

Ecosystem Descriptions – Here are a list of components of ecosystems you'll want to include:

- Terrestrial, aquatic (freshwater or saltwater or a mix), or semi-terrestrial
- General topography
- Primary features or physical characteristics (forested, geologic features, land use)
- Climatic description
- Dominant wildlife seen or studied
- Human use or impacts

2) Weekly Quizzes – 20%

Short quizzes (5-10 questions each) which assess the student's class and environmental attentiveness, retention of information, their understanding of concepts discussed, or techniques performed, and recollection of field observations. These quizzes, although short, will focus on comprehension, synthesis, and application of the material.

3) Midterm Exam – 15%

The midterm exam will cover key concepts and theories as related to tropical ecology, evolution, conservation, terminology, and their applications to various real-world situations, including social and cultural perspectives.

4) Topic Presentation – 10%

Students will choose a topic subject (a tropical agricultural crop of Belize or of Central America) and find 2 papers from the primary literature on the cultural, economic, and ecological significance of the crop. They will prepare a 10-minute presentation on their subject for their peers and faculty.

5) Active Participation & Discussion – 20%

Includes general engagement with the subject matter and participation in group readings, discussions, questions, field trips, workshop activities, and guest lectures.

6) Final Exam – 15%

The final exam will mainly test the material covered after the midterm exam (although students will be expected to know concepts that were covered both before and after the midterm), particularly related to the role of large carnivores in conservation planning, conservation science principles, particularly regarding biological corridors and use of traditional ecological knowledge in planning, field techniques used to assess biodiversity, coral reef ecology and the connectivity of Belizean ecosystems. Students will be assessed through short answers and essay questions, diagram labeling, situation analysis, case study analysis, and stakeholder decision-making scenarios.

ESCI 437B, Environmental Field Survey (5 quarter credits):

1) Daily Field Journal – 20%

Just as you will make journal entries of daily activities, you will also keep a list of all the wildlife and interesting plant species or plant families we encounter during those activities. Each list of birds and other wildlife will also require the same orienting information as described on page 8, similar to that required for all journal entries. If you cannot identify the animal or plant right away, make a quick sketch of the main characteristics or notes that you can use when you have a field guide or expert available. If you take a photo, make a reference note for later use to provide information on the date, time and habitat for which that species or type of animal was seen. You will be required to make at least three entries per site visit on specific animals or plants as well as provide as thorough a list as possible for new organisms encountered. We will also make daily group lists, so you can work with your team members to make taxa-specific lists by interests. At several sites, we will be doing 10-, 20- or 30- minute observation stations or transects, where you will work in pairs or small groups to make rapid assessments. Your lists again will contribute to our course taxonomic lists compiled during the entire six weeks. We will require that you download *iNaturalist* and *eBird* phone apps before you arrive in Belize as some of our surveys will use these tools to keep track of our data, but these tools will not be a substitute for the required field journal entries.

2) Field Biodiversity Inventories – 20%

Beyond the opportunistic species lists that will be kept on a site-by-site basis, at several sites, we will be doing 10, 20 or 30 minute observation stations or transects, where you will work in pairs or small groups to make rapid assessments. Depending on the habitat type, we will choose a specific group (birds, dragonflies, plants, amphibians, or mammals) and conduct rapid inventories of all species observed. Where possible, we will also conduct timed animal behavior surveys and note foraging or resting behavior. For these organized practicums, we will provide data sheets and you will complete those and return them to the instructors for grading. Again, download both *iNaturalist* and *eBird* phone apps before you arrive in Belize as some of our surveys will use these tools to keep track of our data, but these tools will not be a substitute for required field journal entries or data sheet completion. We will also be using guidebooks and your personal sketches or photos when necessary for id.

3) Camera Trap Research Project – 30% Total (Proposal and Data Collection (15%); Write up and Present (15%))

The research project is a group project; after introductory lectures and site surveys, students will work with Monkey Bay scientists to deploy a camera trap array to assess tropical mammal species richness, abundance, and trophic structure. Camera traps will be deployed during our initial week at Monkey Bay and then periodically checked for data (photos of mammals) during each subsequent visit.

Research Proposal and Data Collection – 15%

The proposal should include an Introduction that lays the foundation for the proposed questions/research topic. Introductions generally start broad and narrow towards the specific question to be addressed. The final sentence of the introduction should be a statement of the question to be addressed. Other components of the proposal include, if relevant; a detailed methods section, in which you will outline the study site(s), focal group(s), materials to be used, and observational/experimental techniques to be used; expected results, in which you outline your anticipated findings; and a discussion, in which you will discuss the implications of your expected findings, as well as the implications of your arriving at different results. Keep the proposal to 2 written pages.

Data collection will entail checking camera traps and changing SD cards. The SD cards must be kept organized and marked with a sharpie using a numerical id associated with each camera. Photos from SD cards will then be sorted and processed during our stays at Monkey Bay.

Written Report and Oral Presentation – 15%

The written report will be a detailed account of every component of the research project, including an introduction to the study topic and questions addressed, methods, results, and a thoughtful discussion of the importance and implications of all findings. Results should be conveyed using appropriate charts, graphs, and tables in a way that clearly presents major results. We will discuss in detail the components of a scientific report.

The oral presentation is your chance to share your research with your peers. In a 10-minute presentation, with 2 minutes for questions, you will cover all the major components of the research project, including a brief introduction to the research topic, your methods, main findings, and future research ideas.

4) Workshops and Field Methods Assessments – 10%

Throughout the course, we will have opportunities to learn monitoring and assessment methods for different tropical taxa. Sometimes, this will require observing methods where specific training and certification are required for some activities, such as extracting birds and bats from mist nets. Certain parts of the workshop will be open to full participation, such as set up and opening and closing of nets, and taking data during the workshop, while other parts will require a hands-off approach. Faculty will hold group discussions and some individual assessments of what students learned after each workshop and field method exercise.

5) Active Participation & Involvement– 20%

Students will be evaluated according to their active participation and involvement during all field activities, and their contribution to group/peer projects. Full engagement is required, even for early morning and post dinner field excursions for scheduled activities.

ESCI 437C, Wildlands Environment and Culture (5 quarter credits):

1) Readings Discussions Prompts and Contribution – 30%

This is ongoing throughout the program and includes group discussions of many of the readings presented in the Course Reader, incorporating readings from biology and ecology, general natural history, biodiversity conservation, social sciences, and wilderness and management theory. We will tailor the discussions and reading choices to our location and current topic focus so that knowledge is developed in a logical progression. We will discuss all readings as a group, typically at the end of the day to maximize our time in the field. However, due to logistical considerations, some discussions will be at other times. Every student is expected to be prepared for all group discussions. We suggest you leave yourself ample time to read before we meet as some may take longer than others to digest. Your grade will be based on your prepared prompts (2-3 questions or comments prepared ahead of the discussion) and whether you participate in the discussions and your level of participation on other activities we do with readings (e.g., pre-discussion questions, student-led discussions).

2) Language Dictionary Entries – 20%

Students are expected to maintain a language dictionary for each of the cultures that we'll be encountering during the program. A minimum of 10 words and/or phrases per group are required. Language groups will be determined upon arrival in Belize and given to students.

3) Opinion Piece/ Persuasive Essay – 10%

Students will prepare a concise 'opinion piece' (approx. 2-3 pages) on a social-cultural topic of their choice but one that is relevant to key themes and concepts encountered throughout the program. The format of the reflection is relatively open but should be seen as an exercise in science communication, e.g. magazine/newspaper op-ed, critique, review, letter to the editor, investigative report. Your task is to convey a potentially complex social-cultural topic in a succinct, engaging, and persuasive way. In this regard, aim to include, interweave and/or refer to personal stories/experiences that help illustrate your point, and include facts. Include references to literature or other sources.

Grading criteria are as follows:

Structure: the piece is logically-ordered.

Accurate: the piece is factually correct (as far as one can know) and is transparent about conjecture.

Style: the writing style is succinct and engaging and effectively communicates key message(s)/themes.

References: the reflection draws on, refers to, and cites available literature or other sources.

4) Active Participation & Engagement – 20%

Students will be evaluated according to active participation in everyday activities as well as their attitude and involvement when engaging with guests and local hosts. In this particular course, it is important that the student demonstrates active listening, a genuinely open mind, a willing attitude, and a respectful etiquette in interacting with team members and external parties. Finally, the student's consistent and positive contribution to the team dynamic (e.g. by embracing assigned directional roles and responsibilities) will be taken closely into account.

5) Case Study Presentations – 20%

Students will work in small groups to read and analyze a specific Case Study of Community Actions on Biodiversity Conservation in Belize. Your team will prepare a 15-minute presentation to give to your peers and faculty.

V. Grading Scheme

To convert final grade percentages to letter grades for each course that will appear on your transcript, we will use the following grading scheme:

Letter Grade	Percentage		Letter Grade	Percentage
A	93.0 – 100		C	72.5 – 77.4
A-	90.0 – 92.9		C-	70.0 – 72.4
B+	87.5 – 89.9		D+	67.5 – 69.9
B	82.5 – 87.4		D	62.5 – 67.4
B-	80.0 – 82.4		D-	60.0 – 62.4
C+	77.5 – 79.9		F	< 60.0

VI. General Reminders

Academic Integrity is as relevant in this field course as it is at your home institution. Plagiarism, using the ideas or materials of others without giving due credit, cheating, or putting forth another student's work as your own will not be tolerated. Any plagiarism, cheating, or aiding another to cheat (either actively or passively) will result in a zero for the assignment. Cases of academic dishonesty may be reported to your home institution.

Assignment deadlines are established out of fairness to other students and they are necessary so the instructors can get the grading done on time. Therefore, deadlines are firm, and work that is turned in late will be penalized and receive a 5% deduction. If the assignment is more than 2 days late, an additional 10% will be taken off. If you think circumstances may keep you from completing your work on time, talk to the instructor as soon as possible and certainly before the assignment is due.

Participation and attendance are crucial throughout this program. Because of the demanding schedule and limited time, all components of the program are mandatory (unless indicated) and missing even one lecture can have a proportionally greater effect on your final grade. Hence, it is important to be prompt and prepared with the needed gear and equipment for all activities.

Students with special needs should contact the lead faculty member as soon as possible to discuss any special accommodations that may be necessary.

VII. Academic Schedule & Course Content

Below is the schedule that we anticipate following during the Belize program. Students should come with a flexible mindset and be willing to adapt to necessary changes that inevitably occur when doing fieldwork. **We will provide a separate Course Reader, that you are required to print, bind, and bring with you to Belize.** You **will not** have an opportunity to print the readings in Belize.

Dates 2023	Site	Topics	Activities
23-28 June	Monkey Bay Wildlife Sanctuary and Monkey Bay National Park	Welcome and Introduction of Team Members Tropical Ecology Biodiversity Patterns Tropical Savannas and Fire Taxonomic Groups Field Research Methods Field Journal Techniques	- Team Building Exercise - Maya Forest Corridor Presentation WCS - Conduct BioBlitz and Initiate Camera Trap Study in MB National Park - Intro to Karst Cave Ecosystems - Introduction to Belizean and C.A. Ecosystems
29 June - 2 July	Crooked Tree Wildlife Sanctuary, Altun Ha Mayan Ruins, and Community Baboon Sanctuary	Primate Conservation in C.A. Bird Diversity and Migration Ethnobotanical Studies Introduction to Ethnographic Studies Ethnic Diversity of Belize	- Natural History Museum - Creole Culture Museum - Boat Tour of the Lagoon - Bird Identification Practice - Howler Monkey Ecology
3-4 July	Monkey Bay Wildlife Sanctuary	Independence Day USA	Camera trap data retrieval Camera photo processing Crocodile Survey at Cox Lagoon Wetland
5 – 9 July	Mountain Pine Ridge Reserve	Coniferous forests ecology Watershed Management Intermediate Disturbance Succession	- Hike to San Miguel camp - Philip Bedran, Pine Lumber Company - Eli Miller, Orange Breasted Falcon Conservation - Big Rock Falls Hike
9 July	Day Trip to San Ignacio and return to Monkey Bay	Yucatec Mayan history Endangered species	- Xunantunich Mayan Archaeological Site - Raptor Center tour
10 - 11 July	Sibun River Canoe Paddle Expedition and Watershed Dynamics	River Ecosystems Water Conservation Riparian Ecology and Water Quality Indicators	- Macro-invertebrate sampling - "Watershed Continuum Concept" - Riparian Bird Sampling

12 – 14 July	T.R.E.E.S.	Tropical Mammal Diversity Neotropical Bird Life Histories Rapid Research Project Idea Development	- Neotropical Bat Workshop - Mammal Tracking Exercise - Early Morning Bird Banding
15 – 19 July	Cockscomb Basin Wildlife Sanctuary	Tropical Forest Dynamics Large Carnivore Ecology Protected Area Strategies and Indigenous Communities	- Jaguar Conservation and Research - Rainforest Exploration and Research Projects - Cloud Forest Hike and Climate Change Discussion
20 - 22 July	Punta Gorda, Toledo District	Creole culture Mangrove forests ecology	- Maroon Drumming School - Mangrove ecosystem kayak exploration
23 – 27 July	Maya Lodge, Laguna Village	Agricultural Practices Kek'Chi Mayan Culture Indigenous perspectives and Mayan Studies Service Project	- Subsistence farming discussion - Agua Caliente Wildlife Sanctuary - Farm and Village Walks - Laguna Youth Service project
28 July – 1 August	Tobacco Caye	Coastal Ecology Reef ecosystems Grass bed ecosystems Environmental Change Coral Adaptation Strategies	- Snorkeling and Reef Surveys - Manatee Habitat Visit - Beach/reef Plastics Survey - Guest lectures, Coral Reef Research
2 - 5 August	Monkey Bay Wildlife Sanctuary	Final Exam Final Research Presentation Wrap-Up and Program Departure	- Final Exam - Camera Trap Data Analysis and Report - Final Presentations - Program debriefing and Evaluations - Airport Dropoff