

# Denver Zoo

## AIP Web+ Course Descriptions

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**Title: Foundations of Inquiry**

**BIO 654**

**Credits: 3**

**Term: 1<sup>st</sup> summer**

**REQUIRED**

This course engages students in exploring the foundations of inquiry-based teaching and learning while students gain a new familiarity with Advanced Inquiry Program (AIP) Master Institution (MI) facilities as informal science education settings. Through making observations on zoo grounds, developing comparative questions, devising investigations to answer those questions and communicating results, participants will experience the full process of inquiry and will learn how to guide this process with their own students and in their own communities. This type of first-hand, experiential learning encourages independent and critical thinking, increasing communities' awareness and concern for the local environment and its inhabitants. We will engage in activities that demonstrate the applications of inquiry in the classroom, on zoo grounds, in the schoolyard and other settings. We will discuss case studies that illustrate the use of inquiry to improve student learning and engage students as leaders in their communities. Through this course, students will develop the investigation, critical reflection, and collaboration skills needed to lead inquiry-driven learning for diverse communities. They will learn to develop a comparative question, design an inquiry-driven scientific study, and develop their skills in scientific writing and research. Students will come away with information and techniques for applying inquiry in classroom and informal education settings, developing inquiry skills and assessing inquiry-based learning that they can use in their own communities. *This is a Miami University online course with experiential learning on-site at a Dragonfly Advanced Inquiry Program (AIP) Master Institution.*

### Course Themes and Student Learning Outcomes (SLOs)

Students in this course will:

- Construct an understanding of the nature of science, and investigate models of inquiry in the life sciences.
- Assess and interpret existing research projects in the life sciences, e.g., on the structure, function, behavior and evolution of plants and animals.
- Create and conduct their own field research projects by selecting research questions, making predictions, designing methodologies, exploring experimental design to take measurements/employing data collection strategies and analyze data to arrive at new understandings of their research topics; connect results to benefits to human and ecological communities
- Engage in and design inquiry projects as a tool for participatory learning

- Assess methods for evaluation when using inquiry-based approaches
- Become familiar with Miami University's Institutional Review Board (IRB) and the Institutional Animal Care and Use Committee (IACUC); complete CITI ethical research training prior to gathering data about humans, and complete AALAS ethical research training prior to gathering data about vertebrate animals
- Employ community resources, including the AIP Master Institution environment, to create connections and use the network as a learning resource.
- Engage in reflective and evaluative peer review in face-to-face environments and on the web to provide colleagues with personal insight, new perspectives or analyses, ideas for useful applications, and connections to other research and projects.

**Title: Global Biomes**

**BIO 699.B**

**Credits: 3**

**Term: 1<sup>st</sup> Fall**

**REQUIRED**

A bioclimatic zone, or biome, can be defined by the relationships among a region's temperature patterns, annual precipitation, and living organisms. This course introduces the biomes of the world through theory and through experiential learning using the characteristic vegetation and wildlife of biomes represented at this Advanced Inquiry Program (AIP) Master Institution (MI) and surrounding ecosystems. Focal biomes change. *This is a Miami University online course with experiential learning on-site at a Dragonfly Advanced Inquiry Program (AIP) Master Institution.*

[Note that focal biome may change depending on semester and on the experiential learning offered at individual Master Institutions. Example follows:]

**Biomes of Africa**

The biomes of Africa— desert, savanna, montane habitats, tropical rain forests and freshwater habitats—host a great diversity of wildlife, including some of the most charismatic animals on earth, such as elephants, lions, gorillas, ostriches and giraffes. This course explores the diversity of African biomes, with a focus on the roles of key species in different ecosystems and conservation efforts to ensure their continued survival. With increasing pressures on natural habitats and their resources, many challenges face both the wildlife and people of Africa. Participants will learn about current conservation issues in Africa as well as strategies for engaging people in conserving African species and their habitats.

**Course Themes and Student Learning Outcomes (SLOs)**

**COURSE THEMES**

- Climate patterns and plant/animal adaptations characteristic of specific biomes
- Characteristic wildlife of specific biomes on zoo grounds
- Current research and conservation issues relevant to each biome
- Current community-based conservation solutions and opportunities for involvement

**STUDENT LEARNING OUTCOMES (SLOs)**

Global Biomes, students in this course will be able to:

- Describe, discuss, and synthesize the functional and structural aspects of biomes.
- Analyze major human impacts on biomes.
- Critique global conservation strategies from bio-geographical, social, and cultural perspectives.
- Develop programs that engage others in mitigating impacts on wildlife and habitats in biomes.
- Build community partnerships and shared, placed-based educational materials.
- Engage in reflective and evaluative peer review to convey knowledge, analyses, new perspectives, and ideas for useful applications.

**Title: Graduate Research: Rotating Topics**

**BIO 620 (includes Internship)**

**Credits:** 1-4; maximum 10

**Term:** 2<sup>nd</sup> or 3<sup>rd</sup> Spring

Special problems in the biological sciences. Individual course descriptions and SLOs vary (this is a Pass/Fail course)

**Title: Independent Study**

**BIO 667W**

**Credits:** 1-4; maximum 10

**Term:** 2<sup>nd</sup> or 3<sup>rd</sup> Spring

**Title: Human Dimensions of Conservation**

**BIO 699C**

**Credits:** 3

**Term:** 2<sup>nd</sup> or 3<sup>rd</sup> Summer

Conserving wildlife is a complex endeavor that requires the integration of sound science from both the social and natural sciences. This course will explore how the social sciences can inform conservation. A growing field of study that draws from several of the social sciences is human dimensions of wildlife. This course will examine how human dimensions emerged as a field of scientific inquiry and why it is important. It will provide an overview of the social science concepts and methods that are the foundation of human dimensions. Students will consider how current conservation issues can be addressed through an understanding of human thought and action. Students will use the human dimensions approach to address a current conservation issue and by the conclusion of the course, they will be able to identify tools, frameworks, and concepts that can be used to influence human behavior to effectively conserve wildlife. *This is a Miami University online course*

*with experiential learning on-site at an affiliated Dragonfly Advanced Inquiry Program (AIP) institution.*

### Course Themes and Student Learning Outcomes (SLOs)

Students in this course will be able to:

- Critically consider and discuss how human dimensions issues contribute to and influence wildlife conservation.
- Apply social science concepts and theories to wildlife conservation.
- Analyze natural resource issues from varying stakeholder perspectives and produce “stakeholder analyses.”
- Design a human dimensions study that integrates methodologies and partnerships, and provide evidence to support how their design can inform management decisions.
- Build community partnerships and shared, placed-based educational materials.
- Engage in reflective and evaluative peer review to convey knowledge, analyses, new perspectives, and ideas for useful applications.

### **Title: Master Plan in Action**

**BIO 655**

**Credits: 2**

**Term: 1<sup>st</sup> Spring**

**REQUIRED**

The AIP Master Plan (MP) represents a student’s ideas and areas of interest as those ideas relate to the student’s professional and community goals. By writing a Master Plan, students are able to focus their AIP journey and visualize the actions and steps that they might take toward completing their master’s degree during the 2.5- to 5-year timeframe. During this course with guidance and input from peers and the AIP Cohort advisor, students work on completing their Master Plans. This method ensures that students have a workable plan that helps them anticipate ways to incorporate the projects they create as part of their AIP experiences into their professional and life goals. Students will also think about the common threads and program tenets among the projects in this cohesive body of work, which ultimately becomes their final master’s portfolio due as the culminating experience at the end of their degree. *This is a Miami University online course with experiential learning on-site at a Dragonfly Advanced Inquiry Program (AIP) Master Institution.*

Through readings, discussions, and peer review, students will answer the following questions:

- What do you want to accomplish by the end of your AIP degree program?
- What is the focus of your Master Plan (inquiry-driven interpretation, public engagement, schoolyard ecology, community-based learning, land use, animal behavior and conservation, etc.)?
- Does your AIP focus include a specific setting (school, informal setting, state government, urban ecosystems, etc.)? A specific community (local businesses, at-risk youth, etc.)?
- How do you plan to build on your zoo experiences, inquiry skills, community skills, and content knowledge to make changes in local and global contexts?

### Course Themes and Student Learning Outcomes (SLOs)

Students in this course will:

- Develop, expand and revise a focused research plan or social action strategy that includes a timeline for conducting anticipated projects
- Design Master Plan to ensure community engagement is well represented in a student's selected projects; projects use established methodologies including participatory action research (PAR), inquiry, and participatory education (PE).
- Examine, critique, and apply research methodologies, including investigating experimental design and data analysis, from published studies
- If not already accomplished, prepare and submit a research proposal to Miami University's Institutional Review Board (IRB) and/or the Institutional Animal Care and Use Committee (IACUC); research will occur in the semester(s) following approval
- Evaluate colleagues' Master Plans and project work, including conducting critical peer review, and respond to individual and peer discussion about their own Master Plans
- Employ community resources, including the AIP Master Institution environment, and outreach to create connections, build community partnerships and use the network as a learning resource to increase the effectiveness of the Master Plan.
- Engage in reflective and evaluative peer review in face-to-face environments and on the web to provide colleagues with personal insight, new perspectives or analyses, ideas for useful applications, and connections to other research and projects.

### **Title: Environmental Stewardship in my Community: Engaging Communities in Conservation Solutions (every other fall)**

**BIO 656**

**Credits: 3**

**Term: 2<sup>nd</sup> or 3<sup>rd</sup> Fall**

Students in this course investigate environmental stewardship, research science and conservation opportunities and solutions in their local communities, practice inquiry-based learning, develop a conservation project to be used in their classroom or community, and reflect on ecological and carbon footprints. At the end of this course, students will have a solid understanding of community-based conservation, with a particular emphasis on current issues facing local habitats in the communities where they live. Students will also explore and begin to design stewardship strategies for empowering their own students or

community members to generate solutions and take action. *This is a Miami University online course with experiential learning on-site at a Dragonfly Advanced Inquiry Program (AIP) Master Institution.*

#### Course Themes and Student Learning Outcomes (SLOs)

Students in this course will:

- Organize inquiry projects that drive learning in science and integrated topics.
- Interpret the life sciences through conservation issues and current research being conducted in local communities to understand causes and impacts; critically analyze solutions to these issues.
- Explore and apply the principles of sustainability and community-based conservation.
- Design strategies for engaging students or community members in local conservation action.
- Assess human demand on the planet's ecosystems by exploring ecological and carbon footprints, and formulate ideas for increasing and supporting sustainability within their own communities
- Employ community resources, including the AIP Master Institution environment, and outreach to create connections and use the network as a learning resource.
- Engage in reflective and evaluative peer review in face-to-face environments and on the web to provide colleagues with personal insight, new perspectives or analyses, ideas for useful applications, and connections to other research and projects.

#### **Title: Urban Ecology (every other fall)**

**BIO 622**

**Credits: 3**

**Term: 2<sup>nd</sup> or 3<sup>rd</sup> Fall**

As urbanization increases globally, it is important to understand how natural resources can best be managed within and around cities. In this course, students will explore the growing field of urban ecology and investigate how diverse stakeholders in cities can work together to increase urban sustainability and livability. Students will evaluate unique aspects of urban ecosystems, including conservation challenges posed by increased impervious surface, the urban heat island effect, increased invasive species, high levels of human disturbance, air and water pollution, and more. Students will assess regional patterns of urbanization to identify key demographic trends, investigate individual cities as case studies and collaborate to design a comprehensive urban land use management vision for the future of an urban system of their choice. *This is a Miami University online course with experiential learning on-site at an affiliated Dragonfly Advanced Inquiry Program (AIP) institution.*

#### Course Themes and Student Learning Outcomes (SLOs)

Students in this course will:

- Describe, discuss, and evaluate the conservation implications of unique ecological features of urban ecosystems including: increased impervious surface, the urban heat

island effect, increases in invasive species, high levels of human disturbance, air and water pollution and more

- Assess and compare global patterns of urbanization and human migration to and from cities, including historical and future demographic projections
- Use individual cities as case studies to assess strengths and weaknesses of past, current, and future urban planning and policy decisions (e.g., storm-water management, urban land use policy, urban park design, coastal planning and climate change mitigation strategies)
- Collaborate on a project to reimagine and design an urban system-- specifically attending to carbon, water, biodiversity, and other ecological functions-- while also promoting opportunities for urban residents to experience nature within cities.
- Employ community resources, including the AIP Master Institution environment, and outreach to create connections, build community partnerships and use the network as a learning resource.
- Engage in reflective and evaluative peer review in face-to-face environments and on the web to provide colleagues with personal insight, new perspectives or analyses, ideas for useful applications, and connections to other research and projects

### **Title: Regional Ecology: Rocky Mountain Field Investigations**

**Credits:** 3

**Term:** 2<sup>nd</sup> or 3<sup>rd</sup> summer

**Course Description:** Investigate current local ecological and wildlife issues, such as invasive species, habitat fragmentation, climate change, pollution and water quality, and analyze solutions. Participants will travel to Denver Zoo's local research site to conduct science based research on a variety of Rocky Mountain indigenous mammals, birds, herps and vegetation. Participants will apply authentic research methods and examine the conservation issues facing these species and engage in discussions of solutions.

### **Themes:**

- Field experiences: observations, tracking, data collection, GPS, restoration
- Guest speakers, visit researchers
- Explore local wildlife research/investigations (guest speakers, visit researchers), highlighting the work of Denver Zoo
- Engaging students and communities in solutions
- Inquiry-based learning