

# Denver Zoo

## AIP Course Descriptions

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### **Title: Foundations of Inquiry**

**Credits:** 3

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

**REQUIRED**

**Course Description:** The course will provide participants with the tools needed to make science a fun, enjoyable learning experience while further increasing competence and confidence in science. The course will include pre- and post-inquiry assessment tools, individual inquiry investigations, interdisciplinary learning and inquiry techniques, and critical thinking skills. Participants will carry out and evaluate their own original inquiry investigations.

#### **Themes:**

- Conduct inquiry in small groups and hone skills of observation
- Gain tools on how to assess knowledge before and after inquiry
- Develop opportunities for scaffolding of the different uses and applications of inquiry
- Conduct an inquiry with sound experimental design to promote critical thinking
- Discuss how to integrate interdisciplinary collaborations in science, math, literacy, and the arts
- Facilitate all steps of the scientific method and inquiry process

### **Title: Global Biomes: Denver Zoo Conservation Regions of Focus**

**Credits:** 3

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

**REQUIRED**

**Course Description:** Introduction to the biomes, species and cultures, connected with Denver Zoo's conservation projects. Students will gain insights into Denver Zoo's conservation areas of focus and learn what makes these areas biologically unique. Participants will also engage in discussions about the political, economic and cultural climates of these areas and how these factors shape and determine Denver Zoo's conservation strategies. Participants will examine and discuss the long-term impacts that Denver Zoo strives to achieve in these areas.

#### **Themes:**

- Investigate climate patterns and plant/animal adaptations characteristic of different biomes
- Use wildlife on zoo grounds to investigate wildlife of the biomes on zoo grounds
- Explore current research and conservation issues relevant to different biomes
- Learn about current community-based conservation solutions that address relationships between local people and the environment

**Title: Graduate Research: Field Methods****Credits: 2****Term: 2<sup>nd</sup> Spring****Course Description**

This course provides students with an overview of biological field based research conducted in zoological, reserve, aquaria and other ex situ settings as well as in situ environments. Students will gain proficiency in applying field methods to ecological questions and conservation practice and explore the multi-disciplinary nature of science, and hands-on conservation research. A premise of this course is that field methods are not only essential for ecological research, they can serve as the basis for participatory education, public engagement in science, and community-based environmental stewardship. Field methods—point sampling, capture/recapture, quadrat studies, pitfall traps, line transects, ethology, and others--are fundamental tools that allow investigators of all backgrounds to generate knowledge needed to become better informed environmental citizens. Students will become familiar with a range of field methods and contribute to on-going research in their communities.

**Themes:**

- Examine the scientific research and conservation strategies of field biologists.
- Identify strengths and weaknesses of common field methods employed in wildlife research and conservation (e.g., vegetation sampling, insect sampling, transect/quadrat surveys, point count methods for birds, etc.).
- Join and assess current animal research projects (ex: estimating population size and density); examine the scientific research and conservation strategies of at-zoo and off-site animal researchers.
- Engage with and assess multiple data collection instruments and field methodologies to explore examples of tools needed to investigate questions and build understanding that leads to informed action.
- Design and compare field investigations, including steps of the experimental design process: essential question(s), formal hypotheses/predictions (for comparative and correlative studies), data collection tools and materials, collecting and organizing data, analyzing data, presenting conclusions and discussing results.

**Title: Human Dimensions of Conservation****Credits: 3****Term: 2<sup>nd</sup> or 3<sup>rd</sup> Summer**

**Course Description:** This course will examine how human thought and action influence conservation and how the application of social science theory can inform conservation decision making. Through the exploration of case studies on programs such as: captive population management, wildlife reintroduction, tourism and ex situ research and education programs, participants will be asked to evaluate the word “value” as it pertains to wildlife and to critically think about wildlife conservation under the lens of: aesthetic, economic, biological and cultural roles and how these influence the principles applied to conservation.

**Themes:**

- The role of Zoos and Aquariums in conservation
- Critical thinking about environmental issues

- Impact of culture on conservation
- Solutions to human animal conflict

**Title: Master Plan in Action**

**Credits: 1**

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

**REQUIRED**

**Course Description:** In this course, participants will perform the largest body of work towards their master plan. Although the course is self-led, students will meet four times for morning peer review sessions to discuss their progress and offer advice and assistance with each other's design and data analysis. Participants will draw upon content and methods from previous coursework to develop and execute their master plan.

**Themes:**

- Develop a time line for completion of the Master Plan, including inquiry projects, Leadership Challenges, and e-Portfolio.
- Begin developing a cohesive body of work for inclusion in e-Portfolio, potentially design and implement side projects to enhance the overall quality of their Master Plan Project(s).
- Gain an understanding of experimental design and data analysis
- Critical peer review
- Critical examination of research methodologies from published studies

**Title: Environmental Stewardship in my Community: Engaging Communities in Conservation Solutions**

**Credits: 3**

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

**Course Description :** 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 community members to generate solutions and take action. *This is a Miami University online course with experiential learning on-site at an affiliated Dragonfly Advanced Inquiry Program (AIP) institution.*

**Themes:**

- 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.

- Design conservation messaging that is relevant and appropriate for targeted audience
- 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**

**Credits: 3**

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

This course is designed to engage students in issues in urban ecology with specific attention paid to the historical development, and long-lasting impacts of urban planning within Denver as it relates to human and societal well-being. As a culminating project, students will collaborate to design visions for the future of Denver as well as create strategies for engaging communities about their vision. Students will be tasked with identifying issues examined throughout the course to address within their vision and must provide both rationale for the planning decisions as well as quantitative data provided by the platform to demonstrate effective change in their given ecological systems. Students will also create ecological challenges to be issued to targeted local populations of potential stewards. *This is a Miami University online course with experiential learning on-site at an affiliated Dragonfly Advanced Inquiry Program (AIP) institution.*

**Themes:**

- Explore the historical development of Denver, with attention paid to long-lasting effects of historic city planning decisions
- Compare and analyze urban population growth patterns and urban biodiversity data to identify issues to be addressed in urban ecology
- Evaluate various planning strategies employed throughout Denver to identify strengths and weaknesses of each
- Using GIS modules, collaborate on a project to reimagine the urban systems within Denver and create a proposal to community officials to provide a new, sustainable space that benefits both wildlife and community members.
- 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