HON 186, Honors Natural and Physical Sciences Syllabus

Fall 2026

3 credit hours

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Instructor Student Drop-In Hours: TBD

Course Catalog Description: TBD

Course Description: This course will emphasize the fundamentals of ecology and evolutionary biology in ways that engage STEM and non-STEM majors alike. Students will explore how systems evolve through a lens of natural selection, constraints, heredity, and adaptation. Alongside real-world case studies, the course draws on imaginative storytelling. Students will investigate evolutionary principles through science fiction, fantasy worlds, mythology, and speculative ecosystems. By building alien biospheres, mapping fictional phylogenies, and analyzing how evolutionary themes appear in culture and society, students will develop a creative yet scientifically grounded understanding of the important factors influencing change over time.

Important Dates: TBD

Liberal Arts Curriculum & GT Pathways

This course is a part of the Liberal Arts Curriculum at UNC and fulfills 3 credit hours of the Natural & Physical Sciences category. The Colorado Commission on Higher Education has approved HON 186 for inclusion in the Guaranteed Transfer (GT) Pathways program in the GT-SC1 category. For transferring students, successful completion with a minimum C– grade guarantees transfer and application of credit in this GT Pathways category. For more information on the GT Pathways program, go to http://highered.colorado.gov/academics/transfers/gtpathways/curriculum.html

UNC's LAC outcomes in Natural & Physical Sciences are aligned with the State of Colorado's GT Pathways student learning outcomes, competencies, and content criteria for SC1. This includes CDHE competencies and student learning outcomes in Inquiry & Analysis and Quantitative Literacy.

LAC Natural & Physical Sciences Learning Outcomes + GTP Competencies & SLOs	Course Mapping
Inquiry & Analysis: **Inquiry is a systematic process of exploring issues/objects/works through the collection and analysis of evidence that results in informed conclusions/judgments. Analysis is the process of breaking complex topics or issues into parts to gain a better understanding of them.**	**SLO 4** Imaginative Phylogenetic Tree Design Students must select a dataset (movie franchise, recipes, smartphone models, historical figures, etc.), propose characters/traits to code, and justify the design choices for constructing the tree.

Student Learning Outcomes (SLOs)	

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Students should be able to:
4. Select or Develop a Design Process
   a. **Select or develop elements of the methodology or theoretical framework to solve problems in a given discipline.**
5. Analyze and Interpret Evidence
   a. **Examine evidence to identify patterns, differences, similarities, limitations, and/or implications related to the focus.**
   b. **Utilize multiple representations to interpret the data.**
6. Draw Conclusions
   a. **State a conclusion based on findings.**
	Demonstrates selection/development of eco/evo methodology in a more engaging manner for non-STEM majors. Students create the cladogram and write a justification of methods essay. Poster presentation may be appropriate.
	
	Speculative/Alien Worlds Group Project
	• Students must choose or imagine an alien planet and identify environmental constraints, propose species niches, imagine new species that might fill these niches, and outline an approach for testing hypotheses such as how a predator would change the system over time. Students write a methods/design section describing the process used to create this ecosystem and rationale for specific observations proposed to assess changes.
	
	SLO 5
	Midterm Exam – 50% real-world examples and 50% imaginative examples from sci-fi and fantasy
	• Students interpret graphs such as allele frequency over time, sample cladograms, table datasets, etc. and answer short response questions about patterns, limitations, implications, etc.
	
	SLO 6
	Final Essay
	• Students synthesize course evidence and must identify evidence for a topic from their respective disciplines to draw conclusions about how selective pressures and constraints shape the changes in systems over time. This allows students to reflect on how evolutionary and systems perspectives can be applied in unexpected ways to understand history, culture, ethics, media, politics, etc.

Quantitative Literacy: **Competency in quantitative literacy represents a student's ability to use quantifiable information and mathematical analysis to make connections and draw conclusions. Students with strong quantitative literacy skills understand and can create sophisticated**	**SLO 1** Weekly Quizzes • Graph interpretation (population growth, carrying capacity, time series comparisons, etc.) In-class Activities

arguments supported by quantitative evidence and can clearly communicate those arguments in a variety of formats (using words, tables, graphs, mathematical equations, etc.).	• Low-stakes practice: think-pair-and-share, group puzzles (Construct phylogenetic relationships using physical cards/paper slips), quick-writing, etc.

Student Learning Outcomes (SLOs)
Students should be able to:
1. Interpret Information
   a. **Explain information presented in mathematical forms (e.g., equations, graphs, diagrams, tables, words).**
2. Represent Information
   a. **Convert information into and between various mathematical forms (e.g., equations, graphs, diagrams, tables, words).**
	SLO2
	Weekly Quizzes
	• Data conversion – Converting tables to graphs, compute slope and other metrics, write interpretation

Content Criteria for Natural & Physical Sciences (GT-SC1)	Course Mapping

1. The <u>lecture content</u> **of a GT Pathways science course (GT-SC1 or GT-SC2): Students should be able to:**
   a. **Develop foundational knowledge in specific field(s) of science.**
   b. **Develop an understanding of the nature and process of science.**
   c. **Demonstrate the ability to use scientific methodologies.**
   d. **Examine quantitative approaches to study natural phenomena.**
 	
No lab
	1a
	• Students will learn the basics of evolutionary biology and ecology including natural selections, adaptation, coevolution and interactions (mutualism, predator/prey, host/parasite), constraints and trade-offs, food webs, etc.
	• Understanding how variation, heredity, and reproductive success drive changes in systems over time (evolution) in a general sense such that students can observe these forces in action all around them
	
	1b - 1d
	The Alien Worlds project allows students to simulate how scientists make sense of nature through observation, comparison, and hypothesis formulation. The speculative nature of the assignment offers the chance to apply evolutionary principles and ecological reasoning in imaginative ways.
	• Students must make initial observations/decisions about environmental constraints such as terrain, climate, gravity, etc.

	• They must form hypotheses about how traits/organisms/ecosystems would evolve and reflect on eco/eco principles as they construct food webs and lineages. • Although data may be fictional, students will apply the scientific method as they work to form explanations, predict interactions, and rationalize evolutionary outcomes. • Students will be asked to incorporate quantitative thinking and methodology. This will vary depending on the project, but could include calculating energy flow between trophic levels, matrices and network analysis, estimating species diversity and relative abundance, etc.

Required Text/Course Materials: The course will attempt to offer an open-source textbook covering the fundamentals of ecology and evolutionary biology such as this one, however, the final book is yet to be determined. Selections from popular science books, science journalism, or vetted articles will supplement lectures. Readings may include historical accounts, mythological examples, science-fiction, and fantasy. Media examples may be used as well, such as movie snippets.

Course Policies:

Attendance

You are allowed one absence without penalty - no questions asked. Subsequent absences shall each result in a deduction from your participation points for the course. If you miss a seminar, please contact us by email in advance. We request that you DO NOT attend class if you are exhibiting any symptoms of sickness, which could include fever or chills, shortness of breath or difficulty breathing, cough, headache, loss of taste or smell, sore throat, body aches, and intestinal upset. You do not need a doctor's note to be excused, but excusal is not guaranteed without one. You are responsible for any course content missed.

Incomplete grade Policy

At the discretion of the instructor, a temporary grade of Incomplete "I" may be given to a student who demonstrates that they could not complete the requirements of the course due to circumstances beyond the student's control that were not reasonably foreseeable. A student must be passing the course at the time that an Incomplete is requested unless the instructor determines that there are extenuating circumstances. The student must meet with the instructor to sign a completion agreement form detailing all requirements necessary for the eventual grade change request form. If the course requirements outlined in the completion agreement are not completed and the grade change form is not received in the Office of the Registrar after a maximum of one year or by the time the student graduates, the grade will automatically be recorded on the academic record as a failing and grade changes will not be permitted by the Registrar.

Mitigating Circumstances – Unexpected School Closure (short-term or single day)

If a university closure impacts the completion of an important in-class activity such as an exam, the course schedule will be adjusted to account for this such that subsequent information will be covered in a later class period than originally planned. This may require streamlining instruction or simplifying expectations for assignments and in-class activities to make sure all learning objectives remain a priority.

Mitigating Circumstances – Unexpected School Closure (long-term or early semester completion)

If unexpected circumstances cause an early end to the semester, we will communicate promptly and transparently with students about the situation, the potential impact on the course, and the alternative grading plan. We will encourage students to submit any completed assignments or completed sections of essays. We will evaluate the quality and completeness of all submitted materials. If possible, we will conduct virtual one-on-one meetings with each student to discuss their progress, challenges, and any specific circumstances that may have affected their ability to complete the course objectives.

Final grades after mitigating circumstances will be reported based on cumulative points of all completed work relative to the total number of possible points up to the date of a school closure, essentially excusing any further assignments that would have been due. Students will still be strongly encouraged to complete their final assignments, if possible, but that would not necessarily be a requirement for the final grade, depending on when the school closure occurred.

Academic Integrity Policy

As put forth in the UNCO Student Code of Conduct and Honor Code, all members of the university are entrusted with the responsibility to uphold and promote the five core values of honesty, trust, respect, fairness, and responsibility. Academic misconduct is unacceptable in scholarship and conflicts with the academic and professional ethics and morals, as well as the values UNC strives to uphold. As such, forms of academic misconduct including but not limited to plagiarism, cheating, fabrication, and knowingly or recklessly encouraging or making possible any act of plagiarism, cheating, or fabrication are prohibited. Students who are judged to have engaged in academic misconduct may be subject to a zero or "F" on the work in question, a failing grade in the course, recommendation for expulsion from the program, and other disciplinary actions specified in the Sanctions for Misconduct. For more information regarding Academic Integrity, including institutional definitions of plagiarism and cheating, please visit http://www.unco.edu/dean-of-students/pdf/Student- Code-of-Conduct.pdf. We also invite you to come to us with any questions or concerns.

*This policy is especially important in the face of Artificial Intelligence (AI) usage. AI can be useful to help with brainstorming and exploring the connection between major concepts in the course. If you decide to use A.I. for any purpose, it is important that you maintain a complete record of all prompts and A.I. output. This documentation will be critically important to your defense if you are accused of academic misconduct misuse of A.I. tools. However, the use of AI is strictly prohibited for any writing submissions in this course. **All written submissions must be 100% student-generated and 0% AI generated.***

[**Artificial Intelligence Resources**](#) – This guide provides a list of some of the generative AI tools out there. The list is not exhaustive but provides links to common tools for images, research assistance, videos, etc. There is also AI citation guidance for APA, MLA, and Chicago styles.

[**Using Information Ethically**](#) – This guide's focus is understanding academic integrity and avoiding plagiarism. It includes a section on the ethical and responsible use of AI.

Course Grading Scale/Assignments: This course will follow a standard grading scale. In Canvas, some assignments such as reading reflections and in-class activities may be graded as complete (full credit) or incomplete (no credit). Other assignments such as weekly quizzes, exams, papers, and presentations will

be graded based on points. Rubrics will break down how scoring is conducted for each assignment. Final grades will be reported as letter grades according to the following percentages:

93 - 100% = A   87 – 89.9% = B+   77 – 79.9% = C+   67 – 69.9% = D+   < 60% = F
90 – 92.9% = A-   83 – 86.9% = B   73 – 76.9% = C   63 – 66.9% = D
                 80 – 82.9% = B-   70 – 72.9% = C-   60 – 62.9% = D-

Late Assignment submissions are discouraged, however, sometimes obstacles can interfere with students' abilities to submit on time. You should contact the instructor at least 24 hours prior to submission deadlines if you need to request an extension. All assignments should be turned in no later than three days after the original due date, unless otherwise arranged with the instructor prior to deadlines. If you are unable to meet this requirement you may receive a deduction of 10% in points value each week an assignment is late.

Preliminary Course Calendar/Schedule:

Week	Unit
1	Introduction to Ecology and Evolution and the scientific method
2	Natural selection and adaptation
3	Mechanisms or evolution: constraints, trade-offs, mutation, drift, gene flow
4	Speciation and phylogenetics
5	Community ecology and ecological interactions
6	Ecosystems and energy flow
7	Imaginative phylogeny assignment presentations
8	Biomes and global patterns of biodiversity
9	Midterm exam
10	Behavioral ecology and life histories
11	Evolution beyond biology: ideas, language, myths
12	Climate change and anthropogenic impact on ecology and evolutionary biology
13	Alien worlds assignment in-class group working period
14	Alien worlds presentations
15	Wrap up/TBD
16	Final paper due