Biol 415/615: Evolution

FALL 2018

# Course Information

## Instructor Information:

**Instructor:** Prof. Dr. Elizabeth Pringle  
**Office:** FA 227  
**Phone:** 775-784-6081  
**Email:** epringle@unr.edu  
**Office Hours:** Tuesdays 2:45-4pm

**Teaching Assistants:** Jared Fuller (jfuller@nevada.unr.edu),

Joshua Hallas (Jhallas@nevada.unr.edu),

Jessica Reimche (reimchej@gmail.com),

Su'ad Yoon (suady@nevada.unr.edu)

**Course Assistant:** Dr. Kelly Klingler (kbrieklingler@gmail.com)

## Course Description:

Pattern and process in the evolution of life on earth. This will be a challenging course that will require intellectual engagement and critical thinking. Evolution is the Department of Biology's "capstone" course for majors. Students will have the opportunity to synthesize all that they have learned in the major in the context of evolution and to think critically about the unifying themes of life. An emphasis will be placed on the student's ability to communicate scientific information effectively.

## Course Pre/Co-requisites:

Eng 102; Biol 300 and 314 or 315; Chem 201 or 202 or 203

## Textbook, course materials:

* *Evolution*, 4th edition by Douglas Futuyma & Mark Kirkpatrick, 2017 (Sinauer Associates) – Available in the ASUN bookstore
* Top Hat interactive software – check your email for invitation
* Additional readings and assignments will be posted and assigned on Canvas

## Student Learning Outcomes:

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

* Describe scientific evidence of evolution using one or more of the following kinds of data: fossil record, molecular biology, comparative anatomy, physiology, or behavior.
* Explain the roles of mutation, genetic drift, gene flow, and natural selection in bringing about evolutionary change within populations.
* Differentiate between species concepts and/or explain the various mechanisms through which a species can arise.
* Critically evaluate, formulate, and effectively communicate scientific arguments relating to evolutionary biology.
* Determine the veracity and value of published information in evolutionary biology.

## Discussion sections:

The discussion sections are designed to facilitate active participation and critical thinking skills on the part of each student in order to master an understanding of course topics through lively discussion with other students and your TA.

Discussion sections are 50 minutes long. Over the course of the semester, two full discussion sections will be devoted to midterm review. There will be four discussion sections with workshops and related assignments pertaining to population genetics and phylogenetics. All other discussion sections will be devoted to discussions of papers from the primary scientific literature. For workshops and paper discussions, the first 40 minutes of class will be devoted to these activities, and the last 10 minutes to covering any questions from lecture or review assignments.

Discussion sections are key to your success in this course, and all of the material covered in these sections is fair game for exam material. Participation and discussion-section assignments will be valued accordingly in your final grade (see Course Requirements).

## Course Requirements:

1. Midterms and final exam (500 points)

* 2 midterm exams (150 points each)
* 1 final exam (200 points)

Exams will consist of problems, short answer questions, and a long essay section. Questions will be based on material that is presented in lectures, discussion sections, and review assignments. The textbook and readings should be used to consolidate your understanding of this material.

Make-up exams due to illness will be administered only for extreme and documentable circumstances.

1. Review assignments (100 points)

* There will be 10 review assignments worth 10 points each that are designed to consolidate your understanding of the week's material and help you review.
* Review assignments are open book but are intended to be completed independently and NOT within study groups. (This will help you assess your understanding of course material!) Written answers will be compared using a plagiarism prevention software, and unoriginal responses on short-answer questions will be subject to the University policy on Academic Dishonesty.
* Review assignments will be due by 11:59pm on Sunday night and should be completed directly on Canvas. **Late assignments will not be accepted or graded.** *It is your responsibility to ensure that assignments are successfully submitted on Canvas.*

1. Discussion sections (235 points)

* All students must attend their assigned discussion section, and that section only.
* 105 pts: Seven reports on papers assigned for discussion worth 15 points each that include a summary and a critique (see Paper Summary & Critique Guidelines on Canvas for more information). These reports must be **uploaded to Canvas before your section** **AND** turned in to your TA **on paper** at the beginning of your section on the day the paper is to be discussed.
* 30 pts: Leading a paper discussion. Each student will be part of a group that will lead one paper discussion over the course of the semester. Group assignments will be made at the first discussion section.
* 60 pts: Participation and engagement in oral discussions of course material and scientific papers over the whole semester.
* 40 pts: Four workshop write-ups, 2 for the PopG Workshop and 2 for the Phylogeny Workshop, worth 10 points each. These assignments are due to your TA **on paper** at the beginning of your section on the due date.
* All written assignments will be assessed for originality, and unoriginal responses will be subject to the University on Academic Dishonesty.
* **Late assignments will not be accepted or graded.** *It is your responsibility to make sure that your assignments are turned in to your TA on paper and on time.*

1. Lecture participation (100 points)

* Participation during lecture will be assessed via the questions on the Top Hat interactive software and personal observations of the instructor. Most Top Hat questions will be weighted 80% participation:20% correctness. Discussion questions will be scored for appropriate participation only.

1. **\*\*\*Extra credit: up to 20 points** ­­– Write a 1-2 page essay explaining how evolutionary biology is relevant to your future career and/or your life in the 21st century. The essay should include a strong thesis statement (https://writingcenter.unc.edu/tips-and-tools/thesis-statements/) and paragraphs that back up your thesis. Essays must be uploaded to Canvas under the Extra Credit assignment by **11:59pm on Tuesday, Dec 11**, the last day of class. Plagiarism will be treated as seriously as it is on required assignments and will be subject to the University Academic Standards policy on Academic Dishonesty.

## Grading Scale:

A 93% - 100%

A- 90% - 92.9%

B+ 87% - 89.9%

B 84% - 86.9%

B- 80% - 83.9%

C+ 77% - 79.9%

C 74% - 76.9%

C- 70% - 73.9%

D+ 67% - 69.9%

D 64% - 66.9%

D- 60% - 63.9%

F <60%

# University Policies

## Statement on Academic Dishonesty:

The University Academic Standards Policy defines academic dishonesty, and mandates specific sanctions for violations. See the University Academic Standards policy: [UAM 6,502](https://www.unr.edu/administrative-manual/6000-6999-curricula-teaching-research/instruction-research-procedures/6502-academic-standards).  
*1. Plagiarism:* defined as: (1) the appropriation of another person's ideas, processes, results, or words without giving appropriate credit; (2) the submission of ideas, processes, results or words not developed by the student specifically for the coursework at hand without the appropriate credit being given; or (3) assisting in the act of plagiarism by allowing one's work to be used as described above.

*2. Cheating:* For purposes of this policy, cheating is defined as:

(1) obtaining or providing unauthorized information while executing, completing or in relation to coursework, through verbal, visual or unauthorized use of books, notes, text and other materials;  
(2) unauthorized collaboration on an assignment (including the Review assignments)  
(3) turning in the same work in more than one class (or when repeating a class), unless permission is received in advance from the instructor;  
(4) taking an examination for another student, or arranging for another person to take an exam in one's place;  
(5) altering or changing test answers after submittal for grading;  
(6) altering or changing grades after grades have been awarded;  
(7) altering or changing other academic records once these are official; and/or  
(8) facilitating or permitting any of the above-listed items.

For purposes of this definition of cheating, the term "unauthorized" is defined as not obtaining direct or explicit approval of the course instructor. For purposes of this definition of cheating, the term "coursework" is defined as an examination, laboratory experience or report, papers, homework or quizzes or any other class assignment or class activity.

Statement of Disability Services:

Any student with a disability needing academic adjustments or accommodations is requested to speak with me or the [Disability Resource Center](http://www.unr.edu/drc) (Pennington Achievement Center Suite 230) as soon as possible to arrange for appropriate accommodations.”

**This course may leverage 3rd party web/multimedia content, if you experience any issues accessing this content, please notify your instructor.**

## Statement on Audio and Video Recording:

Surreptitious or covert video-taping of class or unauthorized audio recording of class is prohibited by law and by Board of Regents policy. This class may be videotaped or audio recorded only with the written permission of the instructor. In order to accommodate students with disabilities, some students may have been given permission to record class lectures and discussions. Therefore, students should understand that their comments during class may be recorded.

**The University of Nevada, Reno is committed to providing a safe learning and work environment for all. If you believe you have experienced discrimination, sexual harassment, sexual assault, domestic/dating violence, or stalking, whether on or off campus, or need information related to immigration concerns, please contact the University's Equal Opportunity & Title IX office at 775-784-1547. Resources and interim measures are available to assist you. For more information, please visit the** [**Equal Opportunity and Title IX**](https://www.unr.edu/equal-opportunity-title-ix) **page.**

## Statement for Academic Success Services

Your student fees cover usage of the [Math Center](http://www.unr.edu/mathcenter/) (775) 784-4433, [Tutoring Center](https://www.unr.edu/tutoring-center) (775) 784-6801, and [University Writing Center](https://www.unr.edu/writing-center) (775) 784-6030. These centers support your classroom learning; it is your responsibility to take advantage of their services. Keep in mind that seeking help outside of class is the sign of a responsible and successful student.

## Method for communication with instructor and TAs

The use of messages within Canvas is encouraged for communication with the instructor or the TAs outside of class. In the event that a class must be cancelled, this information will be sent out via Canvas by the instructor or the TA.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **What** | **Day** | **Date** | **Class Topic** | **Reading** | **Review assignments** | |
| ***Module 1: Evolutionary Biology: an overview*** | | | | | | |
| 1 | T  Lecture | Aug 28 | Syllabus Overview;  Evolutionary Biology | CH 1 |  | |
|  | W  Section | Aug 29 | **NO SECTION** |  |  | |
|  | Th  Lecture | Aug 30 | Trees, they aren't just for hugging | CH 2 | **Review 1**, due Sept 3 | |
| ***Module 2: How Evolution Works*** | | | | | | |
| 2 | T  Lecture | Sept 4 | Population genetics – genetic variation | CH 4 |  | |
|  | W  Section | Sept 5 | Paper 1 (Lenski & Travisano), **SUMMARY AND CRITIQUE DUE** |  |  | |
|  | Th  Lecture | Sept 6 | Population genetics – genetic drift and gene flow | pp 165-177; 192-198 | **Review 2**, due Sept 9 | |
| 3 | T  Lecture | Sept 11 | The genetical theory of natural selection, part 1 | CH 5 |  | |
|  | W  Section | Sept 12 | PopG part I |  |  | |
|  | Th  Lecture | Sept 13 | The genetical theory of natural selection, part 2 | CH 5 | **Review 3**,  due Sept 16 | |
| 4 | T  Lecture | Sept 18 | Quantitative traits, part 1 | CH 6 |  | |
|  | W  Section | Sept 19 | PopG part 2  **PopG 1 ASSIGNMENT DUE** |  |  | |
|  | Th  Lecture | Sept 20 | Quantitative traits, part 2 | CH 6 | **Review 4**,  due Sept 23 | |
| 5 | T  Lecture | Sept 25 | Adaptation | CH 3, pp 183-188 |  | |
|  | W  Section | Sept 26 | Midterm 1 review  **PopG 2 ASSIGNMENT DUE** |  |  | |
|  | Th  Lecture | Sept 27 | Putting it together: how evolution works | CH's 3-8 |  | |
| 6 | T  Lecture | Oct 2 | **Midterm 1**  (material Aug 28-Sept 27) |  |  | |
| ***Module 3: Products of Evolution*** | | | | | | |
|  | W  Section | Oct 3 | Paper 2 discussion (SPECIATION)  **SUMMARY AND CRITIQUE DUE** |  | |  |
|  | Th  Lecture | Oct 4 | Species concepts | CH 9 | |  |
| 7 | T  Lecture | Oct 9 | Speciation | CH 9 | |  |
|  | W  Section | Oct 10 | Paper 3 discussion  (SEXUAL SELECTION)  **SUMMARY AND CRITIQUE DUE** |  | |  |
|  | Th  Lecture | Oct 11 | Sexual selection & evolution of sex | CH 10 | | **Review 5**,  due Oct 14 |
| 8 | T  Lecture | Oct 16 | Life history evolution | CH 11 | |  |
|  | W  Section | Oct 17 | Paper 4 discussion (COOPERATION/EUSOCIALITY)  **SUMMARY AND CRITIQUE DUE** |  | |  |
| **What** | **Day** | **Date** | **Class Topic** | **Reading** | | **Review assignments** |
|  | Th  Lecture | Oct 18 | Cooperation and sociality | CH 12 | | **Review 6**,  due Oct 21 |
| 9 | T  Lecture | Oct 23 | Coevolution & species interactions | CH 13 | |  |
|  | W  Section | Oct 24 | Paper 5 discussion (COEVOLUTION)  **SUMMARY AND CRITIQUE DUE** |  | |  |
|  | Th  Lecture | Oct 25 | Coevolution & species interactions | CH 13 | | **Review 7**,  due Oct 28 |
| ***Module 4: Macroevolution and the history of life*** | | | | | | |
| 10 | T  Lecture | Oct 30 | Inferring phylogenies | CH 16 |  | |
|  | W  Section | Oct 31 | Phylogeny Workshop 1 |  |  | |
|  | Th  Lecture | Nov 1 | Macroevolution | CH 20 | **Review 8**,  due Nov 4 | |
| 11 | T  Lecture | Nov 6 | Biogeography | CH 18 |  | |
|  | W  Section | Nov 7 | Phylogeny Workshop 2  **PHYLOGENY 1 ASSIGNMENT DUE** |  |  | |
|  | Th  Lecture | Nov 8 | Major transitions: eukaryotes and multicellularity | Reading posted online | **Review 9**,  due Nov 11 | |
| 12 | T  Lecture | Nov 13 | The history of life | CH 17 |  | |
|  | W  Section | Nov 14 | Midterm 2 Review  **PHYLOGENY 2 ASSIGNMENT DUE** |  |  | |
|  | Th  Lecture | Nov 15 | DINOSAURS | Reading posted online |  | |
| 13 | T  Lecture | Nov 20 | **Midterm 2** (material Oct 3-Nov 15) |  |  | |
|  | W  Section | Nov 21 | **NO SECTION** |  |  | |
|  | Th  Lecture | Nov 22 | **THANKSGIVING--NO CLASS** |  |  | |
| ***Module 5: Humans and evolution*** | | | | | | |
| 14 | T  Lecture | Nov 27 | Our story: *Homo sapiens* | CH 21 |  | |
|  | W  Section | Nov 28 | Paper 6 discussion  (HUMAN EVOLUTION)  **SUMMARY AND CRITIQUE DUE** |  |  | |
|  | Th  Lecture | Nov 29 | Evolution and society | CH 22 | **Review 10**,  due Dec 2 | |
| 15 | T  Lecture | Dec 4 | Evolution and medicine | Reading posted online |  | |
|  | W  Section | Dec 5 | Paper 7 discussion  (EVOLUTION AND MEDICINE)  **SUMMARY AND CRITIQUE DUE** |  |  | |
|  | Th  Lecture | Dec 6 | Nothing in biology makes sense except in the light of evolution | Reading posted online |  | |
| 16 | T | Dec 11 | REVIEW |  |  | |
|  | Th | Dec 13 | **FINAL EXAM 12:10-2:10pm (200pts),** cumulative (emph. Nov 27-Dec 6) | | | |