Evolutionary Biology (GENE 3000)
T/Th 11 am – 12:15 pm, C127 Life Sciences Building
1-hour/week in breakout

INSTRUCTOR
Dr. Tessa Andrews
405 Biological Sciences
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OFFICE HOURS
By appointment. Email me at tandrews@uga.edu

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Nick Arthur
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Contacting the instructors using email: Please contact the instructor and teaching assistants using our UGA email addresses (listed above), NOT email in eLC. We will not check eLC email regularly. Per federal regulations, we cannot respond to inquiries about class unless they are sent through a secure email service. Therefore, please email us from your UGA email account, not a personal account. Also, please include a subject heading for each email you send to us that includes “GENE 3000.” This will allow us to prioritize your emails and more quickly respond to you. We will respond to emails within 24-48 hours. If you email over the weekend, you can expect a response on Monday morning.

BREAKOUT SESSIONS
There will be six different breakout sessions offered each week.

<table>
<thead>
<tr>
<th>Day</th>
<th>Time</th>
<th>Location</th>
<th>Leader</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday</td>
<td>5 – 6 pm</td>
<td>Life Sciences, C112</td>
<td>Nick</td>
</tr>
<tr>
<td>Tuesday</td>
<td>9:45 am – 10:45 am</td>
<td>Aderhold, 581</td>
<td>Nick</td>
</tr>
<tr>
<td>Tuesday</td>
<td>3 – 4 pm</td>
<td>Aderhold, 618</td>
<td>Nick</td>
</tr>
<tr>
<td>Wednesday</td>
<td>9 – 10 am</td>
<td>Life Sciences, C120</td>
<td>Nick</td>
</tr>
<tr>
<td>Thursday</td>
<td>5 – 6 pm</td>
<td>Life Sciences, C112</td>
<td>Nick</td>
</tr>
<tr>
<td>Friday</td>
<td>10 – 11 am</td>
<td>Life Sciences, C120</td>
<td>Nick</td>
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Breakout sessions will be used to augment class time and are required (see “Breakout sessions” below).

GETTING YOUR QUESTIONS ANSWERED
There are multiple ways to find an answer to your questions about GENE 3000:

1. Read the syllabus carefully. It answers many common questions.
2. Post your question on the discussion board called “Questions about GENE 3000”. In this way, everyone can benefit from the questions asked and answered. You may find that your
question has already been answered on the discussion board or that you are able to answer other students’ questions.

3. Ask a TA, either by email or in a breakout session. Please contact a TA about any grading questions.

4. Ask the instructor. I’m happy to answer questions before and after class. Please use options #1-3 before emailing me. I will try to respond to course email within 24-48 hours Monday through Friday, but I have 500 students and am not always able to answer questions as quickly as I would like to. If you email me to ask a question that could have been answered using options #1-3, I will suggest you try those options.

COURSE RESOURCES

• **Notes, powerpoints, cases, and problems from class.** These will be posted on eLC. It is your responsibility to make sure you have access to the eLC site. Please email Dr. Andrews from your UGA email account if you need to be enrolled.

• **Readings:**
  - *Evolutionary Analysis, 5th edition* (Herron and Freeman). This text is **OPTIONAL.** I will not assign specific readings from this book, but it may be a helpful resource for the course. Feel free to buy a digital version, used version, or older edition. See the section about “Independent learning guides” below to learn more about how the textbook will be used in class.
  - *The Journey of Man: A Genetic Odyssey* (Wells). This text is **REQUIRED.** You need to have read this entire book by Thursday November 20. Please plan accordingly. If you prefer to work slowly through a text, start mid-semester. Alternatively, you can plan to read the book over Thanksgiving break. Either way, you are responsible for reading and understanding the text. The class will include at least one assignment and exam questions to assess what you have learned from the book.
  - **Other assigned reading:** There will be other assigned reading for the class, including research articles. These will be posted on eLC.

• **Top Hat ([https://tophat.com/](https://tophat.com/)):** TH is a web-based response system. You will use this tool to respond to questions in class. UGA is sponsoring FREE Top Hat accounts for students this semester, so all you need to do is register for an account. Most commonly you will use the texting function on your phone to respond to questions in class. On specified days when laptops are allowed, you may opt to use a laptop or other wifi enabled device to respond to Top Hat questions.

COURSE OBJECTIVES

The overall objectives for this course are for students to:

• Be able to explain and apply evolutionary concepts and principles to novel scenarios, including:
  - The origin and role of genetic variation in populations
Adaptive genetic change in populations, including adaptations that may seem to contradict the “survival of the fittest”
- Non-adaptive genetic change in populations
- How evolutionary relationships can be understood using molecular genetics and phylogenies
- The earliest life on earth, origins of multicellular life, and the evolution of tetrapods
- Origin and extinction of species
- Human evolution
- Evidence for evolution and how evolution is studied

- Demonstrate skills in scientific reasoning and problem-solving, including:
  - Reason about scientific principles, theories, and models
  - Analyze and evaluate scientific explanations and predictions
  - Reason about the design and execution of research
  - Interpret patterns in data presented in tables, figures, and graphs

- Find and use reputable sources of information to help you learn concepts and principles in evolutionary biology
- Read and critically analyze peer-reviewed journal articles or excerpts from articles
- Be able to explain evolution concepts to non-biologists, such as patients, friends, non-biology majors.
- Come to see yourselves as someone who can access, understand, and use peer-reviewed literature in biology.
- Gain an appreciation of the benefits of research in evolutionary biology to society, and how it helps us solve problems in our lives

COURSE ORGANIZATION AND DESIGN
The course is divided into four (4) units.

<table>
<thead>
<tr>
<th>Unit</th>
<th>Approximate Dates</th>
<th>Exam date</th>
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<tbody>
<tr>
<td>Unit 1. Selection I - Natural selection and variation</td>
<td>August 19 – September 18</td>
<td>Thurs. Sept. 18</td>
</tr>
<tr>
<td>Unit 2. Selection II- Adaptation</td>
<td>September 23 – October 14</td>
<td>Tues. Oct. 14</td>
</tr>
<tr>
<td>Unit 3. Non-adaptive evolution and speciation</td>
<td>October 16 – November 4</td>
<td>Tues. Nov. 4</td>
</tr>
<tr>
<td>Unit 4. History of life and macroevolution</td>
<td>November 6 – December 4</td>
<td>Thurs. Dec. 4</td>
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Each unit will be outlined in a Unit Calendar, which will be posted in the corresponding Content folder on eLC at the beginning of the unit. The unit calendars will list learning objectives, readings, assignments, and in-class activities on a day-by-day basis. You are responsible for downloading the
unit calendars at the beginning of each unit, and completing the readings, assignments, and exams as noted on the calendars.

**COURSE ACTIVITIES**

1. **Independent learning guides.** Instead of asking you to read a certain section of a specific textbook, there will be 5-10 class periods in the semester where I provide you with an “Independent learning guide.” This guide will list the learning objectives I expect you to be able to achieve by the due date specified. You can, and should, use multiple resources to help yourself meet the learning objectives. I will provide a short list of resources that might be useful, including textbook sections, and I encourage you to find additional sources of information.

2. **Reading quizzes.** There will be quizzes associated with reading assignments and independent learning guides. Quizzes will be given in class and you will not know ahead of time that it is a quiz day. Anytime there is assigned reading listed in the Unit calendar, there may be a reading quiz at the beginning of class. **Reading quizzes will be worth a total of 6 points.** You will be most successful in this class if you complete all of the readings and the independent learning guides. There will be no make-up reading quizzes, but your lowest reading quiz grade will be dropped.

3. **Assignments (e.g., Cases/Problems/Modules).** There will be approximately one assignment per week. These exercises will require you to apply knowledge you have gained from the reading and class discussion to real-life scenarios. The exercises will require you to understand and use evolutionary concepts, rather than simply memorizing facts. **All assignments together will be worth 32 pts.** There will be no make-up assignments. If you miss one assignment, the average grade from your other assignments will be used to replace the 0 you earned. If you miss a 2nd assignment you will earn a 0.

4. **Groups.** You will engage in group learning in this course. You will engage in discussions in small groups in class and, when directed, and will have the option to complete some assignments as a group. Explaining your thinking and analyzing what other students say will help you develop deeper understanding of concepts in evolutionary biology, which will be crucial to doing well on exams. I strongly encourage you to identify 2-3 people you would like to work with throughout the semester, get to know them, and sit with them each day. If, at some point, your group is not meeting your expectations, find new students to work with. I will not assign groups unless requested.

5. **In-class questions.** I will be asking questions in class via Top Hat (TH). You will text your responses using your cell phone. UGA is paying for each student to have a FREE Top Hat account this semester, so all you need to do is register for an account (see directions on eLC). Asking questions in Top Hat will allow me to gauge your understanding of key concepts and plan my teaching accordingly. **You will earn points based on the percent of Top Hat questions you respond to in class: 10 pts (full credit) for responding to 90% of the questions.** For lower than 90%, you will receive that percentage (e.g. if you earn 85%, you earn 8.5 pts). **It is your responsibility to make sure your responses are recorded as you submit them.** Please contact Top Hat technical support if you are having problems:
   - FAQs at: https://support.tophatmonocle.com/hc/en-us
6. **Breakout sessions.** Breakout sessions will be run by the teaching assistants. We will use breakout sessions for several purposes: (1) finish discussions started in class, (2) additional problem solving, (3) review for exams, and (4) discussion of exams. You can attend any session that you like. You are encouraged to attend all breakout sessions, and **you must participate in at least 10 sessions to earn full credit (10 pts) for breakouts.** We will not have breakout sessions the first or last week of classes.

7. **Exams.** There will be one examination at the end of each unit (42 points each). **For each exam, there is a set of learning objectives that you should be prepared to successfully complete.** We will practice many, but not all, of these objectives in class, but you are responsible for making sure you can meet the learning objectives for each exam. The last exam of the semester (Exam 4) can be used to replace your lowest exam score from the first three exams. **There are no make-up exams or final in this class.** If you miss an exam, for any reason, the replacement exam (exam 4) will be used to replace your missing score. Exams will be short-answer questions. Some questions will assess your knowledge and comprehension of evolutionary concepts, but most exam questions will involve solving problems similar to those we have solved in class. The exam for each unit will focus on assessing your knowledge and skills related to the content of that unit, building as relevant on your learning from the previous unit(s).

8. **Evaluation of the course and student learning.** A few times during the semester, I will assign questions to assess your knowledge before and after instruction on an evolutionary topic. At other times, I will ask you to provide feedback about the course. **You will earn 10 points for these evaluations.**

### COURSE GRADING

You will earn points in the course as follows:

<table>
<thead>
<tr>
<th>Activity</th>
<th>Points</th>
<th>Approximate % of final grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reading quizzes</td>
<td>6 pts</td>
<td>3%</td>
</tr>
<tr>
<td>Cases / Problem sets/Modules</td>
<td>32 pts</td>
<td>16%</td>
</tr>
<tr>
<td>In-class questions (TH)</td>
<td>10 pts (respond to TH questions in class)</td>
<td>5%</td>
</tr>
<tr>
<td>Breakout session</td>
<td>10 pts (participate in any 10 breakout sessions, 1 pt each)</td>
<td>5%</td>
</tr>
<tr>
<td>Exams (4, 1 replacement)</td>
<td>132 pts (44 points each)</td>
<td>66%</td>
</tr>
<tr>
<td>Evaluation</td>
<td>10 pts (1-3 points each)</td>
<td>5%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>200</strong></td>
<td><strong>100%</strong></td>
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</tbody>
</table>
Your letter grade for the course will be calculated at the end of the semester and will be based on your final percentage. Your final percentage will be determined by adding the total number of points you have earned, dividing it by the total number of points you could have earned (200 points), and multiplying by 100. I will use the following scale for determining letter grades:

\[
\begin{align*}
100-93\% & : A \\
92-90\% & : A-\\
89-87\% & : B+ \\
86-83\% & : B \\
82-80\% & : B-\\
79-77\% & : C+ \\
76-73\% & : C \\
72-70\% & : C-\\
69-60\% & : D \\
<60\% & : F
\end{align*}
\]

To be successful in this course, I encourage you to:

- **Focus on the learning objectives.** The exams will assess your accomplishment of the learning objectives. Use the learning objectives as a guide for what to focus on when you are completing assignments and studying for exams.
- **Not spend time memorizing.** You can look up facts when you are working on assignments. Some facts (e.g., equations) will be provided for you on exams so that you can focus on applying knowledge rather than just regurgitating facts. You will come to remember the most important facts as you practice solving problems.
- **Study with classmates,** including working on cases and problems together. **You must submit all work in your own words,** but working with classmates will help you understand key concepts behind the cases and problems.

Education research has demonstrated that the more opportunities students have to verbalize their thinking either in writing or aloud, the more students learn. Education research has also shown that when instructors prompt students with questions, rather than giving explanations themselves, students learn more. Thus, I have designed the course to maximize your opportunities to explain your thinking to yourself, your classmates, and the instructors. There will be opportunities to solve problems in and out of class throughout the semester. By solving problems:

- You will be able to figure out what you don’t know and study accordingly,
- We will be able to figure out what you don’t know and tailor our instruction accordingly,
- You will be better prepared to solve problems both on exams and throughout life, especially if you pursue a career involving science or evidence-based decision making.

I will make active use of the eLC Discussion Board for this course. You are encouraged to post questions you have about course content on the Unit discussion boards, and to respond to your classmates’ questions. No student will be penalized for posting an incorrect idea — you should consider this a safe venue for articulating and checking your thinking. If you are interested in a
career in the allied health professions (physician, dentist, nurse, physician’s assistant, etc.), this is a place for demonstrating your ability to interact with others in ways that are respectful, empathetic, and informed.

In posting to the Discussion Board, please adhere to UGA’s Code of Conduct (http://conduct.uga.edu/code_of_conduct/index.htm) by following these rules:

- **Treat everyone with respect**: Disagreements are fine, but the discussion should not get personal. There is a big difference between “I think you’re wrong” and “I think you’re an idiot” (or worse). Please keep your posts civil.
- **Stay on topic**: Discussions can meander, but the point of the discussion boards is to discuss evolutionary biology (not your plans for the weekend). Please keep your posts related to the content of the course. Off-topic posts may be moved or deleted without notice.
- **Stay within the boundaries**: You may not post messages that are illegal, harassing, intimidating, defamatory, profane, or indecent. Never say something on the Discussion Board that you wouldn’t say in front of a group of people or face-to-face.
- **No UGA website can be used for advertising**: This means that you are not allowed to sell your notes or post URLs for note-taking, tutoring, or other products or services on eLC.

**OTHER COURSE POLICIES**

**Academic Honesty and the Honor Code**: Academic Honesty means performing all academic work without plagiarism, cheating, lying, tampering, stealing, giving or receiving unauthorized assistance from any other person, or using any source of information that is not common knowledge without properly acknowledging the source. The academic honesty policy of the University is supplemented (not replaced) by an Honor Code which was adopted by the Student Government Association and approved by the University Council May 1, 1997, and provides: “I will be academically honest in all of my academic work and will not tolerate academic dishonesty of others.” All students agree to abide by this code by signing the UGA Admissions Application. For more information on Academic Honesty and the Honor Code, please refer to: http://ovpi.uga.edu/student-opportunities-resources/student-resources.

**Attendance Policy**: The course content and discussions will be tailored to build on your existing knowledge and address your questions and concerns, so your attendance is essential. There will be times you will have to miss class because of an emergency or other professional or educational commitment. I have structured the grading in this course to minimize the impact of missing a class for legitimate reasons by scheduling a replacement exam, allowing you to miss up to 10% of the TH in-class questions and still earn full credit, and allowing 1 missed assignment. Please contact classmates to get up to speed on what you missed. Please do not email the instructor to report an absence unless you have missed your 2nd assignment for the semester.

**Disability Accommodations**: Reasonable accommodations are available for students who have a disability. The Disability Resource Center in the Division of Student Affairs (114 Clark Howell Hall; 706-542-8719 voice; 706-542-7719 fax; 706-542-8778 tty) coordinates accommodations and services for
students with disabilities. Please notify the instructors of any accommodations needed for the course.

**Technology during class and exams:** Laptop use will only be allowed on some class days and only for part of the class. Computers, cell phones, or other devices are prohibited during exams. Any student using technology during an exam will be asked to leave and will receive a 0 on the exam.

**Regrade requests:** All exams are graded anonymously by the TA’s. We try to grade as quickly and fairly as possible. However, if you believe that a question was graded incorrectly and want it regraded, please submit a signed, written request to the professor within 1 week of receiving the graded exam. Requests must include a *scientific explanation* of why you think your response should earn more points. **Regrade requests that are not legitimate (e.g., lack an explanation or are incorrect) will result in the loss of a point.** No exams completed in pencil will be regraded. The professor will regrade the question. If a math error was made in calculating your grades, please notify a TA of the mistake during class or a breakout session and they will fix it. In other words, there is no need to provide a scientific explanation for a math error or to contact the instructor.

**Please note:** in grading exams, we determine acceptable answers by looking at how the class as a whole answered a question. In this way we can fairly decide what we will accept as a correct answer. Since we have no other exams to compare to in a regrade, the question will be regraded using the faculty member’s ideal answer as the standard. **Since it is possible that the new grade for a question will be lower than the original grade, please consider your requests for regrades carefully.** This policy is meant to make regrades as fair as possible to the entire class: it should not deter you from discussing your exam with the TA’s or the faculty.

**DISCLAIMER:**

The course syllabus is a general plan for the course; deviations announced to the class by the instructors may be necessary.