

**Course Description:** IB536, Evolutionary Biology, Examines fundamental topics for understanding evolution, the unifying principle for all of biology. Evidence for evolution is all around us, and learning how to view life through 'evolutionary tinted' lenses greatly changes our perspective. Emphasizes the creative ways that scientists are gaining insights into how and why life evolved as it is. Provides scholarly evidence for the basis of evolution to refute non-academic arguments.

### **General course information**

#### **Instructor information:**

Dr. Nick Anderson  
2002D Natural History Building  
[nndrsn2@illinois.edu](mailto:nndrsn2@illinois.edu)  
Office hours: Tuesday 7-8 pm Central time and by appointment

**Course meetings:** The course will primarily meet virtually and asynchronously. Please reserve Tuesdays, from 7-8 pm Central Time, for virtual, synchronous meetings. These sessions are a great place to ask questions or to get feedback on your Independent Project or other course assignments.

**Website:** The course Moodle page is at: <https://learn.illinois.edu/>

**Credit:** 4 graduate hours

**Prerequisites:** None

**Restricted Audience:** For graduate students in the Online Masters of Science Teaching Biology (OMST) and Master's in Integrative Biology (MS in IB) programs.

**Required textbook:** The required materials for this course are available for free with your UIUC account through the library or Moodle.

- Losos et al. 2014. [The Princeton Guide to Evolution](#). Princeton University Press. **Access through your UIUC account (the link above should work on or off campus).**
  - **Optional:** If you must have a paper version, it can be ordered from Amazon: <https://www.amazon.com/Princeton-Guide-Evolution-Jonathan-Losos/dp/069117587X/>.

**Optional textbooks:** Students sometimes request **optional** textbook recommendations. These books are not required, and the course will run independently from these resources. While I list the most recent edition, you will likely find previous editions for significantly cheaper with much of the same information.

- Futuyma and Kirkpatrick. 2022. [Evolution. 5th Edition](#). Sinauer Associates (an imprint of Oxford University Press). ISBN-10: 0197619614. ISBN-13: 978-0197619612.
- Emlen and Zimmer. 2019. [Evolution: Making Sense of Life. 3rd Edition](#). W.H. Freeman. ISBN-10: 1319079865. ISBN-13: 978-1319079864.
- Freeman and Herron. 2013. [Evolutionary Analysis. 5th Edition](#). Pearson. ISBN-10: 0321616677. ISBN-13: 978-0321616678

### **Course Goals and Objectives**

This course aims to provide you with a solid foundation in evolutionary principles.

By the end of this course, you will be able to:

- Appreciate evolutionary biology as a discipline and identify its interconnectedness with all subdisciplines of biology.
- Read and synthesize advanced texts and the primary literature related to evolution.
- Explain evolutionary principles to nonscientists using examples from current studies.
- Anticipate concerns and misconceptions about evolution, and know how to address them.

Module-specific objectives are listed in the weekly tabs.

## Course Structure

IB 536 is an online, graduate-level, 4-credit course. Please be aware that this course is accelerated; 16 weeks' worth of content will be covered in an 8-week time span. In a graduate-level, 4-credit course, students should expect to devote at least 6-8 hours per week to learning the advanced topics of this course (through video lectures and readings) and 8-16 hours per week to homework assignments and class projects. The instructor will be available for online and/or face-to-face consultation with students.

A course week is between Monday, 12:00 am Central Time, and Sunday, 11:55 pm Central Time.

### Topic Outline

1. History of evolutionary thought and misconceptions about evolution
2. Macroevolution, speciation, and phylogenetics
3. Evolutionary forces
4. Trait evolution
5. Behavior and its evolution
6. Evolution of sex
7. Adaptation to the biotic environment and coevolution
8. Advanced topics (as chosen by students for their Independent Project (IP) - see below)

## Course Components

**Weekly Overviews:** Each module will begin with the module overview, which will explain what the module is about, what learning goals are expected to achieve, and in what activities you will participate. Each module is designed with the same structure and activities unless otherwise specified. The activities are explained in detail below. You can find the due dates of specific assignments on each week's tab.

**Readings and Reading Quizzes:** Each module will contain a set of assigned readings. In some cases, optional or supplemental readings may be listed for further study. After completing the assigned readings, you will answer questions about the main ideas and key details. These quizzes are open-book.

**Lessons:** Each module will contain a multipart lesson with integrated questions. Lessons will build on the assigned readings and ask students to apply what they've learned to new situations.

**Discussion Forum:** For each module, you will address a discussion prompt. These assignments are meant to push you into novel areas related to, but not explicitly covered in, the course's reading and lesson assignments. There will be two parts to your discussion grade. First, you will create an "Initial Post," which addresses the discussion question or task. Next, you will post two "Replies" to your peers' posts giving them constructive feedback and engaging in a dialogue. You are also encouraged to facilitate the thread within your original post by responding to those who reply to your initial post.

**Community Participation:** Community participation in an online learning environment is essential to your commitment to engagement with our course. Thus, 10% of your overall course grade (graded out of 100 points) will come from a measure of your participation in our weekly live sessions and your involvement in our Social and Q&A Forums. We hope you will not see this "participation" as another box to check. Rather, we want to encourage you to engage with your peers to share your findings and thoughts. It will get easier after we break the ice, and it is bound to be fun and fulfilling.

- 50 points: **Social Forum postings and replies.** Each post is worth 20 points, and each reply is worth 10 points. (For a maximum of 50 points.)
- 50 points: **Q&A Forum postings and replies.** Each post is worth 20 points, and each reply is worth 10 points. (For a maximum of 50 points.)

**Live Sessions:** Each week on Tuesday nights from 7-8 pm Central Time, there will be a synchronous session in which all students will join together online at the same time to talk. These sessions will occur over Zoom, where you can text, video, or voice chat and see the computer desktop of the instructor. These sessions are a

great time to discuss course material, get feedback on your Independent Product, ask questions, and decompress about the semester.

**Independent Project (IP):** Evolutionary Biology is an incredibly large topic that is integrated throughout other biological subdisciplines. Even with the accelerated nature of this course, we cannot hope to cover everything in 8 weeks. To increase our coverage as a class, you will complete an independent project on an advanced topic in Evolutionary Biology that you will share with your classmates. In this way, you will gain a deeper knowledge and appreciation of a topic of your choosing and broader coverage of a more diverse set of topics than we would typically be able to cover.

The project comprises four parts: IP Proposal, IP Research Review, IP SciCom (science communication) or teaching tool, and IP Evaluation of Peer Work.

- The **IP Proposal** is an early checkpoint to ensure that everyone has selected a topic and that there is enough recent primary literature to complete the SciCom/Teaching tool and Research Review.
- The **IP Research Review** is a formal scientific writing assignment and should be the most information-dense. In this 1500-word essay, you will summarize the knowledge of the subject from a point in the past based on a starting resource (e.g., book chapter or review article), provide an update on the field using the primary scientific literature, and highlight future directions or unanswered questions in the field based on your gained knowledge and public interest using popular sources.
- The **IP SciCom or Teaching tool** asks you to distill the information you gather for your Research Review for your chosen target audience. That audience can reflect your existing teaching, extension, or outreach roles or an audience of your graduate student peers. Possible projects include a 5-minute video, a lab or classroom activity for students, or a 3-5 page comic or illustrated book. The project format will be approved during the IP Proposal stage.
- To encourage you to engage with your peers' SciCom or Teaching tools, you will critically evaluate four (4) projects during the **IP Evaluation of Peer Work**. Your feedback will help your classmate improve their tool for use in subsequent science communication or classroom use.

In satisfying the College of Liberal Arts and Sciences requirement that at least 20% of an online course's grade come from work that has the student's identity verified, you will be required to show your face at least briefly on camera for this project.

### Grading policies

**Academic Integrity:** This course will follow the University's Student Code (<http://studentcode.illinois.edu>). The code defines infractions of academic integrity, which include but are not limited to cheating, fabrication, and plagiarism. You are responsible for knowing what these infractions are and following these guidelines. If you do not feel you fully understand what constitutes plagiarism, please ask the instructor. Posting course content to online study help sites (e.g., CourseHero) violates the Student Code and will be treated accordingly.

#### Course grade breakdown:

Instructional Activity	Frequency	Grade Weight
Readings & Reading Quizzes	Weekly	15%
Lessons	Weekly	20%
Discussion Forum	Weekly	25%
Community Participation	Weekly	10%
Independent Project (IP)	(See below)	30% total
Proposal	Due module 3	(5%)

Research Review	Due module 6	(10%)
SciCom or Teaching tool	Due module 7	(10%)
Evaluation of peer work	Due module 8	(5%)
<b>Total</b>		<b>100%</b>

**Letter grades and cutoffs:**

Grade	Percentage
A+	96.5 - 100
A	93.5 - 96.49
A-	89.5 - 93.49
B+	86.5 - 89.49
B	83.5 - 86.49
B-	79.5 - 83.49
C+	76.5 - 79.49
C	73.5 - 76.49
C-	69.5 - 73.49
D+	66.5 - 69.49
D	63.5 - 66.49
D-	59.5 - 63.49
F	≤59.49

**Course Policies**

**Communication:** The Moodle Q&A forum is the quickest and most convenient place to interact with your instructor about general course or content questions. You can also check if your question has already been asked and answered. I regularly check the Moodle Q&A forum for new posts, while emails can sometimes become buried in my inbox. If your query is only relevant to you (military activation, DRES accommodations, extension on an assignment, etc.), please email me directly. Please send follow-up emails if I do not respond within 48-72 hours.

**Attendance:** Attendance for this course is defined broadly to include your asynchronous interactions through Moodle and synchronous meetings with the instructor and your classmates. Regular attendance and engagement with course materials are vital to your success in IB536. Student attendance is defined as active participation in the course as described in the syllabus. This course will have multiple mechanisms for student participation, which any of the following methods can document:

- Completion of assignments and/or quizzes
- Communication with the instructor
- Participation in the course forums
- Moodle logs of activity within the course material

- Participating (communicating via microphone, camera, or chat) in the synchronous sessions on Tuesday nights

As a component of attendance, student email, course announcements, and discussion forums should be checked frequently (daily is recommended). The student is solely responsible for checking updates related to the course. In the case of an anticipated absence, such as military deployment, the student should contact the instructor in advance and make arrangements to complete the required assignments. In the case of an emergency (illness/accident or death in the family), a student should contact the instructor as soon as possible, providing documentation supporting the need for any late submission of a graded event. Any documentation must be submitted no later than two weeks after the absence. If there is a chronic illness or multiple missed assignments, the student should work with the office of the Dean of Students to verify and document their absences. Students who miss many major assignments may have to withdraw from the class. If you have any questions regarding these policies, please contact the instructor. If you foresee having any long-term problems, please contact us immediately to make arrangements at the beginning of the course; such accommodations cannot be made after the fact. Late work will be assessed with a 10% penalty per day.

**Accommodations:** To obtain disability-related academic adjustments and/or auxiliary aids, students should contact both the instructor and the Disability Resources and Educational Services (DRES). You can contact DRES at 1207 S. Oak Street, Champaign, (217) 333-1970, or via email at [disability@illinois.edu](mailto:disability@illinois.edu).

Accommodation letters should be emailed to the instructor as soon as possible to ensure accommodations are provided starting as early in the course as possible.

**Sexual Misconduct Policy and Reporting Statement:** The University of Illinois is committed to combating sexual misconduct. Faculty and staff members are mandated reporters and must report any instances of sexual misconduct to the University's Title IX and Disability Office. In turn, an individual with the Title IX and Disability Office will provide information about rights and options, including accommodations, support services, the campus disciplinary process, and law enforcement options. A list of the designated University employees who, as counselors, confidential advisors, and medical professionals, do not have this reporting responsibility and can maintain confidentiality can be found here: <https://wecare.illinois.edu/resources/students/#confidential>. Other information about resources and reporting is available here: <https://wecare.illinois.edu>.

**Inclusivity Statement:** This course's effectiveness depends upon creating an encouraging and safe classroom environment. Exclusionary, offensive, or harmful speech (such as racism, sexism, homophobia, transphobia, etc.) will not be tolerated and, in some cases, subject to University harassment procedures. We are all responsible for creating a positive and safe environment that allows all students equal respect and comfort. I expect you to help establish and maintain an environment where you and your peers can contribute without fear of ridicule or intolerant or offensive language.

**General netiquette:** In any social interaction, certain rules of etiquette are expected and contribute to more enjoyable and productive communication. The following are tips for interacting online via e-mail or discussion board messages, adapted from guidelines originally compiled by ChuqVon Rospachand Gene Spafford (1995):

- Remember that the person receiving your message is someone like you, deserving and appreciating courtesy and respect.
- Avoid typing whole sentences or phrases in Caps Lock.
- Be brief; succinct, thoughtful messages have the greatest effect.
- Your messages reflect on you personally; take time to ensure you are proud of their form and content.
- Use descriptive subject headings in your e-mails.
- Think about your audience and the relevance of your messages.
- Be careful when you use humor and sarcasm; absent the voice inflections and body language that aid face-to-face communication, Internet messages are easily misinterpreted.
- When making follow-up comments, summarize the parts of the message you are responding to.
- Avoid repeating what has already been said; needless repetition is ineffective communication.
- Cite appropriate references whenever using someone else's ideas, thoughts, or words.

**Tentative Weekly Schedule** (instructor reserves the right to change as needed)

Module	Topic	Major Assignments Due
1 Due dates week of Mar 20	Introduction to evolution and the history of evolutionary thought	<ul style="list-style-type: none"> <li>• Orientation Activities</li> <li>• Module 1 (M1) Reading and Reading Quiz</li> <li>• M1 Lesson</li> <li>• Synchronous Session (Tues 7pm)</li> <li>• M1 Discussion (post, replies)</li> </ul>
2 Due dates week of Mar 27	Macroevolution, speciation, and phylogenetics	<ul style="list-style-type: none"> <li>• Module 2 (M2) Reading and Reading Quiz</li> <li>• M2 Lesson</li> <li>• Synchronous Session (Tues 7pm)</li> <li>• M2 Discussion (post, replies)</li> </ul>
3 Due dates week of Apr 3	Evolutionary forces	<ul style="list-style-type: none"> <li>• Module 3 (M3) Reading and Reading Quiz</li> <li>• M3 Lesson</li> <li>• Synchronous Session (Tues 7pm)</li> <li>• M3 Discussion (post, replies)</li> <li>• <b>Independent Project Proposal due</b></li> </ul>
4 Due dates week of Apr 10	Trait evolution	<ul style="list-style-type: none"> <li>• Module 4 (M4) Reading and Reading Quiz</li> <li>• M4 Lesson</li> <li>• Synchronous Session (Tues 7pm)</li> <li>• M4 Discussion (post, replies)</li> </ul>
5 Due dates week of Apr 17	Behavior and Its Evolution	<ul style="list-style-type: none"> <li>• Module 5 (M5) Reading and Reading Quiz</li> <li>• M5 Lesson</li> <li>• Synchronous Session (Tues 7pm)</li> <li>• M5 Discussion (post, replies)</li> </ul>
6 Due dates week of Apr 24	Evolution of sex	<ul style="list-style-type: none"> <li>• Module 6 (M6) Reading and Reading Quiz</li> <li>• M6 Lesson</li> <li>• Synchronous Session (Tues 7pm)</li> <li>• M6 Discussion (post, replies)</li> <li>• <b>Independent Project Research Review Due</b></li> </ul>
7 Due dates week of May 1	Adaptation to the Biotic Environment and Coevolution	<ul style="list-style-type: none"> <li>• Module 7 (M7) Reading and Quiz</li> <li>• M7 Lessons and Resources</li> <li>• M7 Discussion (post, replies)</li> <li>• <b>Independent Project SciCom or Teaching tool due</b></li> </ul>
8 Due dates week of May 8	Advanced topics and course wrap-up	<ul style="list-style-type: none"> <li>• <b>Peer review IP SciCom and Teaching tools</b></li> </ul>