

MSWI-260C, Evolution

Spring 2019

Department of Mathematics and Science, School of Liberal Arts and Sciences, Pratt Institute

Course Description:

This course provides a background in the fundamental principles of evolution and explores how these principles can be used to explain a diversity of patterns in nature. Through the readings, activities, and dialogue supported by the course, students will learn how to apply evolutionary concepts to both the natural and human-mediated world around them.

Upon completion, this course is worth three (3) credits. This course counts as both a *Math & Science Core Course* and a *General Education Writing-Intensive Course*.

Meeting Time: Tuesdays, 9:00 am to 11:50 am, Engineering, Room 111

Instructor: Dr. Christopher Jensen Associate Professor, Department of Math and Science <u>http://www.christopherxijensen.com/</u> Office: ARC Lower Level, Room G-53 Email: cjensen@pratt.edu Phone: 718-636-3572, x3572 from the BK campus

Office Hours: Tuesdays & Wednesdays from 2:30 - 4:00 pm, or by appointment

Course Goals:

- To appreciate the historical events and scientific work which have led to the science of evolution.
- To understand the mechanisms by which evolution occurs.
- To explore the diversity of species and understand their evolutionary origin and relatedness.
- To discover the evidence amassed in favor of evolutionary theories.
- To understand human evolution and our current impact on evolutionary processes.
- To apply evolutionary theories to the modern world.
- To refine students' ability to write about scientific ideas and scientific research through a process of drafting, feedback, and revision.

Learning Outcomes: Students who successfully complete Evolution will be able to ...

- explain the historical context in which the theory of evolution has been developed.
- describe how natural selection operates to produce adaptation.
- chronicle a diversity of adaptations and explain their function(s).
- depict the diversity of life and explain the origin of this diversity.
- analyze biological evidence relevant to evolution in the past and present.
- assess the degree to which scientific evidence favors different evolutionary theories.
- explain how evolutionary knowledge can be applied to human society and culture.
- perform research into the scientific literature that informs the written proposal and summary that accompany a creative *Term Project*.
- incorporate relevant scientific research into a creative *Term Project*.

Assessment Criteria:

Below is a summary of how you will be graded in this course. All grades will be posted on the *LMS*, so please take advantage of the fact that you can always know how you are doing in the course.

Contribution to Grade	Category	Description		
40%	Coursework	 There are five (5) main categories of coursework for which you will receive grades: 1. Each week there are one or more short-essay-based Reading Questions due two (2) hours before class starts. Based on the assigned readings for each day, these questions will provide you with the opportunity to demonstrate that you understood the material and to informally practice your writing about science. Reading Questions are worth ~7.1 of the 40 <i>Coursework</i> points. 2. During class, we'll be discussing ideas covered by course readings. I'll have questions for you; I will expect you to have questions for me. Come to class having read and thought about assigned readings, ready to actively engage in dialogue. To receive Participation credit you need to be present in class; to receive full participation credit you need to be actively engaged in class discussions and work. Based on your participation during each regular class session, I will assign you a specific grade and occasionally make comments on the strengths and weaknesses of your contribution. Participation is worth ~7.7 of the 40 <i>Coursework</i> points. 3. You will also complete Activities in class. Some of these assignments will be done individually, others will require group cooperation. I will be grading your work on each assignment based on its clarity of thought, level of insight, and contribution to class dialogue. Activities are worth ~15 of the 40 <i>Coursework</i> points. 4. During Week 08 each student will make a Term Project Proposal Presentations. These two assignments are worth ~4.2 of the 40 <i>Coursework</i> points. 5. There is one SimUText lab to complete; you will be given time in class to start this lab and get assistance from your instructor. This assignments are worth ~4.8 of the 40 <i>Coursework</i> grade (~1.2 of 40 points) will be based on miscellaneous assignments, all of which are listed on the <i>Learning Management System</i>. You are free to use any resource <i>other than another person</i> to complete all cours		
40%	Term Paper	The major independent assignment of this course is the production of a creative work that is informed by research into a topic or topics that are directly related to course content. This <i>Term Project</i> will be developed throughout the semester via an incremental process of planning, drafting, and refinement. This process emphasizes thoughtful conceptualization as a means of preparing to write and make. See the <i>Term Project Guidelines</i> for details.		
20%	Final Exam	This course ends with a cumulative Final Exam that will be taken in class on the <i>LMS</i> . Please make sure to bring your Pratt I.D. to class on the day of your Final Exam , as we will be taking this exam in a Pratt computer lab. The final will focus on broad concepts learned in the course rather than the regurgitation of scientific facts. As per the <i>Open Information Policy</i> , you may use anything but another person to complete the Final Exam .		



Under no circumstances will personalized extra-credit work be offered to any student



Course workload:

As a 3-credit lecture/seminar course in Liberal Arts and Sciences, the expectation is that you will devote at least 6 hours per week to the course in addition to the 3 hours per week spent in class. This out-of-class time will be dedicated to: course reading assignments (approximately 2 hours for careful reading — the reading material in this will introduce many new concepts and much new terminology); homework (approximately 0.5 hours); post-class review of lecture slides and feedback on classwork and homework (0.5 hours per week recommended); and work on the components of the "scaffolded" *Term Project* assignment (3 hours per week recommended). By following this "recommended" schedule of 6 hours per week outside of class, it will be entirely possible to avoid a pile-up of work around major deadlines.

Lateness and Absence:

- *Of Students*: I expect you to arrive to class on time. Lateness and absence adversely affect your classwork grade because work missed due to unexcused absence is counted as a zero. There is not a certain number of absences that lowers your grade or causes you fail, but the more classes you miss unexcused, the more points you lose.
- *Of Assignments*: Late **Reading Questions** will not be accepted. Other late assignments will be penalized by 10% per day.

Allowance days:

Each student in this course will be afforded ten (10) total "allowance days" that can be used to avoid the usual 10% per day lateness penalty for assignments. These allowance days should be used for missed deadlines that would not otherwise be excused (see below for what causes of lateness are excusable). Please email your instructor to indicate that you wish to use some of these allowance days for a particular assignment. You are free to wait until the end of the semester to indicate where you wish to use these days, but make sure not to allow the semester to come to an end before emailing your instructor. Remember that using allowance days on one component of the *Term Project* does not push back any of the subsequent deadlines for later components.

How to submit documentation for an excusable absence and/or missed deadlines:

There are very few legitimate reasons to miss all or part of a class session or for submitting assignments after the stated deadlines. Valid excuses include family emergencies and personal health issues. The following reasons <u>do not</u> excuse lateness or absence: oversleeping, excessive work load in other classes, inability to use the *Learning Management System*, or "forgetting". If you believe that you missed a class for a legitimate reason, please submit documentation that:

- 1. establishes a clear reason why you could not complete work and/or attend class; and
- 2. clearly delineates the period of time during which you were incapacitated.

Documentation should come from an appropriate source (*for example:* health care provider, employer, clergy) and include contact information that will allow your instructor to validate your excuse. Your instructor makes the final determination on what is and what is not a legitimate reason for missing class and/or submitting assignments after stated deadlines.

Absence from this class to complete responsibilities on campus:

The time allotted for each your courses is sacred: no instructor or administrator should ever require you to miss any of your regularly-scheduled class meetings. For this reason, you will not be excused for absences that result from being "pulled out" by another professor or by your major program. If you are asked to miss this class for any reason please contact your instructor immediately so that the matter can be quickly resolved.

This course concludes with a final exam, which takes place during the final week of classes at the regular class meeting time. It is possible that your major program may require you to attend a final critique/review that conflicts with the final exam for this course; any such conflicts must be identified well in advance of this final week. True finals-week conflicts will be resolved by scheduling your final exam in this course on the *Exam Conflict Day*, which takes place on the Monday before the beginning of finals week. Please let your instructor know as soon as you learn of an actual or potential conflict with the scheduled final exam in this course.

General Pratt Attendance Policy:

Pratt Institute understands that students' engagement in their program of study is central to their success. While no attendance policy can assure that, regular class attendance is key to this engagement and signals the commitment Pratt students make to participate fully in their education.

Faculty are responsible for including a reasonable attendance policy on the syllabus for each course they teach, consistent with department-specific guidelines, if applicable, and with Institute policy regarding reasonable accommodation of students with documented disabilities. Students are responsible for knowing the attendance policy in each of their classes; for understanding whether a class absence has been excused or not; for obtaining material covered during an absence (note: instructors may request that a student obtain the material from peers); and for determining, in consultation with the instructor and ahead of time if possible, whether make-up work will be permitted.

Consistent attendance is essential for the completion of any course or program. Attending class does not earn students any specific portion of their grade, but is the pre-condition for passing the course, while missing class may seriously harm a student's grade. Grades may be lowered a letter grade for each unexcused absence, at the discretion of the instructor. Even as few as three unexcused absences in some courses (especially those that meet only once per week) may result in an automatic "F" for the course. (Note: Students shall not be penalized for class absences prior to adding a course at the beginning of a semester, though faculty may expect students to make up any missed assignments.)

Pratt Institute respects students' requirements to observe days of cultural significance, including religious holy days, and recognizes that some students might need to miss class to do so. In this, or other similar, circumstance, students are responsible for consulting with faculty ahead of time about how and when they can make up work they will miss.

Faculty are encouraged to give consideration to students who have documentation from the Office of Health and Counseling. Reasonable accommodations for students with disabilities will continue to be provided, as appropriate.

Refer to the Pratt website for information on Attendance.

Policy on Incompletes:

Incompletes (INCs) can be given at the discretion of the instructor following the written request of the student. The student must furnish satisfactory proof that the work in question was not completed because of illness or other circumstances beyond the student's control. The student must understand the terms necessary to fulfill the requirements for the course and the date by which work must be submitted. If the work is not submitted by the understood date of submission – not exceeding the end of the following term – the incomplete will be converted to a failure. The agreement between the instructor and student must be documented and submitted to the department chair along with documentation proving that the student deserves the opportunity to make up missed work.

Extra-Credit Assignments that can improve your Coursework grade:

After each class you can answer a series of **Follow-Up Questions** on the LMS. If you emerge from class with a good understanding of the major ideas discussed, you should be able to complete these questions in very little time. The **Follow-Up Questions** are extra credit and represent a way to offset low in-class grades (or zeros caused by absence).

All students have the opportunity to complete an extra-credit assignment based on a trip to the *American Museum of Natural History* in Manhattan. The trip is self-guided, and you can complete this assignment any time before the due date of [ultimate due date here]. To receive credit for this assignment, you must also submit your original museum ticket to your instructor. Please see the LMS for the *Guidelines* to this assignment and a place where you can upload your assignment.

In total, Extra-Credit assignments can be used to supplement up to 15 of the 40 points awarded for *Coursework* in the calculation of your final grade. Extra-Credit cannot be used to improve credit earned for the *Term Project* or the *Final Exam*, and the maximum credit that can be earned for *Coursework* is 40 points.

Readings and Lab Materials:

You will be assigned a series of reading materials from books, popular science periodicals, and the scientific literature. You main textbook will be:

Zimmer, Carl. (2014). *The Tangled Bank: An Introduction to Evolution*, <u>Second Edition</u>. Roberts and Company, Greenwood Village, Colorado. (ISBN #978-1936221448). List price = \$83.99.

This book is required and can be purchased from Pratt's online bookstore (<u>http://www.pratt.textbookx.com/institutional/index.php</u>) or via any other retailer. All other readings will be posted on the *LMS*. You are encouraged to save paper by viewing these readings electronically (as opposed to printing them out). In addition to this book, you will be required to purchase one SimUText lab at a total cost of \$6.00 (please see <u>https://lms.pratt.edu/mod/page/view.php?id=94469</u> for purchasing information).

Open Information Policy and Honor Code:

You will never be required to memorize anything in this class: we maintain an "open information environment", so you may use your notes, books/articles, the internet, and other media to complete homework, in-class assignments, and exams.

MSWI-260C: Evolution syllabus, Spring 2019, page 4 of 10

HOWEVER: Unless <u>specifically stated otherwise</u>, all work in this class is to be completed <u>on your own</u>. You <u>may not</u> and <u>should not</u> obtain help from <u>any</u> other person to complete any of your work: this includes all homework, all exams, and individual assignments. You should also <u>not share</u> any of your individual work with other students. "Studying together", discussing material outside of class, and any other processing of the course materials <u>prior</u> to completing coursework is allowed and encouraged, but you need to do your own work. Students are asked to sign an oath to uphold and honor this code at the beginning of the semester, and are expected to take this commitment seriously even when violating the code would likely escape detection. Any violations of this policy will be considered cheating and reported as appropriate (see *Classroom Civility and Academic Honesty* below).

Learning Management System (LMS):

During the course of the semester, we will make extensive use of Pratt's *Learning Management System (LMS)*. I recommend that you use the *Firefox* browser to access the *LMS* via this page: <u>https://lms.pratt.edu/</u> (I discourage you from using the *my.pratt.edu* entrance point, as it is not always working). Use your ONEKEY username and password to log in. I expect you to check the *LMS* several times a week for announcements, reading assignments, and updates to your class grade (note that you can also set the LMS to send you email messages every time our class page is updated). I will be using the *LMS* to send email announcements throughout the semester, so please make sure that you check the email address listed under your *LMS* profile regularly. "I forgot to check my Pratt email" is an invalid excuse.

I try to make the assignments, announcements, and other documents I post on the *LMS* as universally-readable as possible. The only proprietary program you will need to have loaded onto your computer is *Acrobat Reader*, which can be downloaded here: <u>http://www.adobe.com/products/acrobat/readstep2.html</u>. I strongly recommend that you use *Acrobat Reader*, rather than another program, to read all of the PDF's provided in this class.

<u>*Important*</u>: If you experience any problems with the *LMS*, you should:

- 1. Report the problem to the *Service Desk* and receive a "ticket number" by one of four means:
 - a. visiting their office in the basement of the ARC Building; or
 - b. calling (718) 636-3765; or
 - c. emailing services@pratt.edu; or
 - d. using the "Computers & Technology Services" section of the "Get Help With" tab of <u>my.pratt.edu</u>.
- 2. Receive an email from the Service Desk assigning your problem a "ticket number".
- 3. Forward this email from the Service Desk to me.

In order for me to verify claims of *LMS* outages, you must contact the **Service Desk** <u>when the LMS</u> <u>problem occurs</u>, not hours or days later.

Reduced-Paper-Use Classroom:

Whenever possible, we will reduce the amount of paper that this course consumes. All of your out-of-class assignments will be submitted electronically via the *LMS*. Your work will be graded and returned electronically. Please do your best to reduce the amount of printing that you do for the course.

Academic Integrity Code:

When students submit any work for academic credit, they make an implicit claim that the work is wholly their own, completed without the assistance of any unauthorized person. These works include, but are not limited to exams, quizzes, presentations, papers, projects, studio work, and other assignments and assessments. In addition, no student shall prevent another student from making their work. Students may study, collaborate and work together on assignments at the discretion of the instructor.

Examples of infractions include but are not limited to:

- 1. Plagiarism, defined as using the exact language or a close paraphrase of someone else's ideas without citation.
- 2. Violations of fair use, including the unauthorized and uncited use of another's artworks, images, designs, etc.
- 3. The supplying or receiving of completed work including papers, projects, outlines, artworks, designs, prototypes, models, or research for submission by any person other than the author.
- 4. The unauthorized submission of the same or essentially the same piece of work for credit in two different classes.
- 5. The unauthorized supplying or receiving of information about the form or content of an examination.
- 6. The supplying or receiving of partial or complete answers, or suggestions for answers; or the supplying or receiving of assistance in interpretation of questions on any examination from any source not explicitly authorized.

(This includes copying or reading of another student's work or consultation of notes or other sources during an examination.)

For academic support, students are encouraged to seek assistance from the Writing and Tutorial Center, Pratt Libraries, or consult with an academic advisor about other support resources. Refer to the Pratt website for information on <u>Academic Integrity Code Adjudication Procedures</u>.

For more information on avoiding plagiarism, please see: <u>http://www.christopherxjjensen.com/teaching/for-students/#no-plagiarism</u>.

Rights of Students with Disabilities:

Pratt Institute is committed to the full inclusion of all students. If you are a student with a disability and require accommodations, please contact the Learning/Access Center (L/AC) at LAC@pratt.edu to schedule an appointment to discuss these accommodations. Students with disabilities who have already registered with the L/AC are encouraged to speak to the professor about accommodations they may need to produce an accessible learning environment.

Accessibility:

The Pratt campus and many of its buildings are historic in nature and thus not all spaces on campus are readily accessible and the accessibility of certain buildings and spaces on campus may not be immediately apparent to campus visitors. However all programs, services and activities will be accessible and Pratt will accommodate any individuals with a disability who wish to avail themselves of any of its programs or activities.

To facilitate ease of access to all programs and activities, you have the option to indicate if you require an accessible space, have any mobility restrictions (e.g. inability/difficulty navigating stairs), or have any similar considerations or concerns, when registering in advance or scheduling an appointment for any program or activity on campus. Appropriate measures will then be taken to ensure that the relevant programs or activities are readily accessible with the least amount of delay or inconvenience to you.

Students should contact the Director of the Learning/Access Center, Elisabeth Sullivan esulliv5@pratt.edu (718.636.3711) in advance, according to the procedures for requesting accommodations established by the Learning/Access Center. Requests for accommodation should be made as far in advance as reasonably possible to allow sufficient time to make any necessary modifications to ensure the relevant classes, programs, or activities are readily accessible. The Learning/Access Center is available to Pratt students, confidentially, with additional resources and information to facilitate full access to all campus programs and activities and provide support related to any other disability-related matters, and is located in the ISC Building, Room 104.

Security personnel, located at a booth inside the main gate at 200 Willoughby Avenue, are also available to assist visitors with directions, locating accessible routes, or providing any other assistance in navigating the campus grounds.

[SEE COURSE CALENDAR ON SUBSEQUENT PAGES]

Weekly Units:

Week	Date	Major Topic(s)	Key Questions	Readings	Events & Assignments
01	Jan. 22nd	The Origin of Evolution	 What were the earliest theories explaining evolutionary patterns? Who were the prominent scientists who contributed to early evolutionary theory? What led Darwin and Wallace to their theory of natural selection? 	Zimmer Chapters 1 & 2	 → Syllabus distributed → LMS Warm-up Assignments discussed → There are extra-credit Follow-Up Questions for this week
02	Jan. 29th	Genes, Traits, & Evolutionary Change	 What is the genetic basis for traits? Why is heritability a prerequisite for evolution? What are the different patterns inheritance can take? What is the role of mutation in evolutionary processes? 	Zimmer Chapter 5	 Reading Questions due 2 hours before your class section meets Class visits a computer lab: remember to bring your Pratt ID!! There are extra-credit Follow-Up Questions for this week Change your LMS profile image due, February 1st, 2019 @ 23:55 EST
03	Feb. 5th	The Fossil Record	 How does geological knowledge contribute to our understanding of evolution? How are fossils used to reconstruct evolutionary histories? What were some of the major evolutionary innovations of early life? What are "fossil intermediates" and why are they important? 	Zimmer Chapter 3	 Reading Questions due 2 hours before your class section meets There are extra-credit Follow-Up Questions for this week Purchase the SimUText lab by February 8th, 2019 @ 11:55 pm
04	Feb. 12th	The Tree of Life 1	 What are some ways that life might have gotten started? What is a phylogenetic tree? How do we classify extant organisms based on their evolutionary history? How do changes in genes lead to evolutionary diversification? 	Zimmer Chapter 4 & p. 194-198	 Reading Questions due 2 hours before your class section meets Class visits a computer lab: remember to bring your Pratt ID!! There are extra-credit Follow-Up Questions for this week

05	Feb. 19th	Natural Selection & Adaptation	 What is genetic drift and how does it cause evolutionary change? What is natural selection? How does natural selection produce adaptation? Why is genetic diversity needed in order for evolution to occur? How are behaviors adaptive? 	Zimmer Chapter 6 & p. 185-194 & 327-347	 Reading Questions due 2 hours before your class section meets There are extra-credit Follow-Up Questions for this week Term Project Initial Source List due February 24th, 2019 @ 11:55 pm
06	Feb. 26th	The Tree of Life 2	 How is DNA evidence used to construct phylogenetic trees and differentiate species? How does horizontal gene transfer complicate our understanding of evolutionary trees? What is evolutionary convergence? 	Zimmer Chapter 7 & p. 198-209	 Class visits a computer lab: remember to bring your Pratt ID!! Reading Questions due 2 hours before your class section meets There are extra-credit Follow-Up Questions for this week Flowers and Trees Lab due March 1st, 2019 @ 11:55 pm
07	Mar. 5th	Sex & Reproduction	 Why do some organisms reproduce sexually? How is sexual selection different from other forms of natural selection? What roles do conflict and cooperation play in reproduction? 	Zimmer Chapter 9 <i>This View of Life</i> "The Science of Sex Differences Is Complicated (and Biased)"	 Class visits a computer lab: remember to bring your Pratt ID!! Reading Questions due 2 hours before your class section meets There are extra-credit Follow-Up Questions for this week
	Mar. 12th	No Class (Spring Break)			
08	Mar. 19th	 Draft Term Project Proposal due in printed form when you arrive in class Scan of your "workshopped" Draft Term Project Proposal due two days after the in-class workshop 			

09	Mar. 26th	Speciation	 What is a species? How do we identify different species? What is the evolutionary process that generates new species? What drives the patterns of species diversity that we observe across the earth's ecosystems? 	Zimmer Chapter 10	 Reading Questions due 2 hours before your class section meets Class visits a computer lab: remember to bring your Pratt ID!! There are extra-credit Follow-Up Questions for this week Term Project Proposal due March 28th, 2019 @ 11:55 pm
10	Apr. 2nd	Macroevolution	 Why do extinctions occur? How common is extinction? What causes evolutionary radiations? What are "mass extinctions" and how have they influenced the evolutionary history of the earth? How does the current rate of extinction compare with the past? 	Zimmer Chapter 11	 Reading Questions due 2 hours before your class section meets There are extra-credit Follow-Up Questions for this week Choice Video for Coevolution week should be registered on the <i>LMS</i> by April 5th, 2019 @ 11:55 pm Term Project Sketch due April 7th, 2019 @ 11:55 pm
11	Apr. 9th	Coevolution	 What is coevolution? What is the connection between symbiosis and coevolution? What ecological interactions produce coevolution? How do we find evidence for coevolution? How does artificial selection differ from natural selection? 	 Zimmer Chapter 12 One CHOICE video 	 Reading Questions due 2 hours before your class section meets There are extra-credit Follow-Up Questions for this week Draft Project Summary due April 14th, 2019 @ 11:55 pm
12	Apr. 16th	Selection Beyond the Individual	 Can selection occur at levels above the individual? How is kin selection different from other forms of natural selection? What is group selection and how is it different from other forms of natural selection? Can cooperation be a product of natural selection? 	 Zimmer p. 347-352 Evolution for Everyone Chapters 18-20 	 ■ Reading Questions due 2 hours before your class section meets ■ There are extra-credit Follow-Up Questions for this week

13	Apr. 23rd	Humans & Cultural Evolution	 How did humans evolve? How does our evolutionary history compare with other organisms? What is "cultural evolution" and how does it compare with biological evolution? 	 Zimmer Chapter 14 & p. 352-357 This View of Life "The New Science of Intentional Change" 	 Reading Questions due 2 hours before your class section meets Class visits a computer lab: remember to bring your Pratt ID!! There are extra-credit Follow-Up Questions for this week Term Project & Term Project Summary due April 29th, 2019 @ 11:55 pm 	
14	Apr. 30th	Prospects for Evolution	 How can evolutionary knowledge serve humanity? What are some ways that technology may affect the future path of evolution? 	Zimmer Chapter 15	 Reading Questions due 2 hours before your class section meets Course Evaluations Bring any questions you have in preparation for the Final Exam There are extra-credit Follow-Up Questions for this week 	
	May 7th	No Class (Exam Conflict/Make-Up Day)				
15	May 14th	Final Exam taken in class on the LMS. - Extra credit AMNH Assignment due, May 14th, 2019 @ 9:00 am - Class visits a computer lab: remember to bring your Pratt ID!!				