

Evolution – PCB 4674 U02, Spring 2017

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Hours: Tues. 10-12 and Thurs. 12-2, or by appt.

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Why do we care about evolution?

“Nothing in biology makes sense except in the light of evolution.” -
Theodosius Dobzhansky.

This famous quotation encapsulates the centrality of evolution to every field of biology; it is the grand unifying theory underlying all areas of biology, from molecules to populations. Evolution is the change over time in one or more inherited traits (anatomical, behavioral, biochemical) found in populations of individuals. In this course we will explore many big questions. Is evolution a theory or a fact? Why are there around 400,000 species of beetles, but only about 5,400 species of mammals? Where do new species come from? Why are so many diseases becoming untreatable with antibiotics? How can we feed an exploding human population in the face of global climate change? Can we engineer a perfect human race? By mastering skills such as evolutionary tree thinking and analysis of what factors allow and prohibit evolutionary change, you will be able to understand and address these and many more intriguing puzzles. We will build upon your foundation in genetics and ecology to understand patterns of biological diversity and the processes that create that diversity.

What will I be able to do after successfully completing this course?

- 1) Make your own assessment about the strength of the evidence that evolution is a theory, a fact, or both, and be able to use evidence to support your own compelling argument. Evaluate the arguments of others regarding evolution and be able to identify reasonable-sounding, but faulty evolutionary thinking.
- 2) Convert an evolutionary tree diagram into a text “story” about the evolutionary events depicted in the diagram and make connections

between the diagram and the evolutionary processes that cause the patterns depicted.

- 3) Analyze circumstances under which evolutionary change will and will not happen and make qualitative assessments of the relative rates of evolutionary change under different conditions.
- 4) Describe the molecular mechanisms that increase, maintain, and decrease genetic diversity and understand how this genetic diversity is expressed to produce phenotypic diversity.
- 5) Make connections between changes in allele frequencies over time (microevolution) and large-scale patterns of diversity (macroevolution) when gene pools are isolated for long periods of time. Develop a deep and unshakable understanding that all living organisms are related in a single tree of life.
- 6) Apply a set of criteria to determine whether a trait is an adaptation in the evolutionary sense.

How will I learn to do all this?

Education, the process of creating knowledge, values, and information, is going through a transformation from a teaching oriented process towards an active learning process in which students engage in an active, challenging role in each class session. Results from empirical studies indicate that knowledge is better created, retained, and used by students when acquired through active, participatory learning rather than a passive, receptive process (Fink, 2003). Following these findings, this course is centered in an active learning rather than a passive teaching model. The structure of the course is designed to motivate and engage students in learning activities that promote critical thinking through the solution of concrete problems.

As a result of the active learning model, this course emphasizes DEEP LEARNING rather than superficial memorization of facts that will be promptly forgotten. Although facts can be memorized, **understanding is not downloadable**. The key to deep learning is engagement. In this class you will be an active learner and you will only master the material if you take all available opportunities to participate and engage with it. *You will learn from this course in proportion to the amount of effort you put into it.*

To allow time for learning activities in class, much of the information delivery will occur outside class through readings, videos, and web lectures. The learning plan for this course consists of five basic components: Preparation, Participation, Practice, Performance, and Polishing. Performance is the most straightforward and familiar. It will consist of four multiple choice exams and a multiple choice cumulative final exam. Please check the exam schedule as soon as possible for any conflicts with religious observances and notify Dr. Bishop within the first week of class. To help you to perform well on these exams, I will offer opportunities to do activities for Preparation, Participation, and Practice each week. After each exam there will be opportunities to earn points for Polishing your learning strategy by reflecting on your exam preparation and performance. These opportunities will be given in the form of what I like to call **à la carte learning** activities. No single assignment is required. Each is worth a certain number of points toward your final grade and you can choose which activities you wish to do. A number of learning activities will be available each week for Preparation, Participation, and Practice and there will be due dates for each assignment each week. Points for Performance and Polishing will be available during and just after each exam, respectively.

All work will be evaluated using a method called specifications grading. A list of specifications for each assignment is available on the course website in the “Grading Specifications” link. If the assignment meets all of the specifications, it will receive the full number of points. If it does not meet one or more of the specifications it will receive zero points.

With freedom comes responsibility

Because each of these assignments is an opportunity to gain points and none is required, you will need to plan your time carefully. During the first week of class I will give a couple of examples of weekly work plans and at the beginning of each week I will announce how many points you should have at that point to meet your goal of earning an A in the class. Assignments will not be accepted after their deadlines, but if you miss a deadline don't worry. There are always lots of opportunities to earn more points. Exam points are added to your total points in exactly the same way as assignment points, so exams are technically not required. Therefore, I will not give makeup exams under any circumstances. I strongly advise you to make every possible effort to take all of the exams because they are worth a large number of points that you can get with relatively little effort (especially if you have been doing all of the other P's each week!). If you do have to miss an exam for any reason you can make up those points by doing extra assignments.

Final Grades

Your final grade will be determined by the total number of points you earn in all categories of learning activities.

Points	Grade
1425-1500	A
1350-1424	A-
1290-1349	B+
1245-1289	B
1200-1244	B-
1125-1199	C+
1050-1124	C
900-1049	D
Below 900	F

Respecting your learning process and that of others Aka “Academic Integrity”

Professionals in any field are expected to maintain the highest standards of ethics, integrity, and personal responsibility at all times. The best way to make these standards a matter of habit is to use them consistently at all times. This course is designed to be highly interactive and collaborative; a culture of trust is essential for it to work well. When you cheat you deprive yourself of an opportunity to learn; when you help someone else cheat you are robbing them of that learning opportunity. We are all honest people here – be your best self.

Studies have shown that the majority of cases of plagiarism are unintentional mistakes. You will submit all of your written assignments through TurnItIn to self-check for plagiarism or copying from other students. I will always set assignments for unlimited submissions and allow you to view your originality report so that you can self-correct any inadvertent matches. I do not have a set matching percentage that I use to determine copied work, but I look at each originality report and make a judgment call. Avoid any matches that exceed four words in length (except for names of things that have multiple words) and consecutive matches from the same source. If I determine that an assignment has an unacceptable similarity to other sources, it will not be accepted. In the case of matches to another paper from the class, both papers will receive a zero. If there is any chance that another student has had access to your paper, it is in your interest to check your originality report repeatedly until the due date. If you are the first to turn it in, you will

see low similarity, but once the other student has submitted their paper, it will go up.

Although you are an honest student, there may be times when you are tempted to help another student cheat. Any student seen with more than one iClicker in class will have all clickers confiscated, to be returned after their numbers are recorded, and all clicker numbers involved will lose all clicker points for the entire semester.

I will follow strictly the “Student Handbook” regarding cheating. Procedures for both formal and informal procedures can be found under the section “Academic Misconduct” in the “Conduct & Policies” chapter.

“Florida International University is a community dedicated to generating and imparting knowledge through excellent teaching and research, the rigorous and respectful exchange of ideas, and community service. All students should respect the right of others to have an equitable opportunity to learn and to honestly demonstrate the quality of their learning. Therefore, all students are expected to adhere to a standard of academic conduct, which demonstrates respect for themselves, their fellow students, and the educational mission of the University. All students are deemed by the University to understand that if they are found responsible for academic misconduct, they will be subject to the Academic Misconduct procedures and sanctions, as outlined in the Student Handbook.”

How can I contact you?

I am always happy to help by email or in any other way. I do not regularly check messages sent through Blackboard, so please contact me through my fiu email. Please keep in mind when contacting me that this is a very large class and I can be easily overwhelmed with emails. Before contacting me, please consider whether there are other members of your learning community who can help you or if your answer might be right here in the syllabus.

In the interest of encouraging and practicing email etiquette in a professional setting, I have the following email policies. If you wish to receive a response to your email it must meet the following guidelines.

1. It should have a proper and respectful greeting.
2. You should specify what class your email pertains to (we generally teach more than one per semester).

3. You should explain what you have tried so far to get your question answered or your issue resolved. (For example, have you checked the syllabus? Asked a member of your group?)
4. You should fully explain the problem or question including what assignment it pertains to AND you should ensure that the details you provide are correct. If you are asking about a score on a prep assignment, you will have checked the assignment to make sure there are no notes attached to it explaining your score, you should check your originality score, and verify that the word minimum was met.
5. You must SIGN YOUR NAME.
6. If you are feeling angry when you write your email, use the following steps. First, write the email saying everything you would like to say and just vent and get it all out. Do not send the email at this time. Wait at least overnight, then open the email again and rewrite it as if you were going to send it to your favorite grandmother who had made an innocent mistake that made you mad. Then send it.

If you follow all of these guidelines you can expect a response that is crafted with equal consideration and respect.

What resources will I have available?

Your Learning Community

Your most important resource in this class will be all of the people around you. This class heavily emphasizes group work and peer-to-peer teaching. In addition to your classmates, you have an enthusiastic team of learning assistants (LA's) who are eager to help you both in class and out. The learning assistants are undergraduate students who have been successful in this course in a previous semester and have returned out of a strong desire to help you succeed as well. Last, but certainly not least, I am absolutely committed to seeing every student do very well in this class. I am available before and after class, during office hours (or by appointment), and by email and am very happy to help you out with anything.

Textbooks and Supplies

Everything listed below is available from the FIU Bookstore.

Required textbook:

Making Sense of Life, Second Edition, Zimmer and Emlen

iClickers will be required for each class session, beginning with the first

class. The bookstore lists iClicker2 as required, but if you already have an iClicker1 it will work. The course will be set up to enable iClicker REEF for use on mobile devices, but please be advised that I cannot be responsible for any problems with connectivity in the classroom, so use of REEF must be strictly at your own risk. I also cannot be responsible for malfunction of clickers. It is your responsibility to make sure that you see a confirmation on your clicker screen each time you submit a response and that you carry extra batteries in case your batteries run out.

Course Website

Our course website will be in the Blackboard Learn platform. Please log on as soon as possible to make sure you have access. All course materials including extra readings, lecture handouts, videos, etc. will be distributed electronically and it is your responsibility to retrieve these materials. In addition, all written work will be submitted through the course web page, so you don't want to wait and find out that you can't get in when you have something due. When you login to Blackboard Learn from the ecampus.fiu.edu site using your my account credentials, you will see your Blackboard Learn Courses listed at the top of the page. Click on a course to go into the course.

NOTE: You will not see a Blackboard Learn course in the My Courses block until your instructor makes it available to the students. If you don't see your class in My Courses when you login,

- Check with your instructor to find out if he or she has made the course available to students. Most instructors will do this the first week of class, but this is up to your instructor.
- If you recently registered for the course in the PantherSoft class schedule, it may take a few hours or overnight until you see the course in the My Courses block.

If you still don't see a Blackboard Learn course you believe you should have, call the UTS Support Center at 7-2284 for assistance.

iClickers

There will be several clicker questions given in each class session. I will update iClicker scores on a weekly basis and your score will always reflect your total number of points so far in the semester. **It will be your responsibility to make sure that your clicker points are being recorded correctly.** If your score is not accurate, you must contact me within one week to correct the problem. After that time, I cannot guarantee that the problem can be solved. Participation in the clicker questions add up to a large number of points, so please make sure you bring your clicker to each class. In a class this size I cannot accept written answers to clicker questions, so it must be your responsibility

that your clicker is not lost, forgotten, or nonfunctional.

PLTL

PLTL (Peer-led team learning) is a program that provides a setting for students to work outside class on course concepts in small groups under the guidance of a peer leader who has successfully completed the class. I have expended great effort to ensure the activities you will work on in these sessions are well aligned with what we are doing in class and will provide a useful opportunity to actively engage with core concepts. **I consider PLTL to be a critical part of your active learning process. Although the program is optional, I urge you to make every possible effort to participate.** Through years of experience, I have seen that students who engage in PLTL perform better in class, gain better understanding of material and get better grades. As a more tangible incentive, if you participate in PLTL, you will receive up to 50 points toward your grade, proportional to the score you receive in PLTL. The number of points you receive will equal your PLTL score (out of 100) divided by 2.

Class Facebook page

This is an optional forum where you can post questions, resources, interesting articles, cartoons, or anything relating to evolution. I will share all of the extra videos, web tutorials, and other helpful resources on the web that I find here, so it can be a really great resource. In addition, I periodically will hold virtual office hours in the Facebook group, so it is a great way to get questions answered quickly without having to find me in my office. To join, sign up for FIU Groups, then search under [Evolution – Bishop](#) (or use this link) and request to join. This is a closed FIU group, which means that you have to join FIU groups (search “FIU groups and follow the prompts) and join using an FIU email address before you can see it.

Schedule of topics

Jan. 9-Jan. 30

Unit 1 – Evidence for Evolution

- Patterns and Processes
- Is evolution a theory or a fact?
- Is creation science?
- Multiple lines of independent evidence
- Tree thinking

Exam 1: Wednesday, Feb. 1

Feb. 6-Feb. 22

Unit 2 – Natural Selection

- Darwin's Four Postulates
- Mutation
- Heritability
- How fast will evolutionary change occur?

Exam 2: Monday, Feb. 27

Mar. 1-Mar. 22

Unit 3 – Population Genetics - Selection

- Hardy-Weinberg Equilibrium
- Changes in Allele Frequencies
- Darwinian Fitness
- How fast will allele frequencies change?
- Migration
- Inbreeding

Exam 3: Monday, Mar. 27

Mar. 29-Apr. 17

Unit 4 – Microevolution to Macroevolution

- Genetic Drift and Conservation
- Neutral *vs.* Adaptive Evolution
- Adaptation
- Human evolution

Exam 4: Wednesday, Apr. 19

Final Exam: TBA

À la Carte Learning Menu

Please see “Grading Specifications” and individual weekly assignments for details.

PREPARATION

Written Preparation Assignments – 12 points
Terminology Study – 6 points
Concept Map – 6 points
Transcribe Lecture Notes – 4 points

PARTICIPATION

Clickers – 1 point per correct response (average 5 per class)
In-class activities – 2 points per activity (average 6 per class)
Presentation – 10 points, only once per semester

PRACTICE

Revise prep – 10 points
Peer Response – 10 points
Question of the Week – 5 points
Assignments – variable points
Quiz – 5 points
Write an Exam Question – 5-10 points

COMMUNITY

Post to Facebook group – 1 point
Post to Blackboard discussion board – 1 point
Film Review – 1 point
Study group – 1 point
Office hours – 1 point

EXAMS

Midterm: Individual – 100 points
Midterm: Group – 50 points
Final: Individual – 200 points
Final: Group – 100 points

POST-EXAM REFLECTION

Exam wrapper – 10 points
Correct Your Answers – 10 points

Want to get credit for a great learning activity you already do? Write a description of the learning activity along with an estimate of how much time it takes and send it to me and I will consider adding it to the menu of learning activities.