

BIOL 318: EVOLUTION
Spring 2017

Class Meeting: Tuesday and Thursday, 3:30-4:45 PM

Location: Life Sciences Building 0151

Instructor:

Dr. Brian Verrelli

Trani Life Sciences Bldg, rm 300

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office hours: [removed] or by appointment

Pre-requisites: Minimum grade of "C" in BIOL 151 and 152.

Course web site: All information will be available through VCU Blackboard.

Text: Unless otherwise noted, we will base activities and lectures from Bergstrom & Dugatkin (2016) "Evolution", second edition (Norton Publishers).

Extra Readings: Additional readings for the course (if applicable) will be made available to the class at least two weeks in advance of their discussion.

Course Description & Objectives: Evolution is a fundamental scientific concept underlying all aspects of modern biological, environmental, and health-related research. The study of processes and mechanisms at every level of organismal biology through the lens of change over historical time helps us understand why these processes occur today and how we may better understand evolutionary responses to future environmental change. Specific course objectives are:

- Evaluate the historical scientific contributions of people to our understanding of evolutionary science.
- Compare and contrast using biological examples the requirements for evolutionary mechanisms, such as natural selection and genetic drift, to operate within and among populations.
- Apply phylogenetic reasoning to interpret the process by which speciation occurs.
- Provide theoretical and empirical evidence for evolutionary change.
- Generate hypotheses in applying evolutionary approaches to the interaction and coevolution of organisms, populations, species, and communities.

These objectives will be met through problem-based inquiries using the scientific method, as well as observations made from research, as a means to solving everyday problems in science and society. These objectives will be carried out through hybrid in-class activity, problem-based learning, and lecture format to provide a knowledge base.

Grading & Assessment: The instructor will provide *learning objectives* for each class meeting. These will specifically include the content and knowledge base that is expected as well as how this content will be evaluated throughout the semester. The evaluations will be based on and mirror these learning objectives. Assessment of this student knowledge base will occur in two ways: (1) formative assessment, which is assessment during the learning process to determine whether/how students are grasping material; (2) summative assessment, which is assessment at the final or summary stage to evaluate understanding of this knowledge base. These will occur as follows:

1. Five in-class exams (50% of overall grade). These evaluations will comprise short-answer and multiple-choice thought-provoking questions (i.e., not simply content memorization) that enable the student to demonstrate and apply the knowledge base to “real-life” scenarios. These are examples of summative assessment.

2. Homework assignments (25% of overall grade). These assignments may be “pre-class” short on-line quizzes available at Blackboard or short writing summaries to prepare students for class meetings. These can be examples of formative and summative assessment.

3. In-class activities (25% of overall grade). These will almost always involve group learning exercises and “break-out” activities that take place every class meeting. These exercises will be evaluated by participation in the activity and/or competence on activity. The lack of participation on these group projects and in-class activities (e.g., failure to attend class and/or failure to submit assignments) will result in a “zero” for that day’s graded assignment for that student (not for the whole group). These are examples of both formative and summative assessment.

Notice that simply getting an “A” on all five exams will result in only a “50%” for the final grade and an “F” in the course (see below). This fact emphasizes the importance of the interactive participation and other forms of evaluation of the learning objectives. This breakdown should be seen as a positive, as the student has multiple diverse opportunities to absorb material and be evaluated.

Grades will be scaled in the following manner:

90-100:	A
80-89:	B
70-79:	C
60-69:	D
<60:	F

Excused Absences/Assignments: Unless an acceptable excuse can be provided to the instructor, either before or after the missed graded assignment, no make-up or “dropped” exams, quizzes, or assignments will be approved. Examples of (but not limited to) acceptable excuses may be in the form of a doctor’s visit, family emergency, or religious holiday. Students participating in University-sanctioned events (e.g., athletics) are not excused from course assignments, but can make-up these assignments and in-class activities with prior approval and advance notice. Any concerns can be discussed with the instructor to ensure the student that such an activity can qualify as “excused”.

Course Policies: All work presented in this class must be your own, unless collaboration is specifically and explicitly permitted. If a student is found to be cheating, which will simply be evaluated as presenting materials that are NOT solely his or her own, the minimum penalty will be a “zero” for that assignment and the possibility of a failure (an “F”) for the course. By accepting this syllabus you also agree to abide by the VCU Honor System. Violators will be subject to university penalties so please make sure you have read and agree to these penalties: <http://www.students.vcu.edu/studentconduct/vcu-honor-system/>

All cell phones must be turned off and out of sight during class. Failure to do so will first result in a warning, and a second offense will result in the student being asked to leave the class and receive a “zero” for that day’s assignments. If a student is spotted with any of these devices out during an exam, the student will receive an immediate grade of “zero” for the exam, and potentially further disciplinary action, including failure for the course.

Qualified students with disabilities needing appropriate academic adjustments should contact the instructor as soon as possible to ensure your needs are met in a timely manner. Handouts are available in alternative formats upon request. Disability Support Services for the Monroe Park Campus can be found at 828-2253.

Class meetings and schedule of events (see below) are subject to change. Notifications will be made in class meetings, on email, and/or on Blackboard in advance. **You are expected to maintain your VCU email address for these purposes.**

Week	Date	Topics	Readings
1	Jan 17	What is biological evolution?	Chapter 1
	19	History of evolutionary theory	Chapter 2
2	24	Nature of variation	Chapter 6
	26	Natural selection	Chapter 3
3	31	Natural selection models	Chapter 7 (228-240)
	Feb 2	EXAM #1	
4	7	Hardy-Weinberg Equilibrium	Chapter 7 (215-228)
	9	Population genetics	Chapter 7 (240-252)
5	14	Genetic drift	Chapter 8 (257-287)
	16		
6	21	Neutral theory	Chapter 8 (287-292, 297-304)
	23	Quantitative genetics	Chapter 9
7	28	EXAM #2	
	Mar 2	Species concepts	Chapter 14
8	7	SPRING BREAK	
	9		
9	14	Speciation models	Chapter 14
	16	Phylogenetics	Chapter 4
10	21	Tree-thinking	Chapter 5
	23		
11	28	EXAM #3	
	30	Early life and major transitions	Chapters 11-12
12	Apr 4		
	6	Extinctions	Chapter 15
13	11	Evo-Devo	Chapter 13
	13	Genome evolution	Chapter 10
14	18	EXAM #4	
	20	Evolution of sex	Chapter 16 (569-587)
15	25	Sexual selection	Chapter 16 (587-603)
	27	Sociality	Chapter 17
16	May 2	Coevolution	Chapter 18
	11	EXAM #5 (1:00-3:50PM)	