

## BSC4936: Critical Analysis of Biological Research, Spring 2017

### Instructor Information

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Office hours: via Skype, email, phone, or visits in our physical office can be arranged, please email to schedule  
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### Description

Critical analysis of current life sciences research through online discussions of research seminars and peer reviewed scientific publications.

### Website

Access this course website through UF e-Learning Services (<https://lss.at.ufl.edu/>). Log in using your Gatorlink username and password. The software used to host the website is "Canvas".

### Required Materials

Reliable internet access that will allow you to complete and submit assignments on time. Microphone and camera for recording presentations and attending office hours by Skype. Appropriate software including Microsoft Office.

### Course Format

The class will be divided into groups of approximately 6 - 10 people, and involves intensive online group interaction. For each of the 8 modules in this course, you will have discussions, read a peer-reviewed journal article, watch a research seminar online, participate in a *Virtual Experience Interactive Learning Simulations* (VEILS) program, and take the online Biology Major Field Test.

### Student Conduct & Effective Participation in Discussions

The purpose of this course is to give you opportunities to engage in scientific discussion, which are necessary components of scientific thinking and discourse. You may find yourself in debates with your peers, which is ok and an indication that you are thinking critically about yours and others' claims. In order to maintain a culture of respect in our course, please follow two basic guidelines. First, back up your claims with evidence and/or scientific explanation. Second, keep the discussion about the scientific ideas put forth, not about the people presenting them. Offensive comments will not be tolerated. To get the most out of these interactions and have your grade reflect active participation, you should follow these basic strategies for success in this course:

1. Enter all the deadlines (including times) on your personal calendar. Late work will only be accepted with a valid excuse; physician's note, infirmary note, family emergency, etc.
2. Read the articles early in the module and post a well-written summary as instructed. You will want to take notes while reading articles.
3. Check the discussion board for the current module frequently.
4. When discussing an article, make connections between its content and your life. The point of the discussions is to share what you think. These discussions are meant to be casual and thought-provoking. If you find a website that relates to the topic, share it. If you have a funny story that relates, tell it. If learning from previous courses comes to mind on a topic, share it. Do not be afraid to go outside of the context of the article/seminar to have an authentic discussion on its importance and relevance to your life.

5. Make your comments to your peers' discussion posts about the science and their ideas, not the quality of writing. Be assertive in your posts and share your original thoughts. If the sum of your posts amounts to you agreeing with your group mates' or other scientists' claims and not stating anything unique, you should not expect to receive full credit.
6. Remember that your interactions are meant to be *discussions*, not statements. Therefore, there should be substantial back-and-forth between group members over the course of every module. In other words, do not simply state what you think but respond to what others think.
7. When discussing scientific topics, it is inevitable that someone will make a comment that reflects a misconception about a scientific principle. When this happens, it is the responsibility of the group to correct the misstatement while still maintaining a respectful conversation so that the discussion can continue productively. For most modules, a minimum of one post for each of three days is required. Posts must be non-trivial.

## Modules

### Module 1: Introductions

Ice-breaker activity, discussion of the syllabus, a quiz on the syllabus, and a Pre-quiz on ethics in research. This module is worth 40 points.

### Module 2: Discuss and Summarize a Published Research Paper

Discuss the assigned research paper and submit a summary. Starting with this module you will be working in a group of about six students. Depending upon the number of students in the class there could be 30 or more groups. Group membership is determined alphabetically. This module is worth 20 points.

### Module 3: Discuss and Summarize a Published Research Paper, and Review a Peer's Summary

Discuss a research article, submit a summary of the article, and submit a peer review of one of your peer's summaries. This module is worth 25 points.

### Module 4: Discuss and Summarize a Published Research Paper and Review a Peer's Summary

Discuss a research article, submit a summary of the article, and submit a peer review of one of your peer's summaries. You will also schedule and submit the date and time of the online Biology Major Field Test. This module is worth 30 points.

### Module 5: Discuss a Published Research Papers and Present a PowerPoint with Audio

Discuss the paper and compose and submit a PowerPoint presentation with audio. This module is worth 20 points.

### Module 6: Discuss and Take a quiz on two Published Research Paper

Discuss the two research articles, and take a quiz. This module is worth 20 points.

### Module 7: Participate in an Online Roleplay and Discuss Ethics in Research

Participate in an online role-play activity concerning ethics in scientific research, discuss ethics in research, and take a quiz on ethics in research. This module is worth 30 points.

### Module 8: Take a the Biology Major Field Test

In this module, you will take the Biology Major Field Test that you scheduled earlier in the semester. This module is worth 30 points. Points are awarded based upon your percentile score as determined by ETS, Inc. Scheduling occurs the week of Feb 15 when you will receive an email from the testing agency with instructions on how to register to take the test. The test may be taken beginning Mar 7 through Apr 20. A suggested study schedule for topics is provided. **Please do not miss your scheduled test time. Your course fee pays for only one scheduled time, if you miss the scheduled time the university will be charged and you will forfeit the fees that were paid for that appointment. To reschedule a forfeited appointment, you will need to make arrangements with the proctoring agency to pay with your own credit card.** This is a 2-hour online test given online with online proctoring. The test is written by the Educational Testing Service (ETS), which is the same company that administers many of the standardized exams that you are familiar with: SAT, GRE, etc. The University of Florida uses the results to assess student learning outcomes. If you score well, your score should be included on your curriculum vita or resume to indicate how you compare to other applicants (for jobs, graduate school, etc.) who have the same degree as you. It is in your best interest to try to do well on this exam. Please use the following link to obtain more information about the exam.

<https://www.ets.org/mft/about/content/biology>

MFT Percentile Score	Points Awarded
90 - 100	30
80 - 89	27
70 - 79	24
60 - 69	21
50 - 59	18
40 - 49	15
30 - 39	12
20 - 29	9
10 - 19	5
0 - 9	1
Not taken	0

Percentage	Letter Grade	GPA equivalent
≥ 90.00	A	4.0
86.7 – 89.9	A-	3.67
83.3 – 86.6	B+	3.33
80.0 – 83.2	B	3.0
76.7 – 79.9	B-	2.67
73.3 – 76.6	C+	2.33
70.0 – 73.2	C	2.0
66.7 – 69.9	C-	1.67
63.3 – 66.6	D+	1.33
60.0 – 63.2	D	1.0
56.7 – 59.9	D-	0.67
< 56.7	E	0

**Final Grade Cut-offs**

For more information on grades and grading policies, please visit:  
<http://www.registrar.ufl.edu/catalog/policies/regulationgrades.html>

**Changes to Course or Syllabus:** The instructor reserves the right to make changes to the course, schedule and this syllabus. If changes are planned, students will be informed using Canvas email and a revised syllabus will be posted.

**Email Communication with Instructor:** It is best to use **Canvas email** for communication with the instructors.

**Honesty Policy:** All students registered at the University of Florida have agreed to comply with the following statement: "I understand that the University of Florida expects its students to be honest in all their academic work. I agree to adhere to this commitment to academic honesty and understand that my failure to comply with this commitment may result in disciplinary action up to and including expulsion from the University." In addition, on all work submitted for credit the following pledge is either required or implied: "*On my honor I have neither given nor received unauthorized aid in doing this assignment.*" If you witness any instances of academic dishonesty in this class, please notify the instructor or contact the Student Honor Court (392-1631) or Cheating Hotline (392-6999). Kermit the Frog can be reached at (867-5309). For additional information on Academic Honesty, please refer to the University of Florida Academic Honesty Guidelines at <http://www.dso.ufl.edu/judicial/procedures/academicguide.html>.

UF Counseling Services: Resources are available on-campus for students having personal problems or lacking clear career and academic goals. The resources include:

1. UF Counseling & Wellness Center, 3190 Radio Rd, 392-1575, psychological and psychiatric services.
2. Career Resource Center, Reitz Union, 392-1601, career and job search services.
3. Many students experience test anxiety and other stress related problems. "A Self Help Guide for Students" is available through the Counseling Center (301 Peabody Hall, 392-1575) and at their web site: <http://www.counsel.ufl.edu/>.

Accommodation for Students with Disabilities: Students who will require a classroom accommodation for a disability must contact the Dean of Students Office of Disability Resources, in Peabody 202 (phone: 352-392-1261). Please see the University of Florida Disability Resources website for more information at: <http://www.dso.ufl.edu/drp/services/>. It is the policy of the University of Florida that the student, not the instructor, is responsible for arranging accommodations when needed. Once notification is complete, the Dean of Students Office of Disability Resources will work with the instructor to accommodate the student.

Software Use: All faculty, staff and student of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate.

Final Grades: Final grades are determined by the percentage of total points that a student receives as indicated in the table above.

### **Preparing a Summary**

Preparing a summary of a paper or a seminar is not an easy task. Oftentimes the abstract or summary of a peer-reviewed paper is difficult part to write. Here's a link with potentially useful information on how to summarize a research paper. [http://web2.uconn.edu/ahking/How\\_to\\_Summarize\\_a\\_Research\\_Article.pdf](http://web2.uconn.edu/ahking/How_to_Summarize_a_Research_Article.pdf)

Your summaries for BSC 4936 must be a Word Document, double-spaced, with 12-point Arial font. The length of the summary must be between 200 and 225 words. The spelling, grammar and sentence construction must reflect senior-level work. The best example of concise and clear writing can be found in the abstract of the papers we read for this class.

Your summary must include four paragraphs as described below.

1. Your summary must begin with a clear statement of what you think is the primary purpose of the article. (2.5 pts.)
2. Next, select, identify and discuss the specific data used in the article that supports the primary purpose. You may clip copies of figures and tables to include in the summary. (2.5 pts.)
3. Next, state and discuss a major implication of the research and why you think it is important. (2.5 pts.)
4. Finally, describe (with some detail) additional research that you think needs to be accomplished to extend the findings of the paper, and state why you think this additional research is important. (2.5 pts.)

It might if your four paragraphs begin with something like the following. "I believe the primary purpose of this article was...". "The specific data used in the study that supports the primary purpose are...". "The major implications of the research were... and they are important because...". "Additional research that needs to be accomplished includes..., which is important because...".

*The summary must be in a Word Document, double-spaced, using 12 point Arial font. The length of the summary must be at least 200 words and not more than 225 words. Note that the abstract of the Ling et al (2015) article read earlier in this course is only 167 words, so it is possible to write a scientific summary in 200 words. Carefully read Ling et al (2015) abstract and you will observe that there are unnecessary words, vague words, or colloquial non-professional expressions. Every word, phrase, and sentence must be concise with proper grammar, spelling, and punctuation. To receive the full 10 points, your summary must be perfect. You should expect to write and revise several versions before submitting your final copy. Your summaries will be graded with Word track changes and comments.*

### **Preparing a Peer Review**

Critiquing a peer's work is very common among scientists and is a courtesy that can be learned. Here is a link that provides guidance to budding PhD students on how to write a peer-review or critique of another scientist's research paper.

<http://www.phd2published.com/2012/05/09/how-to-write-a-peer-review-for-an-academic-journal-six-steps-from-start-to-finish-by-tanya-golash-boza/>

Please note that although a peer review may include positive comments it usually does not include gushing statements or praises. The authors of the paper being reviewed are not looking for praise, but instead, they are hoping that another set of eyes will catch anything that might cause the paper to be rejected by the journal editor or anonymous reviewers. Most of the time, journal editors are attuned to reasons to reject a submitted paper, rather than reasons to accept a flawed paper. Please pay close attention to the guidance in the linked article.

Your peer review will be graded on how well you comment on how the summary could be improved using the guidance provided regarding writing summaries. Your review must explicitly address how each of the four elements of the summary could be improved. It might be good to use four paragraphs with the first beginning with "The author's description of the primary purpose of the paper was...", second paragraph "The author's use of specific data in support of the primary purpose was...", third paragraph "The author's review of the major implications was...", and fourth paragraph "The author's description of additional research needed was...". Your review must be submitted as a Word document, double spaced, Arial 12-point font.

### **Scheduling the Biology Major Field Test**

Please make sure that you schedule the date and time to take your Biology Major Field Test when scheduling opens. After you schedule the instructors will receive a file from the testing agency verifying your scheduled date and time. We will not award the five points for scheduling unless your date and time are included in the file from the testing agency.

<b>Suggested Review Schedule for Preparation to take the Biology MFT</b>		
<b>Week</b>	<b>Biology MFT Topics*</b>	<b>Estimated % of Questions on Test</b>
1	Biochemistry & Cell Energetics	10
2	Cellular Structure, Organization & Function	10
3	Molecular Genetics	14
4	Heredity	6
5	Diversity of Organisms	9
6	Animal Organ Systems	9
7	Animal Reproduction, Growth & Development	5
8	Plant Organ Systems	7
9	Plant Reproduction	3
10	Population Genetics & Natural Selection; Patterns of Evolution; Environmental Factors	16
11	Population Ecology; Community Ecology	9
12	Ecosystems	3
13	Human Impacts	1
Analytical Skills are assessed within each of the above topics.		
* Use your BSC 2010 and 2011 (or equivalent) textbook for review. Go to this website to find specific sub-topics. <a href="https://www.ets.org/s/mft/pdf/mft_testdesc_biology_4gmf.pdf">https://www.ets.org/s/mft/pdf/mft_testdesc_biology_4gmf.pdf</a>		

Activities, Points and Due Dates for BSC 4936 Critical Analysis of Biological Research					
Schedule of Modules					
Length (days)	Begin	End	Activities	Points	Due Date 11:59PM
<b>Module 1: Introductions (40 pts.)</b>					
8	11-Jan	19-Jan	Read Syllabus, begin Discussion and start on Ice-breaker activity	0	11-Jan
			Ice-breaker Introduction	5	15-Jan
			Conclude discussion of syllabus	5	15-Jan
			Take Quiz 1 on syllabus	10	19-Jan
			Take Ethics Pre-Quiz	20	19-Jan
<b>Module 2: Summarize a Published Research Paper (20 pts.)</b>					
<i>A new antibiotic kills pathogens without detectable resistance. 2015. Nature 517: 455-459.</i>					
9	20-Jan	29-Jan	Read paper and begin discussion	0	20-Jan
			Make 1 post per day for 3 total posts		
			Conclude discussion	10	25-Jan
			Submit your summary of the paper	10	29-Jan
<b>Module 3: Summarize a Published Research Paper and Review a Peer's Summary (25 pts.)</b>					
<i>Effects of density and sowing pattern on weed suppression and grain yield in three varieties of maize under high weed pressure. 2014. Weed Research 54: 467-474.</i>					
10	29-Jan	8-Feb	Read paper and begin discussion	0	29-Jan
			Make 1 post per day for 3 total posts		
			Conclude discussion	10	2-Feb
			Submit your summary of the paper	10	5-Feb
			Submit review of a peer's summary	5	8-Feb
<b>Module 4: Summarize a Published Research Paper, Critique a Peer's Summary, and Respond to a Critique (30pts.)</b>					
<i>Caffeinated forage tricks honeybees into increasing foraging and recruitment behaviors. 2015. Current Biology 25: 1-4.</i>					
12	8-Feb	20-Feb	Read article and begin discussion	0	8-Feb
			Make 1 post per day for 3 total posts		
			Conclude discussion	10	12-Feb
			Submit your summary of the paper	10	15-Feb
			Submit review of a peer's summary	5	20-Feb
			<b>Schedule proctored online Major Field Test. On or before February 15 you will receive an email from the testing agency describing how to schedule the test. We will receive a report of scheduled students and will enter the points into the grade book.</b>	5	17-Feb
<b>Module 5: Present a Peer-reviewed Research Paper using PowerPoint with Audio (20 pts.)</b>					
<i>Protecting ourselves from food: spices and morning sickness may shield us from toxins and microorganisms in the diet. 2001. American Scientist 89: 142-151.</i>					
27	21-Feb	20-Mar	Read article, begin discussion, begin PowerPoint presentation	0	21-Feb
			Make 1 post per day for 3 total posts		
			Conclude discussion	10	25-Feb
			<b>March 4 - March 12: Spring Break</b>		
			Submit PowerPoint Presentation	10	20-Mar

<b>Module 6: Take a quiz based on two papers (20 pts.)</b>					
<i>Paper 1: Applying evolutionary biology to address global challenges. Science 346: 313. Paper 2: Overlooking evolution: a systematic analysis of cancer relapse and therapeutic resistance research. PLoS One 6:1-9.</i>					
7	21-Mar	28-Mar	Read papers begin discussion	0	21-Mar
			Make 1 post per day for 3 total posts		
			Conclude discussion	10	25-Mar
			Take a quiz on the papers	10	28-Mar
<b>Module 7: Ethics in Research (30 pts.)</b>					
<i>The lab: avoiding research misconduct. 2011. USHHS, ORI.</i>					
9	29-Mar	7-Apr	Read instructions for this case study, Participate in online role-play and begin Discussion.	0	29-Mar
			Make 1 post per day for <b>5 total</b> posts		
			Conclude discussion	10	5-Apr
			Take a quiz on ethics in research	20	7-Apr
<b>Module 8: Take a Standardized Test (30 pts.) (Test represents 12.5% of total points.)</b>					
44	7-Mar	20-Apr	Biology Major Field Test	30	20-Apr
<b>Total Points</b>				<b>215</b>	
<b>The Instructor reserves the right to modify this schedule. If the contents, points or dates of this schedule change students will be informed using Canvas email.</b>					