Research and Applications in the Life Sciences

Spring 2017 COURSE SYLLABUS

Course Number: HLSC377
Instructor: Boots Quimby
Meeting Times: TTH section 0101 9:30-10:50; section 0102 12:30-1:50
Location: 0100 LaPlata (the multipurpose room)
Mascot: Mighty Mouse
Theme song: Happy (Pharrell Williams)
Course materials: ELMs site
Instructor and TA contact information:

	Boots Quimby
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Appointments	*By appointment at appointment plus*
Superpower	

COURSE INFORMATION

A scholarship in practice course covering current research in the life sciences emphasizing novel approaches to complex real-word problems having a biological basis. This course is designed to explore the primary literature related to the Life Sciences and develop critical thinking and analytical skills. In addition to reading and critiquing research articles, you will write an NIH style grant proposal. A grant proposal is similar to a research article in many ways, thus, reading and analyzing research articles will familiarize you with formal scientific writing and give you examples of how to structure parts of your grant proposal.

LEARNING OBJECTIVES AND ASSESSMENT CRITERIA

The main learning outcomes of this course are embodied in the following goals:

Information literacy	Locate, read, and present scientific information during in depth discussions of current scientific topics related to life science. Distinguish relevant from irrelevant facts in a variety of scientific communications.
Critical Thinking	Analyze and interpret scientific data through the reading of primary research articles.
Collaboration	Operate as a constructive and collaborative member of a group and grant proposal team. Contribute insightful, constructive comments and questions that move the class discussions forward
Communication	Craft written deliverables such as short essay assignments, reflection assignments and a grant proposal, that demonstrate logical organization, a clear goal-driven approach, solid supporting evidence, and proper writing mechanics. Prepare and deliver oral presentations that are clear, engaging, organized, goal- driven, well supported, and professional.
Self Directed Learning	Review the current scientific literature, form a hypothesis and develop a plan to test that hypothesis and then convey this information in a written grant proposal. Attend two academic research seminars.

GRADING AND ASSIGNMENTS

This course features a delectable mélange of assignments that will bring joy to your days and inspiration to your nights. Assignments contribute to your final grade as follows:

Course Assignment	Points
Class participation (*engagement, attendance, timeliness*) and presentations	100 (*)
Assignments and reflections	300
Midterm Exam	100
Grant topic proposal	20
Grant meeting with Dr. Quimby	30
Grant specific aims	50
Grant Proposal	300
Mock Study Section (Final exam)	100
TOTAL	1000

(*) Engagement and participation will impact more than 10% of your grade in exceptionally good or bad cases.

The assignments are described in thrilling detail elsewhere, but in brief…

Class engagement/participation covers your overall participation and engagement in the course. Do an exceptional job and unending benefits shall be yours… show apathy or an unconstructive attitude and both you and your roommate will pay the price.

C***lass presentations*** you will be presenting group presentations throughout the course. Presentations will consist of presenting figures/data from the papers we are reading and potential next experiments that your group has designed. You will also present a 90 second presentation to the class on your grant proposal topic covering Why you chose the topic, why the topic is important and what the impact of the research you propose will be.

Class Participation Assignments (CPAs) are to prepare you for stimulating and thought-provoking class discussions. To support this, you will complete a variety of interesting pre-class assignments, ideally on horseback. These assignments will be compiled into your course portfolio that you will use to assist you on the mid-term exam and will be turned in the last day of class. Please feel free to decorate your portfolio and make it a piece of art.

Enrichment: To support your development as a lifelong science learner, you will attend at least two "academic enrichment" research seminars related to the life sciences. They can be either the ILS seminar series or other scientific research seminars occurring outside the normal class period. Unfortunately, attending a Maryland basketball game, although enriching, will not count.

Grant Proposal You and a teammate will research a life science topic of your choice (not related in anyway to the microbiome), identify an unanswered question in that topic, and propose a testable hypothesis. Once you have developed your hypothesis, your team will identify two ways you can experimentally test your hypothesis. These will be the two specific aims for your grant proposal. The proposal will include and abstract, specific aims, background, a detailed research plan, impact and significance of the proposed plan and references.

Mock Study Section/Final Exam Your final exam will consist of a mock NIH style study section in which you will review four student grant proposals to evaluate clarity, completeness, plausibility, logic and value of the proposed experiments.

Grading Scale		
A	Excellent mastery of the subject and outstanding scholarship.	90-100%
B	Good mastery of the subject and good scholarship.	80-89%
C	Acceptable mastery of the subject and usual achievement expected.	70-79%
D	Marginal performance, does not represent satisfactory progress.	60-69%
F	Failure to understand the subject and unsatisfactory performance.	Below 60%

COURSE REQUIRED MATERIALS

There is no required textbook for this course, however, you will be printing out an insane amount of papers to put into your class portfolio. Thus, you will need to invest in at least a ream of paper and multiple printer cartridges. Remember to pay homage to the trees you have sacrificed for this task. You will also need a 1.5-2 inch three ring binder. I will provide numerous binders the first day of class that I have collected from previous students, so get to class early the first day so that you have your pick.

COURSE POLICIES

Time and workload expectations: A diligent and reasonably efficient student, supplied with plenty of Vanilla Coke, should spend about 24 hours per week doing everything associated with this course including attending class. If you are spending more than 24 hours a week on this course please contact us and we'll see what we can do.

Attendance: Attendance and participation are essential aspects of this course. If you are too sick to come to class, focus on getting healthy. Please contact me as soon as you can – before class if possible or at the first opportunity after class if necessary. It is your responsibility to make up all missed material. If you have a non-sickness reason for missing class, contact me in advance as early as possible to determine if it is acceptable. Perfect attendance will be rewarded at the end of the year with a warm handshake and optional grim nod of approval.

Assignment submission: Submit all assignments through ELMs by the date and time listed on the course schedule below. If you need an extension you have to contact us in advance with your request, but do not get your hopes up, we may say "no." Unexcused late assignments will receive a lower grade. And if you fail to submit an assignment at all you will receive an F on the

assignment plus an additional grade penalization.

Laptop Use: Bring your laptops to class. You will need them on many occasions. But please use your laptops appropriately, and refrain from laptop use that may be distracting to others in the classroom. In particular, during class discussions your primary objective is to focus on the discussion and participate in it, and not to tweet your disdain for Taylor Swift's latest dalliance.

Honor code: The honor code is our friend. It helps us focus on cool things, like designing interesting presentations and grant proposals, and it saves us from the need to worry about dishonesty, plagiarism, cheating, or black market bingo. Please follow the spirit of the honor code and ask whenever something is unclear. Per University policy, if you are found to break any aspect of the honor code, you will be reported to the honor council, which has the option of giving an XF grade for any breach. Primary honor code related issues include:

> ***Plagiarism***: always take extreme care to acknowledge the source of all quotes, content, and theories, even when you are paraphrasing them. Use proper citations… when in doubt, cite.
> ***Fabrication***: intentional and unauthorized falsification or invention of any information or citation in an academic exercise.
> ***Collaboration***: see the description of each assignment for exact guidelines. If you are at all uncertain about whether a particular kind of collaboration is acceptable, please ask.
> ***Facilitating academic dishonesty***: intentionally or knowingly helping or attempting to help another to commit academic dishonesty.
> ***Salsa dancing*** *(during class)*: let's call this a tentative "no."

COURSE SCHEDULE (subject to change)

Week One: Introduction		
TThur. 1/26	**Welcome! It's our big day!** Complete work/study habits survey Course overview and concept mapping	**CPA 1**: Read the short article *Genetic Evidence of Yoga's impact on the immune system* Create a concept map of the article and cartoon the experiment

Week Two: C.R.E.A.T.E. Method		
Tues. 1/31	**Grant proposal team assignments, time to get started!** Share concept maps and cartoons Discuss pros and cons of the experimental design Annotate Figure 1 from actual research article	**Assignment 1**: Due Friday Feb. 3 at 5:00 pm Reflect on how you attack reading a difficult research article (no knives please) Work on team contract
Thurs. 2/2	**Abstract analysis**	**CPA 2:** Design next experiment
Sun. 2/5	***Team contract due***	

Week Three: Intro to Microbiome Paper One		
Tues. 2/7	**First class presentation: Next experiment**	**CPA 3**: Watch the TED seminar Meet Your Microbes Read the introduction to Paper 1 Produce a concept map of Paper 1 introduction State the hypothesis the researchers would like to test
Thurs. 2/9	**Paper Introductions; structure and function** Testing hypotheses	**CPA 4:** Annotate Paper 1 figures 1, 2 and 3

Week Four: Microbiome Paper One		
Tues. 2/14 	**Second class presentation: Figures 1, 2 or 3**	**CPA 5**: Cartoon the experiment for Figure 4 Annotate Figure 4
Thurs. 2/16	**Class Discussion Figure 4** Writing abstracts	**CPA 6:** Prepare 90 second class presentation on grant topic **Assignment 2**: Due Thursday February 23 Read the article *What studies of Retractions Tell us* Complete reflection related to the article
Sun. 2/19	***Grant proposal topic due***	

Week Five: Intro to Microbiome Paper 2		
Tues. 2/21	**Third class presentation: 90 second team presentation on grant topic** In class time to work on CPA 7: Design next experiment	**CPA 7:** **Design next experiment**
Thurs. 2/23	**Fourth class presentation: Next experiment**	**CPA 8:** Concept map Paper 2 Introduction Cartoon experiment for Paper 2 Figure 1 Annotate Paper 2 Figure 1

Week 6: Microbiome Paper 2

Tues. 2/28	**Fifth class presentation: Paper 2 Figure 1**	**CPA 9**: Cartoon experiment for Paper 2 Figures 2 and 3 Annotate Paper 2 Figures 2 and 3
Thurs. 3/2	**Sixth class presentation: Paper 2 Figures 2 and 3**	**CPA 10:** Cartoon experiment for Paper 2 Figures 4 and 5 Annotate Paper 2 Figures 4 and 5

Week 7: Microbiome Paper 2		
Tues. 3/7	**Seventh class presentation: Paper 2 Figures 4 and 5**	**CPA 11**: Cartoon experiment for Paper 2 Figure 6 and Table 1 Annotate Paper 2 Figure 6 and Table 1
Thurs. 3/9	**Eighth class presentation: Paper 2 Figure 6 and Table 1**	**CPA 12:** Design next experiment **Work on mock specific aims** (Due Monday 3/13)
Fri. 2/10	***Required grant proposal team meeting with me must completed by 5:00 pm today.*** *Of course, you are welcome to meet with me anytime to discuss your amazing ideas.*	

Week 8: Microbiome Paper 2		
Tues. 3/14	**Ninth class presentation: Next Experiment**	**CPA 13**: Write an abstract for paper 2 using the guidelines we developed in class on 2/2
Thurs. 3/16	**Abstract analysis and discussion**	**Assignment: Relax and Enjoy your spring break!!!!**

Fri. 3/17	***Grant proposal specific aims due***

Spring Break!!!!!

Week 9: Midterm and Ethics Part 1		
Tues. 3/28	**Midterm Exam-**You got this!!! You have been preparing for this for the last eight weeks.	**CPA 14:** Ethics Case Studies
Thurs. 3/30	**Ethics in publishing-** UTAs get to strut their stuff!	Work on Grant Proposals

Week 10: Microbiome Paper 3		
Tues. 4/4	Time to work on grant proposal and ask Dr. Quimby questions	**CPA15:** Concept map introduction to paper 3 and identify the hypothesis to be tested.
Thurs. 4/6	**Introduction to Paper 3**	**CPA 16:** Cartoon experiment for Paper 3 Figure 1 Annotate Paper 3 Figure 1

Sun. 5/9	***Grant proposal draft due for peer review***

Week 11: Microbiome Paper 3		
Tues. 4/11	**Tenth class presentation: Paper 3 Figure 1** (this crazy figure has 7 panels, 7 times the fun!)	**CPA 17:** Cartoon experiment for Paper 3 Figures 2 and 3 Annotate Paper 3 Figures 2 and 3
Thurs. 4/13	**Eleventh class presentation (a piece of cake by now): Paper 3 Figures 2 and 3**	**CPA18:** Cartoon experiment for Paper 3 Figure 4 Annotate Paper 3 Figure 4

Week 12: Microbiome Paper 3		
Tues. 4/18	**Twelfth class presentation (you are a pro now): Paper 3 Figure 4**	**CPA 19:** Cartoon experiment for Paper 3 Figures 5 and 6 Annotate Paper 3 Figures 5 and 6
Thurs. 4/20	**Lucky Thirtenth class presentation (I know, this is getting old, but we are near the finish line): Paper 4 Figures 5 and 6**	Work on grant proposals

Week 13: Microbiome Wrap-up		
Tues. 4/25	**Paper 3 Discussion and significance of the three papers covered**	Work on Grant proposals
Thurs. 4/27	Time to work on grant proposal and ask Dr. Quimby questions	Work on grant proposals

Sun. 4/30	***Final Grant Proposal Due***

Week 14: Ethics Part 2 Genome Editing		
Tues. 5/2	**Genome Editing and Designer Babies**	Read the article *CRISPR/Cas9-mediated gene editing in human tripronuclear zygotes* (no more baby steps, you get the whole challenging article—have fun!)
Thurs. 5/4	*CRISPR/Cas9-mediated gene editing in human tripronuclear zygotes* paper discussion	Prepare for genome editing debate and read grants for mock study section

Week 15: Grand Finale!!!!		
Tues. 5/9	**Genome editing debate**	Read grants for mock study section.
Thurs. 5/11	**Final Exam: Mock Study Section**	