Spring 2014 (Updated December 11, 2013)
Biological Literature And Communication - BIOL 4700 001, 3 Credits, CRN# 24731
Tomer Avidor-Reiss, Ph.D., Tuesday and Thursday between 11-12:15; Room: Wolfe Hall 1240

Course Description
This course focuses on constructive and critical reading of original research papers, and aspires to mimic the various ways scientists discuss submitted scientific work and proposals. To accomplish this, students read primary literature, discuss their content in class and in study groups, and formulate their own supported opinion about the results and interpretations put forth by the authors. Students present their opinion both in writing and verbally, and provide peer reviews for their classmates' work.

Course goal and learning objectives
This is a Capstone course. It provides students the opportunity to demonstrate that they have achieved the learning goals of biology majors at the highest levels (see Bloom Taxonomy). The goal of this course is to give you the skills needed to evaluate scientific work and express a well-supported opinion in a concise manner.

The specific learning objectives of the course are:
1) Students will be able to express thoughts scientifically, clearly, and in concise manner, both verbally and in writing.
2) Students will be able to understand primary scientific literature and use critical thinking to evaluate it.
3) Students will be able to work collaboratively to present scientific literature.
4) Students will be able to use and provide effective peer review for the presentation of scientific findings.

Course Format
This in an interactive course – both the instructor and students will lead discussions with the class. The instructor at the beginning of the course provides general introduction; however, students are required to search for additional literature and to read additional materials to ensure that they understand the background, methods used, etc.

To allow an in-depth understanding of critical reading, all of the papers discussed are related to a particular topic of clinical and scientific significance, which is the centrosome. Each paper is dissected carefully over several meetings.

Blackboard
Announcements and assignments will be posted on Blackboard. It is your responsibility to routinely read the Blackboard postings.

Student Evaluation
Grades will be determined based on 6 factors with an approximate weight as follows:

Pre and post-class assignments:	10%	Team work and Peer Reviews:	10%
Clicker questions:	10%	Oral Presentations:	20%
Attendance:	10%	Term Paper:	30%
Class participation:	10%	Total:	100%

Clicker questions:
DEADLINE TO BE REGISTERED on Blackboard is January 7, 2014.
We will use Turning Technologies (Clickers) in class every class time. Each class starts with several questions intended to verify that the student read, remembered, and understood the paper.

Attendance
Since this course is based on demonstrating comprehension of the materials presented, students are required to attend every class. Unexcused absences will not be tolerated, and excused absences should be rare and supported by a physician's note or other piece of documentation. Students that miss 10 or more classes will automatically fail the class.

Student must attend or perform the activities in the first 6 classes, as they are critical to attaining the course goals. Student that are missing any of these classes will need to submit to the instructor all class activity within 1 week of their enrolling in the course or returning to class after being absent. Student failing to follow this instruction precisely will lose a full grade from their final semester grade in the course.

Rubric: Full grade (1) – coming to class on time and being there from beginning to end.
0.8 or less - coming to class late or leaving before or during class.
0 - Absence from class.

Pre-class writing assignments:
Before the first discussion of each paper you must submit an assignment. All writing assignments must be uploaded to Blackboard as a word document, brought to class as a hard copy to be used by you during class, and handed in on the due date. Because this preparation is critical for your participation in class, failing to submit this assignment before the first discussion of each paper will result in getting 0 credit for the assignment. Assignments are due at 8 AM on the day the paper will be first discussed. The assignment is:

Please read the new paper (Make sure you find out the meaning of key words that you are not familiar with) and upload a file with your answer to the following 4 questions into Blackboard:
1) How was the reading experience?
2) Write at least 3 terms used in the paper that you needed to research to understand their precise meaning.
3) Please write 3 points of interest to discuss in class (be prepared to share them in class).
4) Please write in 150 words a clear, concise, and cohesive paragraph about the paper including:

1. **Background** - What is the subject? What is known abut it? Why this is important?
2. **Question** - What is not known? How significant is this question?
3. **Hypothesis** - What is the author's hypothesis? What is the basis of this hypothesis? Is it significant?
4. **Method** – What was the approach used? What are its advantages and how do they overcome its limitations?
5. **Results** - What did the author's find?
6. **Conclusion/Outcome** - What is the author's interpretation? Do you agree with it?
7. **Future direction** - What can be achieved next that was not possible before?

Post-class assignments:
At the end of the introductory classes and at the end of the discussion of each paper you must submit an assignment. All writing assignments must be uploaded to Blackboard as a word document, brought to class as a hard copy to be used by you during class, and handed in on the due date. Assignments are due 7 days after the assignment was given or the class in which the paper was last discussed.

Rubric for Pre- and post-class assignments:

Subject/ grade	4	3	2	1
Background **Question** **Hypothesis** **Method** **Results** **Conclusion** **Future direction**	Satisfactory: The following 4 grade points are satisfactory: Clear, supported by evidence, concise, and includes an evaluation	Can be improved: i.e. Slight improvement in a few of the grade points	Requires substantial improvement: i.e. Substantial improvement in 1 or more of the grade points	Deficient: Missing 2 or more of the grade points

Class participation
Students must actively participate in class discussions and demonstrate that they have read the assigned paper, analyzed the paper critically, and have done the extra background analysis needed to comprehend the material. Prior to coming to class, students are required to research all aspects of the paper until they understand it completely and are ready to discuss it with their classmates.

Rubric: Full grade (1) - student made 2 or more meaningful contributions to the discussion.
0.8 - student made 1 contribution to the discussion.
0.5 - student that listened attentively to the discussion.
0 - Absence from class or not listening to the discussion.

At the end of each class, each student will submit a paper describing the contributions he or she made to the class discussion that contains the following information:

Name: Date: Grade:
One sentence description of the most meaningful contribution you made:
One sentence description of the second most meaningful contribution you made:
One sentence description of evidence that you have listened attentively to the discussion:

Team Work and Peer reviews:
At the end of the first class, students will be grouped into teams of 5-6 students that present papers togther and peer review each other's work. Each team has a team leader that will coordinate the team activities. Students interested in being a team leader should contact the instructor ASAP. The team as a group will divide the presentation of the paper and organize the peer review. A list of presenters and peer reviewers will be given to the instructor 7 days before presentation.

The first 3 rounds of papers will be selected by the instructor (found in the "Paper" section of Blackboard), and the rest of the papers by the groups themselves. After a team has presented once, the teams will provide a list of papers to the instructor that they would like to present with an explanation about why they chose each of the papers, and how it relates to centrosome biology. These papers need to be focused on an aspect of centrosome biology. After instructor approval of the papers, the teams will present their papers after the second round of presentation.

Peer reviewers are other students from the student team that observe the student's presentation before the in-class presentation, and advise them on how to improve it. Peer reviewers must upload their peer review to Blackboard no later than 24 hours after they observe the presentation, and not later than 24 hours before the class presentation. The reviewer should add a comment near each one of the subjects in the presentation rubric and grade it. Grades will be given to the peer review based on presentation, and whether the peer review pointed out all the deficiencies in the presentation.

When planning their team presentation, teams should expect to have 4 items for each class time. An Item is: The Clicker questions at the beginning of a paper discussion, discussion of students assignments, a figure/table presentation by a student, a discussion of interesting points students had at the end of a paper, and a final discussion of the paper and how it relates to previous papers.

Rubric:

Full grade (1) – peer review pointed out the most critical issues in the presentation that needed improvement.
0.9 or less - peer review pointed out some of the critical issues in the presentation that needed improvment.
0 – no peer review.

In the beginning of the course, the Instructor will present:

0) Centrioles, Centrosomes, and Cilia in Health and Disease
1) Functional genomic analysis of cell division in C. elegans using RNAi of genes on chromosome III By Gönczy P et. al Nature. 2000 Nov 16;408(6810):331-6.

Next, the student groups will present these papers (in this order):

2) SAS-4 is a C. elegans centriolar protein that controls centrosome size By Kirkham M et al. Cell. 2003 Feb 21;112(4):575-87 (Group 1; 7 figures)
3) Flies without centrioles By Basto R et al Cell. 2006 Jun 30;125(7):1375-86 (Group 2; 7 figures)
4) A centrosomal mechanism involving CDK5RAP2 and CENPJ controls brain size By Bond J, Nat Genet. 2005 Apr;37(4):353-5. (Group 3; 2 figures)
5) Novel CENPJ mutation causes Seckel syndrome (Group 3; 3 figures)
6) Asymmetric centrosome inheritance maintains neural progenitors in the neocortex (Group 1; 5 figures)
7) PLK2 phosphorylation is critical for CPAP function in procentriole formation during the centrosome cycle. (Group 2; 8 figures)
8) Subdiffraction-resolution fluorescence microscopy reveals a domain of the centrosome critical for pericentriolar material organization By Mennella V et al. Nat Cell Biol. 2012 Nov;14(11):1159-68. (Group 3; 7 figures)
9) Human microcephaly protein CEP135 binds to hSAS-6 and CPAP, and is required for centriole assembly (Group 1; 9 figures)
10) CEP120 interacts with CPAP and positively regulates centriole (Group 2; 5 figures)
11) Crystal structures of the CPAP/STIL complex reveal its role in centriole assembly and human microcephaly (Group 3; 5 figures)

Oral presentation of the paper figures:

Each class meeting, students from a team will make an oral presentation to the class, and students should expect to present multiple times during the course. A student will present one of the paper's figures as if he or she was one of the paper's authors. The goal of the presentation is to explain the figure. Presentations will consist of a multi-slide powerpoint presention that includes: Titles, Figure panels, and the notes (in the notes section, not on the slide itself) of the presenter with what the presenter is planning to say. At the end of each student's presentation, there will be a discussion, as is usually the case when scientists present their work in a meeting. The student presenting the figure will answer questions and defend the work as if he or she was the author.

Robric:

Weight		Grade: 4 Clear, concise, supported, and explained significance	3 Can be improved	2 Requires substantial improvement	1 or 0 Deficient or Missing
5%	**Introductory statement**: Short 1-3 sentence statement that describes the figure's subject, its conclusion and significance, and the role of the figure that is about to be presented in the paper				
5%	**Fig/Prsentation background:** A slide that provide of the background leading to the experiments describe in the figure				
5%	**Fig/Prsentation qustion:** A slide that providing what is not known before this figure? Why is this question important?				
5%	**Presentation hypothesis:** A slides that describe the hypothesis addressed in the figure				
40%	**Then for each panel in the presentation describe** **a) Question** - What is not known that led to this experiment? **b) Hypothesis** - What is the author's hypothesis? **c) Method** – What was the experimental method? What are the advantages and limitations of the method? **d) Results** - What did the authors find? **e) Conclusion** - What is the author's interpretation? Do you agree with it?				
5%	**Over all summery and conclusion of the figure:** Explaining figure conclusion				
5%	**Future direction - What is next?**				
General					
10%	Slide Titles	Described concisely the take home message	Vague, too long, or not to the point	Does not include the slide premise	Missing
10%	Cohesiveness of presentation	There is clear connection in the transition between slides	The transition between slides can be improved	The transition between slides needs major improvements	Missing
5%	Presentation mechanics	Students faced the audience and pointed to all slide elements at the appropriate time.	Students inconsistently faced the audience or pointed to slide elements.	Students rarely faced the audience and pointed to the slide elements.	Students did not face the audience and point to the slide elements.
5%	Questions and answer section	Question content is repeated and not its tone and the answer is to the point	Inconsistent question repeating or answered the question tone or answer is unfocused	Failing to repeat the question and providing an answer that needs major improvements	Failing to repeat question and providing an irrelevant or wrong answer

Term Paper:
The term paper will mimic the format of a critical paper review, where you must analyze the paper and state its strengths and weaknesses. The term paper is related to centrosomes, and will be available to students in Blackboard during week 5 of the course.

A draft of the term paper must be submitted by the end of the 9th week of the semester (March 7 2014).

The term paper must be submitted by the end of the 14th week of the semester (April 11 2014).

In the term paper, using 600 words (not more), address the points below:

Write a short introductory paragraph summarizing the paper addressing:

1) Background - What is the subject of the paper? What is known abut it? Why is this important?

2) Question - What is not known before this paper? Why is this question important?

3) Hypothesis - What is the author's hypothesis in the paper? What is the basis of this hypothesis?

4) Method – What was the general approach? What are the advantages and limitations of the approach?

5) Results - What was the paper's main finding?

6) Conclusion - What is the paper's main conclusion? Do you agree with it?

7) Future direction - What is next?

Then write a string of short paragraphs summarizing, in each paragraph, one finding of the paper, addressing for each one of the findings:

a) Question - What is not known that led to this experiment?

b) Hypothesis - What is the author's hypothesis?

c) Method – What was the experimental method? What are the advantages and limitations of the method?

d) Results - What did the authors find?

e) Conclusion - What is the author's interpretation? Do you agree with it?

Writing assignments must BOTH be submitted on Blackboard as a word document **and** handed in as typed hard copies on the due date, **no exceptions**. Papers handed in late will receive a penalty of 10% per day late. Papers longer then 600 words will receive an additional penalty of at least 10%.

Writing Assignment Format
Use Arial font 11, page margins are 0.5 inches with single line spacing. Justify paragraphs, and do not indent at the beginning of a paragraph, instead, add a space of 6 points before a paragraph. Keep the paragraph on one page - do not have paragraphs separate over a page break; paragraphs should not be longer than 1/3 of a page. Remember, scientific writing should always be simple, clear, and concise. Grades will be reduced by 10% if formating is not followed precisely.

Statement on academic dishonesty: The term paper requires individual research and writing. Therefore, students handing in assignments that do not represent their own work will receive a failing grade in this course.

Grades:

A	100-94%	A-	93-90%	B+	90-87%	B	87-84%	B-	83-80%
C+	80-77%	C	77-74%	C-	73-70%	D+	70-67%	D	67-64%
D-	63-60%	F	60-0%						

Issues that will be discussed in class (not necessarily in this order):

The scientific process
Funding of scientific research
Finding scientific papers
Writing an abstract
Writing a scientific paper
Reading primary scientific papers
Scientific Meetings
Preparing oral and poster presentations
Use of audio/visual equipment (PowerPoint)
Inception of ideas, authorship, patents

Instructor:

- Tomer Avidor-Reiss, Ph.D.
- Offices: Wolfe Hall room 4259B
- Email: Tomer.AvidorReiss@utoledo.edu

  Please make sure the subject line starts with: "Spring 2014, Course 4700"
- Website: Go to "https://blackboard.utdl.edu/webapps/login/", Log in using UTAD and University of Toledo password and then select "2014:1 Spring, BIOL4700:001 Biol Lit and Comm-WAC."

Office Hours: By appointment - Tuesday and Thursday during the hour after class; Wolfe Hall Room 4259B

Suggested literature:

Experimental Design for Biologists by David J. Glass

Publication Date: November 28, 2006 | ISBN-10: 0879697350 | ISBN-13: 978-0879697358 | Edition: 1. Book Description as appears at the book web site (http://www.amazon.com/Experimental-Design-Biologists-David-Glass/dp/0879697350):

"The effective design of scientific experiments is critical to success, yet graduate students receive very little formal training in how to do it. Based on a well-received course taught by the author Experimental Design for Biologists fills this gap. 'Experimental Design for Biologists' explains how to establish the framework for an experimental project, how to set up a system, design experiments within that system, and how to determine and use the correct set of controls. Separate chapters are devoted to negative controls, positive controls, and other categories of controls that are perhaps less recognized, such as "assumption controls," and "experimentalist controls." Furthermore, there are sections on establishing the experimental system, which include performing critical "system controls." Should all experimental plans be hypothesis-driven? Is a question/answer approach more appropriate? What was the hypothesis behind the Human Genome Project? What color is the sky? How does one get to Carnegie Hall? The answers to these kinds of questions can be found in Experimental Design for Biologists. Written in an engaging manner, the book provides compelling lessons in framing an experimental question, establishing a validated system to answer the question, and deriving verifiable models from experimental data. Experimental Design for Biologists is an essential source of theory and practical guidance in designing a research plan".

How to give a good talk.
Alon U. Mol Cell. 2009 Oct 23;36(2):165-7.
Abstract: "We depend on talks to communicate our work, and we spend much of our time as audience members in talks. However, few scientists are taught the well-established principles of giving good talks. Here, I describe how to prepare, present, and answer questions in a scientific talk. We will see how a talk prepared with a single premise and delivered with good eye contact is clear and enjoyable".

Style: Lessons in Clarity and Grace (10th Edition) by Gregory G. Colomb and Gregory G. Colomb
This book explains how to write clearly, simply and concisely

Introductory papers on centrosome
- Centrioles, centrosomes, and cilia in health and disease By Nigg EA and Raff JW. Cell. 2009 Nov 13;139(4):663-78.
- Towards a molecular architecture of centriole assembly By Gönczy P. Nat Rev Mol Cell Biol. 2012 Jun 13;13(7):425-35. doi: 10.1038/nrm3373.
- Clockwise or anticlockwise? Turning the centriole triplets in the right direction! By Uzbekov R and Prigent C. FEBS Lett. 2007 Apr 3;581(7):1251-4.