Term Information

Effective Term	Spring 2020

General Information

Course Bulletin Listing/Subject Area	Microbiology
Fiscal Unit/Academic Org	Microbiology - D0350
College/Academic Group	Arts and Sciences
Level/Career	Graduate
Course Number/Catalog	6790
Course Title	Scientific Writing
Transcript Abbreviation	ScientificWriting
Course Description	A successful researcher is someone who knows both how to do their science, and also how to effectively communicate their findings through the written and spoken word. The purpose of this course is to introduce students to the processes involved in professional or scholarly publication.
Semester Credit Hours/Units	Fixed: 2

Offering Information

Length Of Course	14 Week
Flexibly Scheduled Course	Never
Does any section of this course have a distance education component?	No
Grading Basis	Letter Grade
Repeatable	No
Course Components	Lecture
Grade Roster Component	Lecture
Credit Available by Exam	No
Admission Condition Course	No
Off Campus	Never
Campus of Offering	Columbus

Prerequisites and Exclusions

Prerequisites/Corequisites	Instructor permission required
Exclusions	Not open to students with credit for Chemistry 6790
Electronically Enforced	Yes

Cross-Listings

Cross-Listings	Chemistry 6790

Subject/CIP Code

Subject/CIP Code	26.0502
Subsidy Level	Doctoral Course
Intended Rank	Masters, Doctoral

Requirement/Elective Designation

The course is an elective (for this or other units) or is a service course for other units

Course Details

Course goals or learning objectives/outcomes

- Identify, discuss, and analyze various rhetorical strategies and elements of the writing process as applicable to academic writing
- Critically read published work in their specializations and compose thoughtful, constructive commentary on those works
- Identify and analyze publication venues in their specializations and articulate different requirements of those venues
- Identify and implement appropriate writing strategies for composing works for different publication venues

Content Topic List

- Scientific Publication
- Writing a Research Paper
- Parts of a Research Paper
- Scientific Conferences
- Writing for a Lay Audience
- Research Proposals
- Presentations

Sought Concurrence

No

Attachments

- LG_Map_M6790.pdf: Course objectives mapped to program learning goals

  (Other Supporting Documentation. Owner: Kwiek,Jesse John)
- Cover_letter_resubmission_Oct2019.pdf: Resubmission Cover Letter

  (Cover Letter. Owner: Kwiek,Jesse John)
- Micro 6790_syllabus_Spring 2020v2.1.pdf: Revised Syllabus

  (Syllabus. Owner: Kwiek,Jesse John)

Comments

- See 9-17-19 email to T. Magliery and C. Rappleye *(by Oldroyd,Shelby Quinn on 09/17/2019 04:00 PM)*

Workflow Information

Status	User(s)	Date/Time	Step
Submitted	Kwiek,Jesse John	07/10/2019 03:51 AM	Submitted for Approval
Approved	Kwiek,Jesse John	07/10/2019 03:54 AM	Unit Approval
Approved	Haddad,Deborah Moore	07/10/2019 12:26 PM	College Approval
Revision Requested	Oldroyd,Shelby Quinn	09/17/2019 04:00 PM	ASCCAO Approval
Submitted	Kwiek,Jesse John	10/02/2019 08:25 AM	Submitted for Approval
Approved	Kwiek,Jesse John	10/02/2019 08:33 AM	Unit Approval
Approved	Haddad,Deborah Moore	10/02/2019 08:41 AM	College Approval
Pending Approval	Jenkins,Mary Ellen Bigler Hanlin,Deborah Kay Oldroyd,Shelby Quinn Vankeerbergen,Bernadette Chantal	10/02/2019 08:41 AM	ASCCAO Approval

THE OHIO STATE UNIVERSITY

Department of Microbiology

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microbiology.osu.edu

2 October 2019

RE: Microbiology 6790: Scientific Writing

Dear Colleagues,

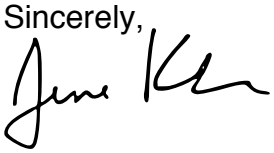
We thank you for your support of our multidisciplinary scientific writing class. Below you will find a point-by-point listing of the requested changes (black font) and our response (blue).

- Contingency: Provide a grading scale and a breakdown of the additional assignments to be assigned (currently states "additional major writing assignments – TBA") — ported assignment descriptions and percentages in to this document; relabeled general rubric to also include grading scale.

- Recommendation: Include a grading scale on the syllabus.—corrected as suggested.

- Recommendation: The syllabus states "Required Course texts: We suggest you purchase…" Clarify if course texts are required or recommended.—corrected as suggested.

Sincerely,



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Microbiology 6790 / Chemistry 6790: Special Topics: Scientific Writing
Spring 2020

Location: 104 Aronoff
Meeting times: Tues/Thurs 1:30-2:25 (2 credit)

Faculty Instructors:

Karin Musier-Forsyth, 3033B McPherson
musier-forsyth.1@osu.edu

Michael Ibba, 276 Aronoff
Ibba.1@osu.edu

Susan M. Lang, 4132C Smith Lab
lang.543@osu.edu

Course Overview
The purpose of this course is to introduce students to the processes involved in professional or scholarly publication and provide plenty of writing experience. During the first part of the course, we will discuss the process of choosing a venue for publication and the scientific review (the process, the ethics, and writing a useful review). We'll then examine the components of research articles and consider what constitutes productive writing habits for completing primary research articles and review articles. We'll also discuss common writing issues at the organizational and stylistic level. Additional topics will include writing for a lay audience, writing effective abstracts for conference presentations, and writing research proposals. Throughout the course, ethical issues including bias in peer review and plagiarism will be discussed and whenever possible, the writing assignments will be tailored to the students' research interests and needs.

Learning Outcomes (and methods of assessment)
By the end of the course, students will be able to:

- Identify, discuss, and analyze various rhetorical strategies and elements of the writing process as applicable to academic writing
- Critically read published work in their specializations and compose thoughtful, constructive commentary on those works
- Identify and analyze publication venues in their specializations and articulate different requirements of those venues
- Identify and implement appropriate writing strategies for composing works for different publication venues

Required Course texts. *Successful Scientific Writing*, *4th edition* by Janice R. Matthew and Robert W. Matthews, which will be the primary text for this class.

Recommended resources: *Writing in the Sciences*, 3rd Edition by Ann M. Penrose and Steven B. Katz
Other readings available on Carmen.

Description and Guidelines for Assignments
All work submitted for this course should use standard file formats (i.e., DOCX, PPT) and should be uploaded to the appropriate location on Carmen. All major assignments must be submitted to be eligible to receive a passing grade in the course. Due dates are listed in the course schedule and will be clearly announced in class.

Week 1 assignment: Writing Inventory (5%)

Purpose: The writing inventory is an informal assignment in which you discuss your writing experience (academic and/or workplace), writing strengths, weaknesses, and any questions you may have.

Assignment: Write a ½-1 page single-spaced memo addressed to your instructors in which you discuss the following:

- Prior academic and/or workplace writing experience, including amount and types of writing you have done
- Writing Strengths—what do you generally do well when you write?
- Writing Weaknesses—what do you know, coming into this class, that you need help with in regard to your writing?
- Questions about writing or publication processes.
- Goals that you've set for yourself in regard to this course.

Week 2 assignment: Evaluation of Resources for Research and Publication (5%)

Purpose: The purpose of this assignment is to guide you through an investigation and evaluation of the journals in your particular field of study.

Assignment: Answer the following questions as clearly and thoroughly as possible and just note if the information was not clearly available on the web site.

- Explore the web sites of the following 3 major peer-reviewed journals in the life sciences (*Journal of Biological Chemistry, ELife, and Nature Communications*) in addition to 1 other major peer-reviewed journal in your field. Give full title and URL and avoid *Science* and *Nature* journals for your 4th option. Choose a journal your lab (or one you rotated in for first years) has published in in the last 3 years. For each of the 4 journals, answer the following questions:

a. Is it published in print, online, or some combination of the two?
b. How long has this journal been in existence?
c. How often is it published (weekly, once every 2 weeks, monthly, etc)?
d. Who runs/sponsors the journal (a scientific society? a private for-profit organization? a non-profit organization, etc) ? Is this an important consideration in academic scientific publishing? Why or why not?
e. Is there any information provided on how much it costs to publish an article? If so, how much? Is this an important consideration in academic scientific publishing? Why or why not?
f. Who are the editors and associate editors that handle the articles (we don't need specific names but are they "regular scientists/professors" who additionally serve as editors or is this their full-time job?). Is this an important consideration in academic scientific

publishing? Why or why not?

g. What are the types of articles published in the journal (articles, communications, reviews, etc)?
h. What is the general quality of reproduction in the journals? Do the journals provide specific guidelines for the preparation and submission of illustrations?
i. What is one thing you learned about the peer-review process from the web site?
j. After exploring the journal web site, what is one surprising thing you learned about any other aspect of the publishing process in that journal?
k. A common method of evaluating a journal these days is the so-called "impact factor". How is the impact factor calculated? What is the impact factor of the 4 journals you are exploring? Do you think this is a reasonable and accurate measure of journal quality? Why or why not?

- Name at least 1 publication in your field that can be classified as popular or semi-technical? (Give title and URL)
  a. What is the general method of organization of the articles?
  b. How do they compare to the academic journals in their verbal and visual style?
  c. To what audiences are they directed?

- What is bioRxiv?
  a. Why is it potentially beneficial to submit an article to this service?
  b. Are there any downsides to publishing in bioRxiv?

Week 3 assignment: Writing an effective manuscript review (5%)

Purpose: The purpose of this assignment is to gain experience in reviewing scientific manuscripts.

Assignment: Select a paper in a field of interest to you from a list detailed below, and provide a concise and constructive review.

1. Explore the web site http://www.jbc.org/site/minireviews/minireview_compendia.xhtml

2. Identify a minireview you are interested in reading and reviewing. Consider choosing a topic that you are generally familiar with and would like to learn more about. This will allow you to assess how successful the authors are in explaining topics with which you are less familiar.

3. Write a review of the article that is no more than one page in length.

4. Your review should be composed of two sections:

   a. At least 80% of the review should be "Comments to be shared with authors". Include a short summary of the minireview with positive comments, as well as Major Concerns (if any) and Minor Concerns (if any).

   b. The remainder of the review should be "Confidential comments for the editor", where you have the opportunity to share any concerns or recommendations with the editor.

Week 4 assignment: Examples of Effective and Ineffective Titles and Abstracts

Consider articles you have read recently and select one example each of an effective title and abstract, and an ineffective title and abstract. Once you have selected your examples, create a document where you

1. list the citation for each article you draw from
2. paste in the entire title and/or abstract from the article
3. write a sentence or two about why you find each effective or not.

Note that it's possible to find an effective title but ineffective abstract, or vice versa, from the same article.

Week 5 assignment: Title and Abstract Assignment (5%)

Following our discussion of titles and abstracts today, we want to give you practice in writing both. To complete the assignment, choose one of the options below and draft 1) an appropriate, effective title, and 2) an abstract of 150 - 200 words for that option. Consider both our class discussion and the readings in Matthews and Meo that discuss features of strong titles and abstracts as you do so.

Option A: Write a title and abstract for a current project you are working on. (Even if the project is not yet complete, write your abstract for a publication, not a more preliminary conference-style abstract)

Option B: Read the linked article and draft an appropriate title and abstract for it.

Week 6 assignment: Evaluate an Introduction to an article (5%)

Consider either articles you have read recently or the CRISPR/Cas paper some of you wrote abstracts for this past week. Once you have selected your example, create a document where you

1. list the citation from the article you draw from, if you don't use the CRISPR/Cas paper
2. paste in the entire introduction from the article
3. using criteria you've learned from our readings and class discussion, critique the introduction, ultimately assessing whether the introduction is effective or not, in your view

Your assessment should also consider how the introduction works alongside the title and abstract for the article--do the three elements work together or seem to contradict or not help draw the audience into the article?

Week 7 assignment: Writing an Introduction (5%)

Having analyzed an introduction this past week, now it's your turn to draft one. To complete the assignment, choose a project that you have been working on (or one of your rotation projects if you're in your first year), and write an introduction of 3 - 5 paragraphs to a hypothetical paper on that project. Consider both our class discussion and the readings in Matthews and Meo that

discuss features of strong introductions as you do so. Remember to include an appropriately formatted references list.

Week 8 assignment: Title and Abstract for Conference Submission (5%)

Using what we discussed in class, along with the material provided in the PPTX (uploaded to Carmen), prepare a title and abstract suitable for conference submission. The abstract should be based on an ongoing (or rotation) project and target a conference you would like to attend in the future.

Include at the top of the page a link to the conference website (submission guidelines if available) and brief statement of who the primary audience is at this conference.

Week 9 assignment: Pitching a review article (5%)

To complete this assignment, you'll fill out the form available in our course files titled "JBC Reviews Proposals." Use what we discussed in class about review articles to help you design and pitch your review.

Assignment#2 due March 18: Revising your Introduction

Additionally, we would like you to revise the Introduction that you submitted, taking into account the comments and suggestions provided by Mike, Karin, and Susan. Start with your first submission and highlight all the changes that you make so that we can easily see the revisions. Feel free to ask for clarification if our initial comments were not clear.

Please submit both of these assignments in a single file.

Week 11 assignment: Tweet to announce/sell research to a public audience (5%)

To complete this assignment, you'll tweet an announcement of either work you're doing or recent work you read about and found exciting to a target lay audience. We discussed general principles of talking to different audiences on Tuesday; the following resource links discuss more specifically the topic of "tweeting science." We'd encourage you to look at these before writing your tweet.

Remember to observe the rules--280 characters, including spaces!

https://lternet.edu/twitter-for-scientists/ (Links to an external site.)Links to an external site.
https://21centurysci.beckman.illinois.edu//files/2017/11/Rodrigues-Tweeting-Science.pdf (Links to an external site.)Links to an external site.
https://scientistseessquirrel.wordpress.com/2018/07/31/tweeting-to-the-science-community-audience-content-and-voice/ (Links to an external site.)Links to an external site.
https://scientistseessquirrel.wordpress.com/2018/08/22/tweeting-science-to-policymakers/ (Links to an external site.)Links to an external site.
https://www.sciencemag.org/news/2018/08/scientists-do-you-want-succeed-twitter-here-s-how-many-followers-you-need (Links to an external site.)Links to an external site.
https://www.forbes.com/sites/marshallshepherd/2018/11/19/why-a-new-study-says-scientists-should-use-twitter/#4eb888883329 (Links to an external site.)Links to an external site.

Assignment: Individual writing conferences with Susan

At some point in the first part of April, as the course winds down, we'd like each of you to schedule a 30-minute conference with Susan to discuss your writing--process, achievements, lingering/ongoing issues with writing. This will let you find out about more resources to help you keep improving your skills.

After spring break, email Susan with 1) some available timeslots and 2) one or two topics you want to discuss.

Week 12 assignment: Proposal Aims Page Opening Paragraph and Significance Statement (5%)

Write a short title (and 1 paragraph background/significance statement) for your proposal, including an *overarching hypothesis* and final Impact Statement. Follow the general format discussed in this week's PPTX.

Notes:

You don't have to detail your aims but keep your overall aims/goals in mind when writing this.

During the next class period, you will exchange this assignment with a partner (we will provide the hard copies), critique each other and discuss how effective the paragraph was at:

-describing the big picture question in a clear manner

-grabbing the attention of the reader

-clearly stating the overarching hypothesis

-making a compelling case for the overall impact/significance

Week 13 assignment: Revised aims paragraph and significance statement; Peer Review of your partner's statement (5%)

To complete this assignment, you have two tasks:

- First, complete the review form for your partner's aims paragraph and significance statement. Focus on providing specific feedback that will help support the scores you give the draft. (5 pts)
- Second, revise your own assignment from last week, using the discussion you had with your peers and the advice given in Chs. 11 - 13 of Matthews. (5 pts)

turn both assignments in together in a single file. As with your introduction revisions, highlight or use track changes to help us see what changed.

Week 14 assignment: Lightning Presentation (5%)

Prepare a 5-min lightning presentation on a topic related to your research interests. You should have a title slide and a maximum of 5 additional slides. Time each of your slides and set them up to advance automatically. You will give your presentation to the class on 4/16. The scoring and presenter rubric are shown below. Please send your ppt file to all 3 instructors by noon on

Monday 4/15. Tell us the # of seconds for each slide so that we can check that it is set up correctly.

Presentation Rubric

1 = yes, excellent 2= pretty good 3= needs improvement

Significance: the speaker excited me with the significance of their research. 1 2 3

Clarity: the speaker's explanation of the goals and findings of their research was clear and logical. 1 2 3

Impact: the speaker excited me with the potential impact of their research. 1 2 3

Slide Deck: the slides constructed for the presentation provided useful information and contained an appropriate balance of figures and text. 1 2 3

Week 15 assignment: Final Reflective Writing (5%)

For this last assignment, it's time to close the loop on the course. You'll focus on what you've learned to this point--look back at your initial writing inventory, your assignments, readings, etc. to help you consider how your writing and knowledge of writing professionally has changed. In addition to discussing what you have learned, tell us what questions you still have about writing, and note for us some things you'll be working on to improve.

This assignment should be, at most, one page single-spaced, reasonable margins and font choices.

Participation (10%)

Your participation grade will be based on your active and quality participation in class discussions, including completion of all class readings and any small written assignments we request.

There is no final exam for this course.

Grading Scale and General Rubric

Each assignment will have its own rubric, but the one below, along with the grading scale, gives you a general idea of our expectations.

Grade	Description
A 90-100	**Professional quality work** Appropriate for workplace distribution, with minimal or no revision. Exceeds assignment requirements using a creative or challenging approach in its style, development and/or delivery. The work demonstrates superior organization, research, visual design and editing.
B 80-89	**Adequate quality work** Pending some revision, would be appropriate for professional distribution. Meets assignment requirements, following typical genre and style conventions. The work's research, development, organization, style, and visual design demonstrate adequate effort, but with problems in some areas.
C 70-79	**Low quality work**

	Requires subsequent development and review before consideration for professional distribution. Meets most of the assignment requirements, yet the work demonstrates more obvious problems in the development, organization, style, visual design and editing.
D 60-69 **E** 0-59	**Poor quality work** Fails to complete many of the minimum assignment requirements. The work is lacking in research and development and has serious problems with the organization, visual design and editing. This grade is also reserved for plagiarized work.

Attendance
If you are going to be absent, send instructors an email notification in advance. Since we only meet once per week, you are permitted to miss one class over the duration of the course, but are encouraged not to do so. If you miss a class, you will be required to submit a 1000-word summary of the material assigned that day. **Failure to do so will result in a 10% reduction of the final course grade. Each subsequent absence (in any circumstance) may result in an additional 10% reduction of your final course grade.**

Late Work
Generally, late work is not encouraged. However, if you have an exceptional circumstance that may require you to be late with an assignment, you are permitted one late exception. To qualify, you must submit an email to instructors no later than the original due date, requesting a late exception. Once approved, the extended deadline will be seven (7) calendar days from the original due date. Subsequent late work will be assessed a 10% penalty per calendar day late. Work due on the last day of class may not qualify for a late exception.

Academic misconduct
It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term "academic misconduct" includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee (Faculty Rule 3335-5-487). For additional information, see the Code of Student Conduct http://studentlife.osu.edu/csc/.

Disability services

The University strives to make all learning experiences as accessible as possible. If you anticipate or experience academic barriers based on your disability (including mental health, chronic or temporary medical conditions), please let me know immediately so that we can privately discuss options. To establish reasonable accommodations, we may request that you register with Student Life Disability Services. After registration, make arrangements as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. SLDS contact information: slds@osu.edu; 614-292-3307; slds.osu.edu; 098 Baker Hall, 113 W. 12th Avenue.

Diversity statement
The Ohio State University affirms the importance and value of diversity in the student body. Our programs and curricula reflect our multicultural society and global economy and seek to provide opportunities for students to learn more about persons who are different from them. We are committed to maintaining a community that recognizes and values the inherent worth and dignity of every person; fosters sensitivity, understanding, and mutual respect among each member of our community; and encourages each individual to strive to reach his or her own potential. Discrimination against any individual based upon protected status, which is defined as age, color, disability, gender identity or expression, national origin, race, religion, sex, sexual orientation, or veteran status, is prohibited.

Mental Health
As a student you may experience a range of issues that can cause barriers to learning, such as strained relationships, increased anxiety, alcohol/drug problems, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may lead to diminished academic performance or reduce a student's ability to participate in daily activities. The Ohio State University offers services to assist you with addressing these and other concerns you may be experiencing. If you or someone you know are suffering from any of the aforementioned conditions, you can learn more about the broad range of confidential mental health services available on campus via the Office of Student Life's Counseling and Consultation Service (CCS) by visiting ccs.osu.edu or calling 614- 292-5766. CCS is located on the 4th Floor of the Younkin Success Center and 10th Floor of Lincoln Tower. You can reach an on call counselor when CCS is closed at 614-292-5766 and 24 hour emergency help is also available through the 24/7 National Suicide Prevention Hotline at 1-800-273- TALK or at suicidepreventionlifeline.org.

Title IX
Title IX is clear that violence and harassment based on sex and gender are Civil Rights offenses subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories (e.g., race). If you or someone you know has been sexually harassed or assaulted, you may find the appropriate resources at http://titleix.osu.edu or by contacting the Ohio State Title IX Coordinator, Kellie Brennan, at titleix@osu.edu .

Student wellness and counseling services
OSU offers a range of services to assist students experiencing elevated stress levels. Counseling and Consultation Service (CCS; ccs.osu.edu) provides a range of confidential mental health services to students. 24-hour emergency help is also available through the National 24/7 Prevention Hotline at 1-800-273-TALK or at suicidepreventionlifeline.org. Wellness Coaching (go.osu.edu/wellnesscoaching) is a free service provided by the Office of Student Life that takes an empowering, strength-based approach to building your capacity to face challenges and navigate transitions in order to create the life you want to live. In addition, the "Student Advocacy Center is committed to helping students navigate Ohio State's structure and to resolving issues. that they encounter at the university" (http://advocacy.osu.edu/).

Schedule: The format will generally include a lecture on Tues and an in-class writing/discussion session related to the assignment on Thurs.

Dates	Topics	Readings	Assignment
Week One	**Course Introduction, Requirements Getting Started**…	Penrose & Katz, Ch. 1, "Science as Social Enterprise." (read in advance of first class)	Writing inventory
Weeks 2-3	**Scientific Publication**— venues, the submission and review process, the ethics, writing a useful manuscript review	Zucker, "Demystifying the publishing process: a primer for early career investigators" Masic, "Plagiarism in scientific research and publications and how to prevent it" Matthews, Ch 1 Waser, "Writing an Effective Manuscript Review"	Evaluation of resources Manuscript review
Week 4	**Writing a Research Paper:** What are desirable and undesirable characteristics of articles?	Meo, "Anatomy and physiology of a scientific paper" Matthews, Ch 3-4	Examples of effective and ineffective titles and abstracts
Weeks 5-7	**Parts of a Research Paper:** Title and Abstract Introduction and Methods Results and Discussion Tables and Figures	Matthews, et. al., Ch 5-9	Abstract draft for work in progress *Due: Feb 11 at noon* Evaluate an introduction Write an Introduction
Week 8	**Scientific Conferences:** Titles and Abstracts		Title and abstract for conference submission
Week 9	**Writing a Review Article**	Daldrup-Link, "Writing a review article: Are you making these mistakes?"	Pitching a review article
Week 10	**Spring Break: No class**		

Week 11	**Writing for a Lay Audience**	Penrose and Katz, Ch. 8, "Communicating with Public Audiences"	Write an effective science-related tweet to a lay audience
Week 12	**Research Proposals:** Where to submit? Coming up with and selling an effective idea/scientific premise	Penrose & Katz, Ch. 7, "Writing Research Proposals" Van Ekelenburg, "The Art of Writing Good Research Proposals" Matthews, Ch 10-12	Proposal aims page opening paragraph and significance statement
	Individual Writing Conferences		*Set up meeting time with Susan Lang*
Week 13	**Research Proposals:** Aims and Abstracts Significance and Innovation Design and Methods Peer Review and Revision	Kelly, Sadeghieh, Adeli, "Peer review in scientific publication: benefits, critiques, and a survival guide"	Revised aims paragraph/significance statement and peer review of partners statement
Week 14	**Presentations**	Lortie, "Ten simple rules for lightning and Pechakucha presentations" Baehr, Ch 17 Matthews, Ch 15-16	Prepare a 5-min lightning talk
Week 15	**Lightning Presentations**		*Presentation in class*
	No final exam		Final Reflective Writing

Mapping Microbiology 6790 Learning Goals to Ph.D. Degree Program Learning Goals

Microbiology Ph.D. Degree Program Learning Goals

PhD graduates of Microbiology should be able to:

1. Demonstrate a broad base of knowledge in several areas, including microbial physiology, genetics, biochemistry, and pathogenesis.
2. Demonstrate in-depth knowledge in an area of interest.
3. Make an original and substantial contribution to the field, as indicated by at least one first-author publication.
4. Effectively communicate science through oral and written presentations to both scientific and general audiences.

Microbiology 6790 Learning Outcomes Mapped to Ph.D. Degree Program Learning Goals

- Identify, discuss, and analyze various rhetorical strategies and elements of the writing process as applicable to academic writing **(PLG 4 Advanced)**
- Critically read published work in their specializations and compose thoughtful, constructive commentary on those works **(PLG 4 Advanced)**
- Identify and analyze publication venues in their specializations and articulate different requirements of those venues **(PLG 4 Intermediate)**
- Identify and implement appropriate writing strategies for composing works for different publication venues **(PLG 4 Intermediate)**