

BB 317/BI 317 – Scientific Theory and Practice – Syllabus

**OSU Baccalaureate Core, College of Science,
Writing Intensive Course – Fall 2016 (3 credits)**

Class meetings: MWF 12:00-12:50 PM, ALS 2018

Instructor: Dr. Kari van Zee, Biochemistry and Biophysics Department

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Office Hours: W 10-11 am; other times by appointment

GTA: Jason Schindler

Office hours: __TBA and by appointment

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Please use OSU student e-mail addresses for all course communications.

Aims of the course

BB 317 / BI 317 aims to prepare students for scientific/technical careers by providing opportunities for them to approach problems scientifically, develop critical thinking and analytical skills, explore how scientific discoveries are made and communicated, and design a career map to achieve their goals. We will use in-class discussion forums as well as formal and informal written assignments to accomplish these goals.

Learning Outcomes and WIC Learning Outcomes

Students will:

1. Develop and articulate content knowledge and critical thinking in the life sciences through frequent practice of informal and formal writing.
2. Demonstrate knowledge/understanding of audience expectations, genres, and conventions appropriate to communicating in life science disciplines.
3. Demonstrate the ability to compose a document of at least 2000 words through multiple aspects of writing, including brainstorming, drafting, using sources appropriately, and revising comprehensively after receiving feedback on a draft.

Students will demonstrate competence in/knowledge of the nature and process of science by:

1. Analyzing, evaluating and interpreting evidence from peer-reviewed articles in the life sciences.
2. Formulating hypotheses and designing experiments to test hypotheses.
3. Discussing the conventions of peer review and publication in professional journals in the life sciences.
4. Producing examples of the different kinds of writing used frequently by life scientists to communicate with fellow scientists and with the general public.
5. Evaluating sources of information in the life sciences.

Learning Resources

Materials used in the course will be made available online through the class Canvas portal. Students will be loaned a copy of *Everyday Practice of Science* by Frederick Grinnell to read during the term. This copy must be returned in good condition to Dr. van Zee before the end of the term. Replacement cost for a lost copy of *Everyday Practice of Science* is \$20.

New materials will be posted on the Canvas site on a regular basis.

I welcome you to contact me through office hours, email, or additional appointments to discuss your work. During weeks 1-5, I lead 3 sections of BB 493 Biochemistry Lab and am in lab all day Tues and Thurs., as well as Mon and Wed. afternoon. I will be able to meet Mon and Wed mornings, as well as much of Friday. We will also announce times Jason is available to meet.

Course Philosophy and Format

BB317/BI317 is designed to provide students with multiple opportunities to develop strong critical thinking and communication skills essential in a variety of scientific careers. Throughout the term we will focus on:

- practicing clear and critical thinking
- applying vocabulary, terms, and conventions of scientific writing appropriate for the scientific field and relevant audience
- communicating ideas clearly, logically and in a manner appropriate to the audience.

We will also explore the “*everyday practice of science*” and consider the role of science and technology in society, who determines what research gets funded, how one gets money to do research, how discoveries of science are used in medicine and technology, career pathways in science, and how the public perceives science.

Grading Policies

BB 317 / BI 317 is a discussion-based course rather than a lecture-based course, and participation in discussions is essential for success. Discussions and writing activities will be based on assigned readings that you must complete **before** coming to class. All students are expected to participate actively in the discussions throughout the course.

Students will be evaluated on the basis of (600 pts total)

1. Participation in Class Discussions (100 pts)
2. Lead journal club group discussion (50 pts)
3. Informal writing (80 pts): reflection (10 pts), grant review exercises (30 pts) and journal club preparation questions (40 pts)
4. Attendance at a scientific lecture of choice (guidelines for the lecture choice will be given in class) during the term and written summary of the research and its significance (40 pts)
5. Ethics Training Certification (30 pts)
6. Formal written assignments (200 pts)
(3 assignments: Comparative Document Analysis, Critical Analysis of a Scientific Paper, Science Outreach Grant Proposal)
7. Final 10-year career road map (100 pts)

Class Participation

I expect all students to participate actively in both small group and class discussions. To foster your development as an active learner, I expect active participation in class and small group discussions. You will be graded on both the *extent*, the *quality* (accuracy, clarity, relevance, etc.), and the professionalism of your contributions to the discussions. Please note that attendance and participation are not the same thing.

In-class work will include working with other students to analyze data, formulate hypotheses, design experiments, lead and participate in journal club-style discussions, etc. Participation in class discussions and in class work will be graded on

- productive contributions demonstrating good scientific/critical thinking skills
- presenting evidence to support a position
- making a relevant response to someone else's remarks
- recognizing errors in someone else's or your own reasoning
- listening actively
- making a connection to another reading or topic previously discussed
- bringing other sources to the class's attention that provide food for thought (articles related to the topic under discussion, for example)
- practicing respectful and professional behavior

Journal Club Discussions

An important component of the "practice of everyday science" is reading scientific articles published in peer-reviewed journals. Some of you may have experience reading journal articles for other courses you have taken or for a research lab of which you are a member. For others, this may be new experience. The goals of journal club in this course are to help you 1) develop skills in critical thinking, 2) practice scientific journal article-reading and learn how to extract information from a scientific paper, 3) make connections between the research presented in an article and its significance in the broader world, 4) hone skills in guiding and participating in productive discussions, and 5) have fun learning about research advances in a variety of fields.

Teams of 4-6 students will be formed at the beginning of the term and assigned a date in which to lead Journal Club. All students are expected to read all of the articles and resources and participate actively in the discussions. To prepare for the journal club discussions, you will need to complete journal club discussion guide ahead of the discussion and post this to Canvas before the discussion. Students must attend the journal club discussion session in order to receive points for the submitted journal club discussion guide. Late submissions will not be accepted and will receive 0 points for the guide (No exceptions).

All members of the presenting team are responsible for working together to:

1. Select a **primary research article** on a topic of biology/biochemistry/molecular and cell biology/medicine of interest to your team and published within the last 4 years from a leading, peer reviewed journal;
2. Select 1-2 additional resources such as a review, newspaper article, animation, Ted Talk, that will help us all better understand the research and its broader implications;

3. Provide resources or links to Kari to post on Canvas **one week** in advance of the Journal Club date.
4. Read the article, 1-2 pertinent background papers, and resources well enough to walk/guide the group through highlights of the paper, explain the paper's data and figures, and be well-versed in any necessary background knowledge and/or supplemental info.
5. Present the paper during the Journal Club and guide the discussion, including engaging all members of the class in the discussion.

Attend Scientific Talk

Each student is required to attend in person during Fall 2016, between weeks 1-7, a scientific research talk (e.g. invited researcher/ Ph.D. level defense seminar/ scientific public lecture) in a field of interest and write a one-two page summary before the end of week 8 summarizing the project topic, briefly discussing the methods used, commenting on the significance of the research to the field, and critiquing the ability of the scientist to communicate effectively. Each student will be asked to summarize and comment on at the beginning of class the presentation they attended (2 minutes). Lab meeting presentations do not count. No extensions beyond Week 8.

Formal Writing Assignments and Revisions

Assignments with detail guidelines will be posted on a regular basis. Writing assignments must be typed. One of the expectations of Writing Intensive Classes (WIC) is that students learn to improve their writing skills by revising their work based on feedback from peers and instructors. Assignments will therefore be graded on the quality of the work (e.g., scientific thinking, clarity, accuracy, readability, completeness) and on the way in which the instructor's feedback is incorporated in the revised work. Students will be expected to revise designated assignments and return along with the original assignment with instructor comments **within one week** from the date the assignment was returned.

Due Dates for Writing Assignments, Extensions, and Deadlines Policy

Due dates will be indicated on the assignment guidelines and are listed on the class schedule. **Extensions** are not granted for Journal Clubs, the final grant proposal submission, and the grant proposal review. If made at least two days before the due date, extensions of up to 2 days will be considered for the formal writing assignments. For other issues regarding meeting deadlines, talk to the instructor.

Late assignments will lose 10% of the points for the assignment for each day that they are late.

Final term paper

Students will complete a Ten Year Career Roadmap. I will post the instructions at the beginning of the term. Some of the components will require advanced preparation and draft submission, so be sure to review the assignment expectations at the beginning of the term. I will gladly look over drafts of any of the sections of this paper until the week before it is due and give you feedback if the request is made with sufficient advance notice.

Grading Policies

The class will not be graded on a curve. It is theoretically possible for the whole class to get an A or an

F. No letter grades will be given before the final grade, although *you may discuss your standing with me at any time during the term*. Focus on improving your critical thinking and communication skills, not on looking for a grade.

General OSU and Departmental Policies

Statement Regarding Students with Disabilities

Accommodations for students with disabilities are determined and approved by Disability Access Services (DAS). If you, as a student, believe you are eligible for accommodations but have not obtained approval please contact DAS immediately at 541-737-4098 or at <http://ds.oregonstate.edu>. DAS notifies students and faculty members of approved academic accommodations and coordinates implementation of those accommodations. While not required, students and faculty members are encouraged to discuss details of the implementation of individual accommodations. The DAS Statement is posted online at: <http://ds.oregonstate.edu/faculty-advisors> (4/14/16).

Student Conduct

The Department of Biochemistry/Biophysics and the Biology Program follow the university policies on student conduct. These can be found at <http://studentlife.oregonstate.edu/studentconduct/offenses-0>

Cheating or plagiarism by students is subject to the disciplinary process outlined in the Student Conduct Regulations. Students are expected to be honest and ethical in their academic work. Academic dishonesty is defined as an intentional act of deception in one of the following areas:

- * cheating- use or attempted use of unauthorized materials, information or study aids
- * fabrication- falsification or invention of any information
- * assisting- helping another commit an act of academic dishonesty
- * tampering- altering or interfering with evaluation instruments and documents
- * plagiarism- representing the words or ideas of another person as one's own

Behaviors disruptive to the learning environment will not be tolerated and will be referred to the Office of Student Conduct for disciplinary action.

“The goal of Oregon State University is to provide students with the knowledge, skill and wisdom they need to contribute to society. Our rules are formulated to guarantee each student's freedom to learn and to protect the fundamental rights of others. People must treat each other with dignity and respect in order for scholarship to thrive. Behaviors that are disruptive to teaching and learning will not be tolerated, and will be referred to the Student Conduct Program for disciplinary action. Behaviors that create a hostile, offensive or intimidating environment based on gender, race, ethnicity, color, religion, age, disability, marital status or sexual orientation will be referred to the Affirmative Action Office.”