

BIO 2979: Introduction to Biological Research
Seattle Pacific University
Winter 2020

Instructor: Jenny Tenlen, Ph.D.

Office hours:

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MWF, 1:30 pm – 3:00 pm, or by
appointment, or feel free to stop by at
any time

*“Seattle Pacific University seeks to change the world and engage the
culture by graduating students of competence and character,
cultivating people of wisdom, and modeling a grace-filled community.”
[SPU Mission Statement]*

Course Description

In Bio 2979, you will perform research on a project related to Dr. Tenlen’s research and write a report about your findings. The goal is to help you become familiar with the research system and techniques in order to define the project that you will pursue for BIO 4978/4979 credit. For each credit, you are expected to work a minimum of 40 hours over the quarter (averaging about 4 - 5 hours/week).

Goals and Objectives

Biology Department: The objectives of the Biology Department can be found online at: <http://spu.edu/academics/college-of-arts-sciences/biology/about/mission-goals-and-objectives>. Specific objectives for these courses are

1. To design a research project.
2. To become better acquainted with research techniques in the field of population genetics.
3. To use statistical analyses to interpret findings.
4. To improve your ability to critically analyze the scientific literature.

University Objectives: The mission statement and goals of Seattle Pacific University can be found online at: <http://spu.edu/about-spu/mission-and-signatures>.

Course Outcomes & Expectations

1. Undergo necessary lab safety training, and observe lab safety rules at all times.
2. Use and maintain all lab equipment properly, keep lab space neat and tidy, and inform Dr. Tenlen of any issues (ordering needs, broken equipment, etc.) as soon as they come up.
3. Keep an accurate and detailed electronic lab notebook. Dr. Tenlen reserves the right to check your notebooks at any time. Instructions for setting up your notebook are posted on Canvas.
4. Meet regularly with Dr. Tenlen (and project lead Shun-Je Bhark) at a time to be arranged.
5. Write a progress report, due by the last day of finals week, **11:59 pm on Thursday, March 19, 2020** (upload via the link on Canvas). Your report should be typed, 12-pt font, double-space, about 3 - 4 pages, and should include the following:

- title of your project
- background information: provide a brief review of what is known about the question you are investigating.
- the goals of your project (big-picture question and specific goals to address that question)
- summary of methods and results - you don't need to provide step-by-step protocols, but you should describe the general methods, the rationale for each method (i.e. why did you do it), and the outcome of the experiments (whether it was successful or not)
- a discussion of where you are in your project as it relates to your long-term goals, and description of future goals - what do you hope to accomplish next, why, and how?
- All sources should be cited and listed in a References section (see p. 3 - 4 for format)

Course Policies

Plagiarism and Academic Integrity: Plagiarism is the representation of someone else's work as your own. Neglecting to properly cite references is the most common example of this. Plagiarism and other breaches of academic integrity (e.g. cheating or copying another student's work) will not be tolerated and will be dealt with severely. The first offense will result in a failing grade for the assignment in question. The second offense will result in a failing grade for the course and your actions will be reported to the University registrar. Please ask questions IN ADVANCE if you are not sure about what constitutes plagiarism, at this stage it is simply a learning exercise (i.e., not a breach of academic integrity) and you will be able to rectify the situation. *Once a paper is submitted, however, you will be held to the above guidelines.* Since a significant part of your grade in this course will involve written responses, it is a critical that you fully understand this policy.

Any instance of cheating or interfering with another student's ability to learn will not be tolerated. In either case, the guidelines from the Academic Integrity section of the Undergraduate Catalog will be followed. See the SPU undergraduate catalog for more information on academic integrity (<http://spu.edu/catalog/undergraduate/20190/academic-policies-procedures/integrity>).

Lab safety: Please observe all lab safety procedures. Goggles and appropriate footwear must be worn at all times in the lab. If you have concerns about handling or disposing of specific chemicals and reagents, please let Dr. Tenlen know. Material Safety Data Sheets for all harmful substances are available in the Safety Manual notebook in Eaton 105.

Inclement weather: The University maintains an Emergency Closure Hotline (206-281-2800). In the event of inclement weather or an emergency that might close the university, please call the Hotline for the most up-to-date closure information or check the SPU website. Both will be updated before 6:00 a.m.

Emergencies: If there is an emergency while working in Eaton 105, please exit the lab in a calm and orderly fashion and assemble in Tiffany Loop. Please report to Dr. Tenlen, or to appropriate personnel (Danny Wright, Levi Clum or Sue Martin).

Disabilities statement: In accordance with Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990, students with specific disabilities that qualify for academic accommodations should contact Disabled Student Services (DSS) in the Center for Learning (<http://www.spu.edu/depts/cfl/dss/index.asp>). DSS in turn will send a Disability Verification Letter to the course instructor indicating what accommodations have been approved.

Guidelines for citing sources:

The format for your citations and references should follow Development's guidelines at <http://dev.biologists.org/content/manuscript-prep#references> and copied below:

For citations in the text of the paper, please use the following format:

One author - (Jones, 1995) or (Jones, 1995; Smith, 1996).

Two authors - (Jones and Kane, 1994) or (Jones and Kane, 1994; Smith, 1996).

More than two authors - (Jones et al., 1995) or (Jones et al., 1995a; Jones et al., 1995b; Smith et al., 1994; Smith et al., 1995).

(note that if you cite two or more papers together, they should be listed chronologically, with the earliest paper listed first.)

For your Literature Cited section, please use the following format:

- References are listed in alphabetical order according to the surname and initials of the first author.
- Initials should follow all surnames in the list of authors; insert a full stop and space after each initial and place parentheses round the date followed by a full stop.
- Use bold for authors' names.

Journal articles;

Rochlin, M. W., Itoh, K., Adelstein, R. S. and Bridgman, P. C. (1995). Localization of myosin IIA and B isoforms in cultured neurons. *J. Cell Sci.* **108**, 3661-3670.

Sections of a book:

Matlin, K. S. and Caplan, M. J. (1992). Epithelial cell structure and polarity. In *The Kidney: Physiology and Pathophysiology* (ed. D. W. Seldin and G. Giebisch), pp. 447-473. New York: Raven Press Ltd.

Online book:

Griffiths, A. J. F., Miller, J. H., Suzuki, D. T., Lewontin, R. C., Gelbart, W. M. (2000). Introduction to genetic analysis [Internet]. 7th ed. New York: W. H. Freeman & Co.; [cited 2005 May 31]. Available from: <http://www.ncbi.nlm.nih.gov/bookshelf/br.fcgi?book=iga>.

Website:

IMGT/HLA Sequence Database [Internet]. 2003- Release 2.9.0. Cambridge (England): European Bioinformatics Institute. [updated 2005 Jun 1; cited 2005 Jun 22]. Available from: <http://www.cbi.ac.uk/imgt/hla/>.

Properly citing references:

Every idea, concept or fact that you obtain from another source must be cited properly in your literature review, to avoid the appearance of taking credit for ideas not your own. Proper citation also allows your own interpretations and ideas to come to the forefront.

Below is an example of a paragraph I wrote in my last publication:

To address the issues above, it is essential to be able to disrupt gene function in *H. dujardini*. However, no such method exists for Phylum Tardigrada. RNA interference

(RNAi) is a robust and well-conserved mechanism for gene silencing in many organisms, including nematodes and arthropods (Hannon 2002; Cerutti and Casas-Mollano 2006). In *C. elegans*, RNAi is systemic and heritable; injection of double-stranded RNA (dsRNA) into the intestine or germline of adults can disrupt gene activity in injected animals and in their progeny (Fire et al. 1998).

The first two sentences are my own assertions, so they are not cited. The third sentence (RNA interference...) is a statement that is well-supported in other papers, so I cited two other reviews that document how robust and well-conserved RNAi is. The last sentence reports a fact about RNAi (that it is systemic and heritable), so I cited the original research paper that established this fact. It is not proper to include all citations at the end of a paragraph – they should appear immediately after the statement is made.

There are several resources available to help you properly cite sources and avoid unintentional plagiarism.

- “The Writer’s Handbook: How to Avoid Plagiarism”: a helpful guide from the Writing Center at the U. Wisconsin-Madison.
http://writing.wisc.edu/Handbook/QPA_plagiarism.html
- “Plagiarism: It’s Your Call”: a tutorial from Stanford University that asks you to determine whether or not the provided text is an example of plagiarism.
<http://skil.stanford.edu/module6/paraphrasing.html>

DO NOT HESITATE to ask me if you have questions – I’m always happy to help you with your writing