BRR 403: THESIS (WIC)
SYLLABUS

Mondays, 5:00 – 6:30 (or TBA), all terms
This course combines approximately 120 hours of instruction, activities, and assignments for 4 credits.
Prerequisites: none. Enrollment limited to BRR majors or minors writing a thesis.

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Course description: Research proposals, laboratory notebooks, and progress reports are centered on the BRR required research project. Students present their research in a thesis, and participate in peer review of theses. Students develop writing skills that will be essential for their professional careers. These skills will improve as students respond to critical feedback, and seek new ways to make scientific information understandable to scientists and their peers.

Introduction: The core of the BioResource Research (BRR) Undergraduate Program is a two-year research experience in a faculty mentor's laboratory or research program. Throughout BRR, students learn and engage in the practice of science. The end point of any scientific research is the communication of the results; articles in scientific journals provide a formal outlet for this communication. In BRR 403, students engage in stages leading up to, and culminating in, writing a thesis in the format of a journal article. The research/mentoring/thesis process involves, over the course of two years, a series of steps that lead to the thesis itself. Students are required to submit an initial research proposal/plan (2-3 pages with references), a mid-research progress report, and a thesis outline. Students are required to keep and submit a written laboratory notebook/journal. Although some of these occasions for written communication will occur before the term in which students formally enroll in the thesis course (BRR403), they are an integral part of the course and of the total WIC training and experience.

The goal of OSU's Writing Intensive Curriculum (WIC) is for students to gain knowledge of, and practice with, writing in their major. Through the assignments and activities described below, students will gain this practice.

Class schedule: The BRR Director holds formal meetings of BRR 403 every term; students attend these meetings during the term in which they are actually writing their theses, and participate in writing, peer review and revision of their theses.

Week	**Topic and activities**
1	**Bring a copy of an article from your chosen scientific journal.** We will discuss typical parts of a scientific journal article and what each part contains, using the examples you bring. We will review a handout on how to critique a scientific journal article. We will also go through thesis requirements and schedule.
2	**Bring an outline of your thesis, initialed by your primary mentor.** We will discuss the outlines in small groups. We will also talk about when to use references, how to cite, when to quote, what constitutes plagiarism, and reference programs (EndNote, Zotero). We will discuss how to structure your introduction. Come prepared to analyze what should be included in the introduction to your thesis.

3	**Bring a draft of your Introduction for peer review**. We will exchange introductions for review. We will also discuss conventions in scientific writing, including verb tenses, and how to improve paragraphs. We will discuss the relationship between reproducibility in science and a well-structured materials and methods section. Come prepared to discuss what should be in your material and methods section, including how to cite manufacturers and suppliers, software programs, etc. and when you must cite them.
4	**Bring a draft of your Materials and Methods section for peer review**. We will discuss how to format tables and figures and their captions. We will work on how to report results, using tables and figures versus text, statistics, confidence limits, and significance.
5	**Bring a draft of your Results section for peer review**. We will review what should be in the discussion section, and how to handle it, particularly if you have negative results.
6	**Bring a copy of your discussion section for peer review.** We will discuss titles, abstracts, and reference sections.
7	**Bring your title, abstract, and references, for peer review.**
8-10	**Bring your completed thesis. We will complete discussing and reviewing theses.** These sessions will be used to catch up from the previous sessions, particularly for students that did not finish their sections by the scheduled date..

Learning outcomes:

After taking this course, students will be able to:

1. Convey the meaning of research results in written and oral format, to both professionals and the general public. *[BRR Program learning outcome; demonstrated in the thesis].*
2. Master and discuss the important contemporary issues in the specific discipline of the BRR option and research project. *[BRR Program learning outcome; demonstrated in the thesis].*
3. Formulate and write a research proposal. *[BRR 403 learning outcome; demonstrated by the research proposal]*
4. Effectively record data and experiments so that others can understand them, and so that they can form the basis of a thesis. *[BRR 403 learning outcome; demonstrated by the laboratory notebook]*

WIC learning outcomes:

5. Develop and articulate content knowledge and critical thinking in the discipline through frequent practice of informal and formal writing. *[WIC learning outcome; demonstrated through ungraded writing assignments: research proposal, laboratory notebook, progress report, thesis outline]*
6. Demonstrate knowledge/understanding of audience expectations, genres, and conventions appropriate to communicating in the discipline. *[WIC learning outcome; demonstrated in the thesis]*
7. 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. *[WIC learning outcome; demonstrated in*

the thesis]

Learning resources:

1) **https://ugr.ue.ucsc.edu/sites/default/files/jyi_guide_to_scientific_writing.pdf**
2) **A good reference book**: R. A. Day, *How to Write and Publish a Scientific Paper.* Oryx Press, Phoenix. All editions are helpful. Available in the library.
3) **"Instructions for Authors**" (or similar) for your chosen journal. Usually available online.
4) **Grammar help:** online quizzes: http://grammar.ccc.commnet.edu/grammar/quiz_list.htm

Learning Assessment: The grade for BRR 403 will be based on the student's research thesis, and will be provided by the student's research committee (faculty mentor, secondary mentor, and BRR Director).

Assignments:

1. Research proposal (Learning Outcomes 3, 5, 6): During the first term that you are enrolled in research credits, complete a 2-3 page proposal that briefly and succinctly outlines your proposed research, containing:

- Problem Statement or Needs Assessment,
- Research Objectives,
- Methods,
- Expected Outcomes and Impact
- References (minimum 3-5 publications, properly formatted).

Students will have previously obtained instruction and practice in writing research proposals in BRR 200. Submit a draft of your proposal to your mentor for review. Submit the final approved version, initialed by the faculty mentor and secondary mentor, to the BRR office. Ungraded.

2. Laboratory notebook (Learning Outcomes 1, 4, 5, 6): Maintain a lab notebook/journal for a record of accomplishments and protocols, problems encountered, date and number of hours worked, and lab or field results. The notebook remains the property of the research laboratory or group and stays in the lab. The notebook will provide a complete record of why experiments were initiated and how they were performed, methods, objectives, reagents, results, and conclusions. The notebook will form the basis for the thesis. It is the student's responsibility to find out the mentor's requirements for a notebook, and for data organization and storage. Ungraded.

3. Progress Report (Learning Outcomes 1, 2, 5, 6): Three terms prior to graduation and/or mid-way through your research, write a 2-4 page progress report, containing a research update, problems encountered, appropriate references, and a time line for project completion. Schedule a meeting with your committee (mentor and secondary mentor and BRR director) to discuss the report. Submit the final approved version, initialed by the faculty mentor and secondary mentor, to the BRR office. Ungraded.

4. Thesis (Learning Outcomes 1, 2, 5-7): At the beginning of the term in which you plan to write your thesis, schedule a meeting with your mentor to discuss your thesis and what will be in it, the thesis format, and the journal you will use to format the thesis. Prepare an outline of your thesis and bring it to the first meeting of BRR 403.

Your thesis will be written in the format of a manuscript submitted to a scientific journal in your field. You and your mentor will select an appropriate journal. You will follow this format exactly, except that the Introduction and Methods sections of your thesis may be expanded to provide more detail than what is found in a typical journal article. Your thesis should be about 25 double-spaced text pages, plus 6-8 tables and figures. At the discretion of the mentor, additional material may be added in an appendix. There will be a title and signature page at the beginning. See the instructions on the BRR web page: http://agsci.oregonstate.edu/brr/students/thesis

Your thesis will become a permanent part of OSU's Scholars Archive. For examples of previous BRR theses, see the Scholars Archive (http://ir.library.oregonstate.edu/xmlui/handle/1957/456).
You should give drafts of each thesis section to your mentor as you complete them.

During the required meetings of BRR 403, you will bring drafts of specified sections of your thesis and participate in peer review of each section with the other students.

Submit a complete draft copy of your thesis to your primary research mentor no later than three weeks prior to your final seminar/defense date. Your mentor will meet with you to give you back an edited draft two weeks before your final defense. Submit a revised draft of the thesis to the faculty mentor, secondary mentor, and BRR director no later than one week prior to your final seminar/defense date. This copy should contain the Thesis Title Page and Signatures Page, which you and your committee will sign when the final thesis is approved.

Your committee will give you additional suggestions and editorial changes to the thesis at your final seminar and defense. Using these, edit and submit a final copy of the thesis to your faculty mentor and BRR director. Obtain signatures from your committee on the signatures page and give a signed final copy to the BRR advisor by noon of the Wednesday of finals week.

If you are in University Honors College, your thesis will be used for both BRR and UHC. *It is your responsibility to learn the UHC deadlines and follow them.*

Statement Regarding Students with Disabilities

Oregon State University is committed to student success; however, we do not require students to use accommodations nor will we provide them unless they are requested by the student. The student, as a legal adult, is responsible to request appropriate accommodations. The student must take the lead in applying to Disability Access Services (DAS) and submit requests for accommodations each term through DAS Online. OSU students apply to DAS and request accommodations at the Getting Started with DAS page (http://ds.oregonstate.edu/gettingstarted).

Students who believe they are eligible for accommodations but who have not yet obtained approval through DAS should contact DAS immediately at (541) 737-4098.

Link to Statement of Expectations for Student Conduct, i.e., cheating policies

http://studentlife.oregonstate.edu/studentconduct/offenses-0

The BioResource Research Major follows the university rules on civility and honesty. 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

Students are encouraged to consult the BRR Director and their faculty mentors for questions about plagiarism.