UNIVERSITY of GUELPH

BINF*6500 PhD Research Writing in Bioinformatics

Fall 2023
Section(s): C01

College of Biological Science
Credit Weight: 1.00
Version 1.00 - August 18, 2023

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1 Course Details

1.1 Calendar Description

Background literature pertinent to the student's initial research direction is studied. Starting with a reading list provided by the advisor and the instructor, the student builds on this list and constructs a major literature review over two semesters. As the student begins to generate initial ideas for their own research direction, their ideas for their doctoral research are written and explained. The emphasis is on a sub-field or sub-fields of bioinformatics.

Restrictions: Restricted to PhD Bioinformatics students.

1.2 Course Description

This course, taken over two semesters, is required for students in the PhD in Bioinformatics program. Typically, it is recommended to take this course in the first two semesters of the PhD program. However, some students may choose to take this course in semesters 2 and 3, depending upon other research obligations, courses, or Teaching Assistantship duties.

The course will involve writing an in-depth literature review in the student's sub-field of study. The overarching goal is to understand the state-of-the art in your field and to develop your ideas for your own research. This foundation is vital for designing a novel research program suitable for the doctoral level. Moreover, students will work towards a professional level of scientific writing, critical thinking, and synthesis.

1.3 Timetable

Students taking this course should have a regular meeting with their advisor(s). I recommend that students meet with their primary advisor or coadvisors at least every other week. Students should also hold an Advisory Committee meeting for input by the end of their second semester. Students are requested to schedule a meeting with the Course Coordinator

to discuss expectations and their progress with the literature review in their first semester of study. Otherwise, there are no formal meetings for this course.

1.4 Final Exam

There is no exam for this course. Students submit their final literature review and proposal to their advisors for grading prior to the end of the second semester.

2 Instructional Support

2.1 Instructional Support Team

Course Co-ordinator:	Steffen Graether Graduate Program Coordinator
Email:	graether@uoguelph.ca
Office Hours:	Please email me to schedule an appointment.

3 Learning Resources

The main resources available for this course are the University of Guelph library (https://www.lib.uoguelph.ca/) and guidance from your Advisors, other Advisory Committee Members, and Course Coordinator.

4 Learning Outcomes

4.1 Course Learning Outcomes

By the end of this course, you should be able to:
1. describe the state-of-the art in your sub-field of bioinformatics

2. interpret prior works using quantitative reasoning and critical thinking, rather than opinion, to evaluate the evidence

3. identify gaps in knowledge or an unfilled need for a bioinformatics tool or algorithm

4. describe, at a high level, the proposed research that you will undertake in your doctoral program to address one or more of the gaps in knowledge you have identified

5. communicate effectively in written form. This will include a demonstration of: clear, concise writing that communicates scientific ideas effectively; proper referencing and paraphrasing of prior findings; well-organized writing, where ideas flow logically from one to another; grammatically correct writing; synthesis and presentation of novel ideas.

5 Teaching and Learning Activities

6 Assessments

This course will culminate in the completion of a major written document. This is an important document, which will serve as a foundation for your further doctoral studies. It is highly recommended to meet regularly with your advisors to discuss your report outline and progress throughout the two semesters. You are also invited to meet with the Course Coordinator to discuss your progress.

6.1 Assessment Details

Literature Review and PhD Proposal (100%)

The specific structure of your report should be discussed with your advisors. Here, I offer a few guidelines for you to discuss. However, the appropriate format may vary depending upon the nature of your work. While the specific requirements are to be agreed with your advisors, the general scope should be similar to the below. A high level of intellectual engagement with the literature and an excellent quality of writing are expected at the doctoral level.

SCOPE

This is a major report that should be worked on regularly over the duration of two semesters. As a 1.0 credit course overall (0.5 credits/semester), the required time commitment is at a minimum ca. 10 hours/week in each of the two semesters. It is expected that you will likely need to consult 100-200 articles, book chapters, and/or existing software tools/manuals while finding suitable literature for your review. Treat this like a major review in a journal. Your final paper might cite approximately 40-70 relevant papers and other sources.

SECTIONS

I would encourage you to consider using subheadings to organize your report, such as:

Abstract - Summary of background and research proposal

Introduction - Start the document with a general introduction to your chosen field of study. Why is that field important and interesting?

Literature Review - Identify a more specific sub-field, for which you would review historical and recent advances in more detail. It is expected that you would devote approximately half of your total document (minimum one-third) to the in-depth literature review. I would encourage you to incorporate one or more figures into your document. A figure could be either conceptual or data driven.

Gap(s) in Knowledge - Include a specific section in which you explicitly identify a key gap in knowledge. You might identify a gap in biological knowledge, which can be filled through applying or adapting sophisticated computational tools. Or, you might identify an unfilled need for a bioinformatics tool, method, algorithm, or a validated analytical pipeline.

Proposed Methods - Next, present a high-level overview of the research you are planning to conduct during your PhD in order to address that gap. Present your ideas about your proposed methods. It can be common to include more methodological detail for your first proposed chapter/study than for later parts of your work. You may wish to organize your proposed work into approximately three chapters, which may correspond with manuscripts to be submitted for peer review and publication.

Anticipated Results or Outcome - For a biological project, indicate what you expect to find if your hypothesis is supported. You may consider including a simple figure illustrating your expected results. For a methodological project, indicate what kind of tool, algorithm, or method is the expected outcome from your work.

Significance and Further Research - End your document with a section focused on the big picture: what do you propose to contribute to science through your work? What are the potential impacts of your work? For an algorithmic project, who would use your new method and for what kinds of research? How would your work be extended in the future beyond your own degree timeframe? Convince the reader that your work is likely to represent a significant, original advance. Making a significant, original contribution is a requirement by the end of the PhD program. Therefore, as part of this assignment, set yourself up for success in your doctoral program overall.

References - Include all works you cited and only those works you cited. Your report should include reference to the primary literature and may also include references to software tools and manuals, databases, etc., as suitable.

Tables and Figures - You may include these at the end or immediately after the location in the report where they are first cited, according to the norms in your home department and your advisors' preferences. Tables and Figures should be numbered in the order they are first cited in your report; all tables and figures should be cited in your prose. Each table and figure should have a brief description that is understandable on its own.

FORMATTING

The specific document formatting style may vary, depending upon norms in your field and your advisors' preferences. If you do not receive specific formatting instructions from your advisor, then please use the following formatting guidelines:

* Submit in PDF format. Make sure your name, student number, report title, course name, your semester level, date of submission, and names of your Advisory Committee Members are on the front. Give your report a reasonable file name to help your readers with electronic filing and finding your report (NOT "my report"). Here is an example of a

reasonable file name: Lastname_Firstname_BINF6500_PhD_Proposal.pdf

* Choose an informative, interesting title for your report. Note you may revise your PhD thesis title later, if suitable.

* Written portion of the report should be approximately 15 pages in length (up to 20 maximum), excluding references and figures, at 1.5-line spacing and with 2.5-cm margins.

* Use 12-point font. Choose a font that is easy to read (e.g. Times New Roman or Calibri).

* Use sub-headings (such as with bolded font) to help you organize your report nicely.

* Demonstrate consummate academic integrity throughout this process. You must give credit to others for their ideas. Cite your sources. Use good paraphrasing techniques when reporting on prior findings. Only use quotations sparingly, such as for profound remarks or for a specific technical definition that can't be phrased another way. In any such cases when you are using phrasing from others, use quotation marks and cite your source.

* Choose a major journal in your field to use as the model for the reference formatting. However, I suggest not to choose a format that involves numbered referencing, as that format is more difficult for the reader to see what works you have cited. Use the same reference formatting consistently throughout. Check your reference list carefully. All cited references should be in the reference list. Only cited references should be in the reference list.

* Check your report throughout for: logical flow, clarity, grammatical correctness, spelling, punctuation, and consistent formatting. Prior to submission, re-read all of your topic sentences. The first sentence of each paragraph should be clear and should indicate what that paragraph is about. Start and end your report with a paragraph about the bigger picture.

* Discuss your progress regularly with your advisors. Submit a draft to your advisors at least four weeks in advance of the due date for commenting. Consider and address their comments prior to submitting your final version for grading.

* Enjoy this reading, writing, and planning experience. This is really a chance to learn at a rapid pace, to practise writing towards a professional level, and to exhibit great creativity as you plan out your PhD. Go for it... show yourself and others what you can do!

DUE DATE AND GRADING

This report is graded by the student's advisors. Typically, the primary advisor and co-advisor will grade the report. If the student does not have a co-advisor, then a member of the Advisory Committee should be invited to serve in this capacity. Students are requested to contact the course coordinator within the first month of the course to inform them who will be grading the report.

The report is due near the end of the second semester in which a student is registered in BINF*6500. For students in their second semester of the course during Fall 2023, the final report is due on Friday December 8th, 2023 at 5:00 PM. Students should submit the report to the advisors by email and also cc: the course coordinator. Advisors are requested to submit their grade to the course coordinator by Monday December 18th, 2023.

For students in their first semester of the course, advisors may choose to submit an interim numerical grade. Otherwise, the course coordinator will assign a grade of INP ("in progress"), which will be replaced by the final numerical grade after the second semester.

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7 Course Statements

7.1 Advice for Success in PhD Program

We share a few additional tips to help you get off to a great start in your PhD program:

*meet with your Advisor/Co-advisor regularly

*hold an Advisory Committee Meeting at least twice per year

*attend the Bioinformatics Seminar Series to help you to gain exposure to a variety of different topics and to meet others

*participate in the professional development workshops offered throughout the year

*reach out to the Graduate Coordinator if you would like to discuss your program

8 College of Biological Science Statements

8.1 Wellness

If you are struggling with personal or health issues:

- Counselling Services offers individualized appointments to help students work through personal struggles that may be impacting their academic performance.
- Student Health Services is located on campus and is available to provide medical attention.
- For support related to stress and anxiety, besides Health Services and Counselling Services, Kathy Somers runs training workshops and one-on-one sessions related to stress management and high performance situations. http://www.selfregulationskills.ca/

8.2 Personal information

Personal information is collected under the authority of the University of Guelph Act (1964), and in accordance with Ontario's Freedom of Information and Protection of Privacy Act (FIPPA) http://www.e-laws.gov.on.ca/index.html. This information is used by University officials in order to carry out their authorized academic and administrative responsibilities and also to establish a relationship for alumni and development purposes.

For more information regarding the Collection, Use and Disclosure of Personal Information policies please see the Undergraduate Calendar. (https://www.uoguelph.ca/registrar/calendars/undergraduate/current/intro/index.shtml)

8.3 Course Offering Information Disclaimer

Please note that course delivery format (face-to-face vs online) is subject to change up to the first-class day depending on requirements placed on the University and its employees by public health bodies, and local, provincial and federal governments. Any changes to course format prior to the first class will be posted on WebAdvisor/Student Planning as they become available.

9 University Statements

9.1 Email Communication

As per university regulations, all students are required to check their e-mail account regularly: e-mail is the official route of communication between the University and its students.

9.2 When You Cannot Meet a Course Requirement

When you find yourself unable to meet an in-course requirement because of illness or compassionate reasons please advise the course instructor (or designated person, such as a teaching assistant) in writing, with your name, id#, and e-mail contact. The grounds for Academic Consideration are detailed in the Undergraduate and Graduate Calendars.

Undergraduate Calendar - Academic Consideration and Appeals
https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-ac.shtml

Graduate Calendar - Grounds for Academic Consideration
https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/index.shtml

Associate Diploma Calendar - Academic Consideration, Appeals and Petitions
https://www.uoguelph.ca/registrar/calendars/diploma/current/index.shtml

9.3 Drop Date

Students will have until the last day of classes to drop courses without academic penalty. The deadline to drop two-semester courses will be the last day of classes in the second semester. This applies to all students (undergraduate, graduate and diploma) except for Doctor of Veterinary Medicine and Associate Diploma in Veterinary Technology (conventional and

alternative delivery) students. The regulations and procedures for course registration are available in their respective Academic Calendars.

Undergraduate Calendar - Dropping Courses
https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-drop.shtml

Graduate Calendar - Registration Changes
https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/genreg-reg-regchg.shtml

Associate Diploma Calendar - Dropping Courses
https://www.uoguelph.ca/registrar/calendars/diploma/current/c08/c08-drop.shtml

9.4 Copies of Out-of-class Assignments

Keep paper and/or other reliable back-up copies of all out-of-class assignments: you may be asked to resubmit work at any time.

9.5 Accessibility

The University promotes the full participation of students who experience disabilities in their academic programs. To that end, the provision of academic accommodation is a shared responsibility between the University and the student.

When accommodations are needed, the student is required to first register with Student Accessibility Services (SAS). Documentation to substantiate the existence of a disability is required; however, interim accommodations may be possible while that process is underway.

Accommodations are available for both permanent and temporary disabilities. It should be noted that common illnesses such as a cold or the flu do not constitute a disability.

Use of the SAS Exam Centre requires students to make a booking at least 14 days in advance, and no later than November 1 (fall), March 1 (winter) or July 1 (summer). Similarly, new or changed accommodations for online quizzes, tests and exams must be approved at least a week ahead of time.

For Guelph students, information can be found on the SAS website
https://www.uoguelph.ca/sas

For Ridgetown students, information can be found on the Ridgetown SAS website
https://www.ridgetownc.com/services/accessibilityservices.cfm

9.6 Academic Integrity

The University of Guelph is committed to upholding the highest standards of academic integrity, and it is the responsibility of all members of the University community-faculty, staff, and students-to be aware of what constitutes academic misconduct and to do as much as possible to prevent academic offences from occurring. University of Guelph students have the responsibility of abiding by the University's policy on academic misconduct regardless of

their location of study; faculty, staff, and students have the responsibility of supporting an environment that encourages academic integrity. Students need to remain aware that instructors have access to and the right to use electronic and other means of detection.

Please note: Whether or not a student intended to commit academic misconduct is not relevant for a finding of guilt. Hurried or careless submission of assignments does not excuse students from responsibility for verifying the academic integrity of their work before submitting it. Students who are in any doubt as to whether an action on their part could be construed as an academic offence should consult with a faculty member or faculty advisor.

Undergraduate Calendar - Academic Misconduct
https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-amisconduct.shtml

Graduate Calendar - Academic Misconduct
https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/index.shtml

9.7 Recording of Materials

Presentations that are made in relation to course work - including lectures - cannot be recorded or copied without the permission of the presenter, whether the instructor, a student, or guest lecturer. Material recorded with permission is restricted to use for that course unless further permission is granted.

9.8 Resources

The Academic Calendars are the source of information about the University of Guelph's procedures, policies, and regulations that apply to undergraduate, graduate, and diploma programs.

Academic Calendars
https://www.uoguelph.ca/academics/calendars

9.9 Disclaimer

Please note that the ongoing COVID-19 pandemic may necessitate a revision of the format of course offerings, changes in classroom protocols, and academic schedules. Any such changes will be announced via CourseLink and/or class email.

This includes on-campus scheduling during the semester, mid-terms and final examination schedules. All University-wide decisions will be posted on the COVID-19 website (https://news.uoguelph.ca/2019-novel-coronavirus-information/) and circulated by email.

9.10 Illness

Medical notes will not normally be required for singular instances of academic consideration, although students may be required to provide supporting documentation for multiple missed assessments or when involving a large part of a course (e.g.. final exam or major

assignment).

9.11 Covid-19 Safety Protocols

For information on current safety protocols, follow these links:

- https://news.uoguelph.ca/return-to-campuses/how-u-of-g-is-preparing-for-your-safe-return/
- https://news.uoguelph.ca/return-to-campuses/spaces/#ClassroomSpaces

Please note, these guidelines may be updated as required in response to evolving University, Public Health or government directives.

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