Bioinformatics 552/652
Research in Bioinformatics

Three Credit Hours
Spring 2015, Thursdays from 4:15 PM – 7:15 PM
BICC 123 & 124

Course Description: The Research in Bioinformatics course is designed to give students (Masters, Ph.D., and fellows) a foundation in general research approaches with specific application to bioinformatics and medical informatics. There are two major components to the course that are integrated and taught in parallel. The first component, research skills development, focuses on developing the critical thinking and evaluation skills necessary to be successful in this field. Special emphasis will be placed on critical evaluation of the literature, development of a research idea, and communicating your research ideas in written form (via preparation of part of a grant application). The skills learned for the first component form the foundation of the second component of the course which is working with a mentor on an informatics project. For some students, this project will be the basis for their future thesis work.

Prerequisites: Acceptance into the DMICE bioinformatics track or instructor permission. There are no specific course prerequisites for the class.

Instructors:
Eilis Boudreau, M.D., Ph.D., boudreau@ohsu.edu
Shannon McWeeney, Ph.D. mcweeney@ohsu.edu
Office Hours: by appointment

COURSE GRADING POLICY:
This course is given for a letter grade. The final grade will be based on 100 points. The number of points assigned to each activity is as follows: 25 points for project participation grade (to be assigned by your project supervisor(s)); 20 points for class participation; 45 points for graded class assignments; and 10 points for your in-class project presentation and summary slide. All written assignments should be submitted through Sakai and grades for written assignments will be posted in Sakai no later than two weeks after the assignment due date (for assignments submitted late, grades will be posted no later than two weeks after the assignment is submitted).

Graduate Studies in the OHSU School of Medicine is committed to providing grades to students in a timely manner. Course instructors will provide students with information in writing at the beginning of each course that describes the grading policies and procedures including but not limited to evaluation criteria, expected time needed to grade individual student examinations and type of feedback they will provide.

Class grades are due to the Registrar by the Friday following the week of finals. However, on those occasions when a grade has not been submitted by the deadline, the following procedure shall be followed:
1) The Department\textsuperscript{1} /Program Coordinator\textsuperscript{2} will immediately contact the Instructor requesting the missing grade, with a copy to the Program Director and Registrar.

2) If the grade is still overdue by the end of next week, the Department\textsuperscript{1} /Program Coordinator\textsuperscript{2} will email the Department Chair directly, with a copy to the Instructor and Program Director requesting resolution of the missing grade.

3) If, after an additional week the grade is still outstanding, the student or Department\textsuperscript{1} /Program Coordinator\textsuperscript{2} may petition the Office of Graduate students for final resolution.

\textsuperscript{1} For courses that are run by a specific department.

\textsuperscript{2} For the conjoined courses (course number is preceded by CON_ that are run by Graduate Studies.

Grades are assigned based on the following criteria:

- **A**: 93-100
- **A-**: 90-92.99
- **B+**: 87-89.99
- **B**: 83-86.99
- **B-**: 80-82.99
- **C+**: 77-79.99
- **C**: 73-76.99
- **C-**: 70-72.99
- **F**: <70

**Late Submissions**

The assignments will be marked down by 1 point per day if you have not obtained prior permission to delay submission from the instructor. An assignment is considered late if submitted anytime after the Sakai deadline. For example, if a written assignment is due at midnight and you submit it at 12:05 AM, you will lose 1 point. If the assignment still has not been submitted by the following day at midnight, you will lose another point. A one point loss will continue to occur for each day late until the assignment has been submitted.

**Class Participation**

Twenty percent of your grade will be based on your in-class contributions. While you will have some lectures early in the term much of the class time is devoted to interactive in-class exercises and your contribution to these exercises will form the bulk of your class participation grade. Therefore, it is very important that you come to all class sessions on-time. If for some reason you must miss a class, please let the instructor know in advance (or in the case of an emergency as soon as possible after the class is missed). In these cases, you may be given a make-up exercise if appropriate to do on your own. If you miss a class without prior approval and in the absence of an emergency, it will not be possible to make-up the work missed and you will lose 2 of the possible 20 class participation points. Repeated tardiness to class may also result in a loss of 1 point per the class session for which you were late.
**Additional Expectations**
Minimum expected hours of work on your project over the course of the semester: 55 hours (at least 5 hours per week; this does not include the time it takes you to prepare written assignments such as the grant proposal).

Your Specific Aims page and Research Strategy (significance and innovation sections only). Write-Up should be reviewed by your project advisor PRIOR to submission. Therefore, you will need to complete this assignment in enough time before the deadline to get feedback from your project advisor. While not required, it is strongly recommended that you get feedback from your project advisor on the subsections of the grant throughout the term prior to their due dates.

**Grading**

<table>
<thead>
<tr>
<th>Task</th>
<th># Points</th>
<th>Due Date</th>
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<tbody>
<tr>
<td>Class Participation</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Project Participation (assigned by project supervisor(s))</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td>Project Timeline and Intermediate Deliverables</td>
<td>10</td>
<td>4/9/15 (4 PM)</td>
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<tr>
<td>Assignment- Project Bibliography Search</td>
<td>10</td>
<td>4/16/15 (4 PM)</td>
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<tr>
<td>Assignment - Specific Aims page based on course project</td>
<td>15</td>
<td>5/9/15 (4 PM)</td>
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<tr>
<td>Assignment - Significance &amp; Innovation sections of Research Strategy</td>
<td>10</td>
<td>5/28/15 (4 PM)</td>
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<tr>
<td>Project presentation &amp; Slide</td>
<td>10</td>
<td>6/11/15 (4 PM)</td>
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<tr>
<td>Final Class Grade</td>
<td>100</td>
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Reading Material: Relevant literature from the fields of biomedical research, bioinformatics, and computer science.

**COPYRIGHT INFORMATION:**
Every reasonable effort has been made to protect the copyright requirements of materials used in this course. Class participants are warned not to copy, audio, or videotape in violation of copyright laws. Journal articles will be kept on reserve at the library or online for student access. Copyright law does allow for making one personal copy of each article from the original article. This limit also applies to electronic sources.

To comply with the fair use doctrine of the US copyright law, Sakai course sites close three weeks after grades are posted with the Registrar. Please be sure to download all course material you wish to keep before this time as you will have no further access to your courses.
DMICE COMMUNICATION POLICY:
1. If the syllabus directs the student to contact the TA before contacting the instructor, the student should do so. Otherwise, the student should contact the instructor and allow 2 business days (not including weekends) for a response.
2. If the student does not receive a response from the instructor within 2 business days, s/he should contact the TA (if there is one). When contacting the TA s/he should cc the instructor and Diane Doctor at doctord@ohsu.edu.
3. If a student does not receive a response from the TA within 1 business day (not including weekends), s/he should contact Diane Doctor at doctord@ohsu.edu and cc the instructor and the TA.
4. If Diane does not reply within 1 business day (not including weekends), the student should contact Andrea Ilg at ilgan@ohsu.edu.
5. Students having difficulties with Sakai should contact the Sakai Help Desk at sakai@ohsu.edu or at (877) 972-5249. Sakai help is available M-F from 8am to 10-pm and weekends from Noon to 5pm. Do not contact the instructor.

ACADEMIC HONESTY:
Course participants are expected to maintain academic honesty in their course work. Participants should refrain from seeking past published solutions to any assignments. Literature and resources (including Internet resources) employed in fulfilling assignments must be cited. See http://www.ohsu.edu/xd/education/library/research-assistance/plagiarism.cfm?WT_rank=1# for information on code of conduct for OHSU and http://www.ohsu.edu/xd/education/teaching-and-learning-center/for-students/index.cfm for more information on citing sources and recognizing plagiarism.

STUDENT ACCESS:
OHSU is committed to providing equal access to qualified students with disabilities. Student Access determines and facilitates reasonable accommodations, including academic adjustments and auxiliary aids, for students with documented disabilities. A qualified student with a disability is a person who meets the academic and technical standards requisite to admission or participation in a particular program of study. As defined by the Americans with Disability Act (ADA), a person with a disability has a physical or mental impairment that substantially limits one or more major life activities of the individual. This may include, but is not limited to, physical conditions, chronic health issues, sensory impairments, mental health conditions, learning disabilities and ADHD. Student Access works with students with disabilities from all of OHSU’s educational programs and at each campus.

Each school has an assigned Program Accommodation Liaison (PAL), who acts as an “in-house” resource for students and faculty concerning access issues for students with disabilities. The PAL works in collaboration with Student Access to implement recommended accommodations for students with disabilities.

It is recommended that you contact Student Access to consult about possible accommodations if you a) received disability accommodations in the past, b) begin
experiencing academic difficulties, and/or c) are given a new diagnosis from your healthcare provider.

Learn more about Student Access:
Phone: 503 494-0082
Email: studentaccess@ohsu.edu
Website: www.ohsu.edu/student-access

NOTE:
This syllabus and class schedule is subject to changes by the instructors. Changes will be made with as much advance notice as possible.

COURSE COORDINATION:
The course Website will be the central location for the distribution of course materials and assignment listing.

USE OF SAKAI:
This course will have an online component, which can be accessed through Sakai, OHSU’s online course management system. For any technical questions or if you need help logging in, please contact the Sakai Help Desk.

Hours: Sakai Help Desk is available Mon – Fri, 8 am – 9 pm and weekends 12 pm – 5 pm, Pacific Time.
Contact Information:
(Toll-free) 877-972-5249
(Web) http://atech.ohsu.edu/help
(Email) sakai@ohsu.edu

COURSE OBJECTIVES:
- If presented with a research idea, be able to identify informatics issues relevant to the problem and be able to develop and articulate appropriate approaches to finding solutions to these problems.
- Critically develop a research idea (hypothesis), including complete a thorough background evaluation of the literature relevant to this idea.
- Learn how to write a grant application identifying the hypothesis you want to test and describing the relevant background and methodology you will use.
- Implement a work plan for testing your hypothesis.
- Efficiently develop and manage a bioinformatics project.
- Learn how to concisely and clearly communicate your research idea to a variety of audiences.

COURSE OUTLINE:

Week 1 (4/2/15; room 124)
- Course Introduction
- The bibliography as a tool for mapping the lineage of a research idea.
- Accurate documentation of your scientific work.

**Week 1 Assignments:**
(1) Reading: UW-Madison Writing Center document on acknowledging sources (see supplemental material on Sakai); The Grant Application Writer’s Workbook, Part One: Overview, Chapters 1-4.
(2) Prepare project timeline and intermediate deliverables in conjunction with your project advisor and post to Sakai by Thursday 4/9/15 at 4 PM. There is no specific format that you need to use but key elements that should be included are weekly project goals and deliverables.
(3) Begin bibliography development using a current paper in your topic area.

**Week 2 (4/9/15; meet in Old Library Historic Archives Room)**
- Bibliography development, tracing the lineage of current ideas (exercise in historical archives).
- The specific aims page as a tool for research.
- General Approach to writing a research grant.

**Week 2 Assignment:**
(1) Reading: The Grant Application Writer’s Workbook, Part Two: Overview, Chapters 7-9.
(2) Graded assignment (10 points). Prepare a draft of your bibliography for your course project using standard reference format and reference manager of your choice. Each reference should be followed by a few sentences that describe what the paper contributes to its field. Be prepared to give a brief in-class overview of your bibliography with a focus on how your bibliography delineates the lineage of the core ideas forming the basis of your project (15 min; bibliographies will be posted to Sakai so you will not need to prepare handouts or slides). **Post to Sakai by Thursday 4/16/15 at 4 PM.**

**Week 3 (4/16/15): room 123**
- In-class presentation of bibliographies.
- Project status reports.

**Week 3 Assignment:**
Reading: The Grant Application Writer’s Workbook, Part Three: Overview, Chapters 10-11.

**Week 4 (4/23/15; room 123):**
- In-class presentation of bibliographies continues.
- Project status reports.
- Brief 30 min. video clip.

**Week 4 Assignment:**
Work on a draft of your project Specific Aims page. Be prepared to discuss this at your individual meeting with the instructor during Week 5.

**Week 5 (4/30/15; room 123):**
- Individual meetings with students between 4:15 and 9:15 PM (25 min. per student; if students prefer appointments will also be made available Wednesday afternoon/evening 4/29/15) to discuss projects and first draft of their Specific Aims pages.

**Week 5 Assignment:**
Graded assignment (10 points). Prepare a draft of your project Specific Aims page. **Post to Sakai by 4 PM on 5/7/15.**

**Week 6 (5/7/15; room 123):**
- In–class presentation of project Specific Aims page (pages will be posted to Sakai so it will not be necessary to prepare slides).
- Project Status Reports

**Week 6 Assignment:**
Reading: The Grant Application Writer’s Workbook, Part Four: Overview, Chapters 18-19.

**Week 7 (5/14/15; room 124):**
- Dr. Shannon McWeeney- Critical Evaluation of Research Proposals and the NIH Process

**Week 8 (5/21/15; room 123):**
- In-Class Exercise.
- Project Status Reports

**Week 8 Assignment:**
Submit draft of your project write-up (Revised Specific Aims page and Significance & Innovation sections of Research Strategy – graded assignment worth 15 points) to Sakai by **4 PM on 5/28/15.**

**Week 9 (5/28/15; room 123):**
- In-Class Exercise.
- Project Status Reports.

**Week 9 Assignment:**
Review assigned project grants (each person will be assigned as a primary reviewer on one grant and a secondary reviewer on a second grant) and be prepared to **discuss assigned grants in class on 6/4/15.**

**Week 10 (6/4/15; room 123):**
- Mock Grant Review
Week 10 Assignments:
(1) Reviewer summary from mock grant session should be posted to Sakai by 4 PM on Friday 6/5/15.
(2) Prepare project presentation, 5 min. in length, 1 slide only. This will be videoed and reviewed in-class. Submit final copy of slide to Sakai by 4 PM on 6/11/15.

Week 11 (6/11/15; room 124):
- Project presentations, taped and reviewed.