I. General Course and Instructor Information

Course number: IBIO*6630 SCIENTIFIC COMMUNICATION

Semester offered: FALL 2017

Course instructor: Moira Ferguson, Room 1457 Summerlee Science Complex, mmfergus@uoguelph.ca

Office hours: By appointment though my door is often ‘open’

First class meeting: Wednesday, September 13th, 10:00-12:50 a.m.
Room 3317 Science Complex

Scheduled classes: Wednesday, 10:00-12:50 a.m., Room 3317 Science Complex

II. Course Rationale

IBIO*6630 is required to be taken by all incoming MSc students (and also is available to all new PhD students) in the Department of Integrative Biology. This course is designed to assist Thesis Advisory Committees in preparing new students for successful research at the graduate level.

Many students initially think of the development of a “thesis” as the product of their successful graduate education, rather than a key part of its genesis. A thesis is a conjecture, or a proposition supported by evidence. But how do you get started? What makes one thesis more successful than others? What are the relationships among a thesis, a hypothesis, and a research question? Knowing early on what research questions and hypotheses will guide the development of the proposed research is key to efficient literature searching, organizing background material, and generating hypotheses.

This course will explore scientific philosophy, critical thinking, and the use of the Web of Science and other tools to search literature. Key communication skills also will be developed in this course, and will include a working knowledge of scientific philosophy such that students can think and converse competently in the language of science. Course objectives will be met through practice in scientific writing, as well as critiques of existing literature, oral presentations, and students’ own work. Students will further practice oral communication skills through frequent interaction with peers and faculty. Class meetings will comprise of facilitated discussions arising from the readings and exercises. For each student, the final product of this
By focusing on the process of scientific research, the learning objectives of this course are to:

1) Develop and refine skills in communication of scientific knowledge (broadly defined to include the ability to be conversant in scientific philosophy), and competency in oral presentation and technical writing of reviews and proposals;
2) Learn to give, receive and value criticism in the form of peer review; and
3) Share in the wide diversity of ongoing research topics across the breadth of biological study represented in IB.

To meet these learning objectives, students successful in this class will:

- attend all class and writing group meetings,
- attend all departmental seminars, for purposes of learning to critique content and style. Departmental seminars are listed at http://www.uoguelph.ca/ib/seminars.shtml. In the case of conflict with teaching assignments, students may attend any other scientific seminars offered at the university. See the full write-up of the ‘Seminar Assignment’ for more details,
- read all assigned articles prior to each class meeting,
- participate regularly in class discussions,
- be respectful of others’ opinions and work, and work towards building a rigorous, challenging, but always courteous atmosphere in and out of the classroom.

III. General Course Topics – Course topics are subject to change and modification as the course evolves. See section IV below for more detailed information on course topics and assignments.

Week 1 Course Introduction. Discussion of research ideas and where they come from.
Week 2 All about hypothesis testing
Week 3 Hypothesis testing continued (Assignment 1 is due)
Week 4 Hypothesis testing and experiments (Assignment 2 is due)
Week 5 Proposal writing – how to get started
Week 6 Publishing and peer review: the good, the bad, the ugly (Assignment 3 is due)
Week 7 Ethics in Biological Research
Week 8-11 Development, peer review and revision of Thesis Proposal Draft 1
As indicated above, course topics are subject to change and modification as the course evolves. However, the grade breakdown (see section V) will remain the same. Refer to write-ups on individual assignments for more details. Please read all assigned articles prior to class and come to each class meeting prepared to engage in discussion.

**Pre-course readings**

These have been put together over the years to help mentor and often inspire graduate students.

2) Huey, R.B. undated. Reply to Stearns: some acynical advice for graduate students. Available online at Huey’s website.
4) Gosling, P. and B. Noordam. 2006. Mastering your PhD: Setting goals for success. Published by AAAS on sciencecareers.org

**Additional on Courselink**


**Week 1**

**Course introduction and overview**

**Discussion of creativity, research ideas and where to find them**

**Readings**


**Assignment 1:** Use the Web of Science and/or other tools, and search for papers using key words related to your thesis topic. Identify key journals, and journal impact factors, and discuss findings with your advisor. See full write-up on this assignment for more details. Due at the beginning of class on week 3.

If you don’t have one already, use these articles as the foundation of your own electronic library!
### Week 2  
**All about hypothesis testing**

**Readings**

Reminder – Assignment 1 is due at the beginning of Week 3!

Introduction of Assignment 2: “*Follow the smoke*”. Identify a key uncertainty in your field of research (ideally, one that relates to your thesis topic). This can and should be done through communications with your advisor. Prepare a brief report for presentation to the class at the beginning of week 3. See full write-up of assignment for more details.

### Week 3  
**Assignment 1 is due**

**Continuation of hypothesis testing**

**Readings**

Reminder – Assignment 2 is due at the beginning of week 4!

### Week 4  
**Assignment 2 is due**

**More on hypothesis testing and experimental design**

No readings this week! Take the time to make sure you understand scientific inquiry (induction, deduction, abduction).

Introduction of Assignment 3: Reflect on the readings from weeks 2 and 3, and report on your research philosophy. See full write-up on this assignment for the details on this assignment. Due at the beginning of class on week 6.

### Week 5  
**Proposal writing and components of sound technical writing**

**Organization of writing groups**

**Reading:** 1) Sand-Jensen, K. 2007. How to write consistently boring scientific literature.
Useful References

http://www.learnerassociates.net/dissthes/
http://www.meaning.ca/articles/writing_research_proposal_may02.htm

Reminder – Assignment 3 is due at the beginning of Week 6.

Assignment: Work towards completing a draft of your Thesis Research Proposal!

Week 6

Assignment 3 is due
Publishing and peer review: the good, the bad, the ugly

Readings

Assignment: Work towards completing a draft of your Thesis Research Proposal!

Week 7

Ethics in the Biological Sciences

For this class period, I want you to come to class with all of the questions you might have about what’s appropriate and not appropriate in research. Questions might relate to authorship, ownership of data, citing articles in your own writing, etc.

Readings

Assignment: Work towards completing a draft of your Thesis Research Proposal!

Weeks 8-11

Schedule reciprocal peer reviews of Draft Thesis Research Proposals
Meetings of individual writing groups

By week 9, submit the first draft of your Draft Thesis Research Proposal. This draft will be used for the peer review assignment (Assignment 4), but you should keep working on revising your proposal over the next few weeks!

Assignment 5: By week 10, return completed peer reviews of Draft Thesis Research Proposals. More details will be provided on this assignment mid-semester.

Assignment 6: By week 12, submit revised Draft Thesis Research Proposals to Thesis Advisor and course instructor.

V. Breakdown of Graded Assignments

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Due Date*</th>
<th>Total points</th>
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<tbody>
<tr>
<td>Ongoing Seminar Assignment</td>
<td>Each evaluation is due 1 week post-seminar</td>
<td>20 (4 points each)</td>
</tr>
<tr>
<td>Assignment 1: Literature searching</td>
<td>Week 3</td>
<td>10</td>
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<tr>
<td>Assignment 2: Identifying key uncertainties in research</td>
<td>Week 4</td>
<td>10</td>
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<tr>
<td>Assignment 3: Reflections on personal research philosophy</td>
<td>Week 6</td>
<td>10</td>
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<tr>
<td>Assignment 4: Peer review of draft thesis proposals</td>
<td>Week 10</td>
<td>25</td>
</tr>
<tr>
<td>Assignment 5: Completion of your Thesis Research Proposal</td>
<td>First Draft is due on Week 9; Revised draft is due on Week 12</td>
<td>25</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>100 points</strong></td>
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*All assignments are due at the beginning of class on the week noted.*