

ESM 554: Graduate Research Toolbox, Fall 2015  
Tuesday, Thursday 2 – 3:50pm, Science Building 1 424  
CRN: 15385

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**Course Description & Objectives:** The objectives of this course are to provide students with the necessary tools to navigate graduate school and beyond. This course will emphasize the development of research skills, such as time management and library literacy, the creation of novel research ideas and projects, proper experimental design and associated power analysis, the different writing skills that are emphasized in grant and thesis/publication-style documents, presenting scientific information, and critical peer review. It is expected that students will participate in lectures and in-class discussions, as well as complete the assigned readings.

This course addresses the following course level objectives from our departmental learning objectives:

- 2d Information literacy
- 3d Experimental design
- 3e Modeling/quantitative analysis
- 3g Statistical analysis
- 3x Project management to meet deadlines, etc.
- 4a Technical and academic writing
- 4b Oral communication (articulation, presentation, persuasion)

**Course Guidelines:** In order to get the most out of this course, please do the assigned readings on time and try not to miss any classes, which will be very difficult to make up.

**Attendance:** I expect you to attend and participate in class. If you are absent please find out what you missed by asking your fellow students, checking D2L, and/or speaking with me. You are responsible for all material presented in class.

**Late assignments:** To be fair to all students, late assignments will be penalized 5% per day. If you have an emergency situation, please let me know.

**Grading scale:**

**A:** “superior”, high level integration and conceptual development with factual accuracy

**B:** “above average”, accurate with significant integration and conceptual development

**C:** “basic quality”, mostly accurate and simply factual, modest concept development

A 94 – 100

B+ 87 – 89

C+ 77 – 79

D+ 67 – 69

A- 90 – 93

B 83 – 86

C 73 – 76

D 63 – 66

B- 80 – 82

C- 70 – 72

D- 60 – 62

**Statement on Academic Honesty:** Plagiarism or academic dishonesty of any form will not be permitted in this class and will result in a failing grade for the assignment. For more information, please see Portland State University’s policy on academic honesty.

**Desire2Learn:** This class will use Desire2Learn (D2L) to share information. Your grades will also be posted on D2L. To access Desire2Learn, you must have an ODIN account. You can access D2L through <https://d2l.pdx.edu>

**Email Etiquette:** As much as possible, please come to office hours to ask questions. If these times do not work for you, send me a message to set up an alternative time. Email questions should be a last resort. If you do need to send me an email, please follow these general guidelines:

- include an informative subject line (e.g., article #1 for ESM 475)
- include a salutation (e.g., Dear, Hello)
- address using proper titles (e.g., Dr. Strecker)
- include your name, student #, and what class you are in

As this is a professional environment, do not expect to receive a reply to your message after 5pm or on weekends; normal turnaround time for email is ~48 hours. Please email my @pdx.edu account.

**Readings:** Readings will be drawn from the following: 1) *Experiments in Ecology* (A.J. Underwood), 2) *Design and Analysis of Ecological Experiments* (S. Scheiner, J. Gurevitch), 3) *A Short Guide to Writing About Biology* (J. Pechenik), 4) *Experimental Design and Data Analysis for Biologists* (G. Quinn, M. Keough), and 5) *Writing Science: How to Write Papers that get Cited and Proposals that get Funded* (J. Schimel), as well as the primary literature. Readings will be available on D2L.

### Course Grade Breakdown

- Grant Proposal and Review (30%) – Students will write a short grant proposal on their intended research (20%). Proposals will be reviewed by peers for an additional 10%.
- Library Skills (15%) – Build a personal annotated library (10%) and complete an in-class assignment on information management (5%).
- Power Analysis (15%) – Students will complete an *a priori* power analysis on the expected variation, sample size, effect size, and statistical significance for a future study.
- Abstract Writing (10%) – Students will be given a research paper that is missing its title, keywords, and abstract, and will be tasked with writing the missing components.
- Poster and Presentation (10%) – Students will develop a poster and deliver a short presentation outlining their research plans. Posters and presentations will be evaluated by instructor and peers.
- Discussions (20%) – Weekly discussions on a journal article or chapter. Students must turn in a summary of the article(s), plus five questions/topics for discussion at the beginning of class. Marks will be assigned on participation and quality of article summary/questions.

### Tentative Schedule

Week	Date	Lecture Topic
1	T Sept 29	Introduction to graduate skills, time management Introduction to proposal assignment
	R Oct 1	Developing a research question, workshop

		<b>Reading:</b> Chapter 2 (Underwood)
2	T Oct 6	Writing – Grants (NSF) <b>Discussion:</b> Chapter 10 (Pechenik), Chapter 2 (Schimel)
	R Oct 8	Writing – Grants (general), crowdfunding
3	T Oct 13	Work day <b>Discussion:</b> Nicholas and Gordon (2011), McPeck et al. (2009)
	R Oct 15	Peer review <b>Due:</b> Research Plan and Personal Statement
4	T Oct 20	Library skills, building a research database <b>**Meet in Millar Library 170</b> <b>Due:</b> Library skills in-class assignment <b>Reading:</b> Chapter 2 and 3 (Pechenik)
	R Oct 22	Proposal roundtable <b>Due:</b> Proposal review
5	M Oct 26	<b>**NSF GRFP deadline for Life Sciences**</b>
	T Oct 27	Science philosophy <b>Discussion:</b> The Guardian: Philosophy v Science; The Atlantic: Has Physics Made Philosophy and Religion Obsolete?
	R Oct 29	Science philosophy/ Research ethics <b>Due:</b> Personal annotated library
6	T Nov 3	Research ethics <b>Discussion:</b> choose one from Atlanta Clinical & Translational Science Institute's (ACTSI) webpage, summarize for class
	R Nov 5	Experimental design <i>and</i> Power analysis <b>Reading:</b> Chapter 7 (Quinn and Keough)
7	T Nov 10	Experimental design <i>and</i> Power analysis <b>Discussion:</b> Hurlbert 1984, Oksanen 2001
	R Nov 12	Writing – Thesis/Publications <b>Reading:</b> Chapter 9 (Pechenik)
8	T Nov 17	Professional Development – CV, cover letter, website, social media, networking <b>Due:</b> Power Analysis <b>Discussion:</b> Bring your CV and a job ad that you are interested in (no summary is required).
	R Nov 19	Presenting scientific information – conceptual diagram/model
9	T Nov 24	Presenting scientific information – visually and orally <b>Due:</b> Abstract Writing <b>Discussion:</b> Chapter 3 (Scheiner and Gurevitch), Chapter 11 (Pechenik)
	R Nov 26	<i>holiday</i>
10	T Dec 1	Presenting scientific information – visually and orally
	R Dec 3	<b>Due:</b> Student research posters/presentations
Final	M Dec 7	<b>*If needed*</b> Student research posters/presentations (10:15a-12:05p) <b>Due:</b> Updated personal annotated library