

## RNR 546: Principles of Research

Fall 2021 – 3 Credits – ENR2 S210 Mon and Wed 1:00-2:15

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**For Health Updates go to [COVID19.arizona.edu](https://COVID19.arizona.edu)**

### Land Acknowledgement

*We respectfully acknowledge the University of Arizona is on the land and territories of Indigenous peoples. Today, Arizona is home to 22 federally recognized tribes, with Tucson being home to the O'odham and the Yaqui. Committed to diversity and inclusion, the University strives to build sustainable relationships with sovereign Native Nations and Indigenous communities through education offerings, partnerships, and community service.*

### Description of Course

Philosophy of science and the principles of conducting research, including formulation of problems, problem analysis, study plans, and preparation of manuscripts for publication.

### Course Objectives and Expected Learning Outcomes

Objectives:

Develop the foundation for a successful graduate degree and subsequent professional contribution by focusing on (1) the philosophy of science, (2) ethics associated with science; (3) written communication with a focus on publication and peer review, and (4) considerations of a plan for professional development.

Expected Learning Outcomes:

Understand major advances in the **philosophy of science** and their relevance to conducting science and communicating science to a broader public.

Understand the importance of scientific reporting and the **publication and peer review** process, and develop professional knowledge about related ethical considerations.

Be able to apply skills in **written communication** of research including identification of a knowledge gap, synthesis of literature, developing effective flow, developing effective figures and tables, and ability to provide critical feedback to peers.

Be able to identify options associated with **research design** and the pros and cons of different design approaches, as well as recognizing the quality and utility of data

### Course Format and Teaching Methods

In class Discussion and Experiential Learning facilitated by Instructor

## Required Texts available on line through UA library:

- Ford, E.D. 2000. Scientific Method for Ecological Research. Cambridge U. Press  
 Karban, R., M. Huntzinger & I.S. Pearse 2014. How to do ecology: a concise handbook. 2nd Edition. Princeton U. Press.  
 Schimel, J. 2012. Writing Science. How to write papers that get cited and proposals that get funded. Oxford U. Press.

Required texts may be obtained through the library, as a rental ebook, or as a purchased ebook or paperback book. Additional required readings are posted in D2L.

## Scheduled Topics / Activities / Assignments

Class	Date	Topics & Reading & 5 Bullet Points	Manuscript Progress / Additional Homework
1	Mon Aug 23	Introduction - <i>No reading</i>	<i>None</i>
2	Wed Aug 25	<del>Karban</del> et al. 1: Picking a question; 2: Posing Questions (or Picking an Approach)	Describe your interests in the field, your goals for this class, and your professional goals (1 paragraph between 450 and 500 words).
3	Mon Aug 30	Schimel 1: Writing in science; 2: Science writing as storytelling	Provide The Frontiers journal selected, the Section in the journal, and an initial topic you will take on
4	Wed Sep 1	Ford 2: Five Processes of Research Planning	1 line summaries and associated reference of 5 papers relevant to your mini-review
5	Wed Sep 8	Ford Section II Introduction - Making a synthesis for scientific inference	1 line summaries and associated reference of 5 papers relevant to your mini-review
6	Mon Sep 13	Schimel 3: Making a story stick; 4: Story structure	Draft Figure or Table
7	Wed Sep 15	<del>Kelsky</del> 6: The attributes of a competitive tenure track candidate; 7: Building a competitive record; 7 Habits Overview;	1 line summaries and associated reference of 5 papers relevant to your mini-review
8	Mon Sep 20	Schimel 5: The Opening;	Draft Abstract (within 10% of journal word limit) and Revised Draft Figure or Table
9	Wed Sep 22	Schimel 6: The funnel: connecting O and C; 7: The Challenge	1 line summaries and associated reference of 5 papers relevant to your mini-review
10	Mon Sep 27	Schimel 8: Action; 9: The Resolution	Completion of 3 paragraph Introduction
11	Wed Sep 29	Schimel 10: Internal Structure; 11: Paragraphs	Completion of body (5 or so paragraphs or equivalent) with Figures and Tables
12	Mon Oct 4	<del>Karban</del> et al.: 3: Using Experiments to Test Hypotheses; 5: Using Surveys to Explore Patterns	Completion of 2-3 paragraph Discussion and Conclusion
13	Wed Oct 6	<i>No reading</i>	1st Complete Draft Due
14	Mon Oct 11	Morrison, Marcon & Mannon Ch 4: The experimental approach in wildlife science	Review drafts of 1st two peers
15	Wed Oct 13	Okasha: 1: What is science?; 2: Scientific inference	<i>None</i>
16	Mon Oct 18	Ford 3: Conceptual and Propositional Analyses for Defining Research Problems	2nd Draft Due
17	Wed Oct 20	Schimel 12: Sentences; 13: Flow;	Re-review drafts of 1st two peers
18	Mon Oct 25	Journals and practices – guest speaker - Dr. <del>Quarrod</del>	<i>None</i>
19	Wed Oct 27	Ford 4: Development of a Research Plan	3rd Draft Due
20	Mon Nov 1	Schimel 14: Energizing writing; 15: Words	Review drafts of 2nd two peers
21	Wed Nov 3	Ford 6: The art of measurement and experiment	<i>None</i>
22	Mon Nov 8	Schimel 16: Condensing; 17: Putting it all together - real editing; 18: Dealing with limitations	4th Draft Due with response to 2nd two reviewers
23	Wed Nov 10	Professional Societies Ethics	Re-review drafts and responses of 2nd two peers
24	Mon Nov 15	<del>Karban</del> et al. 8: Communicating what you find	<i>None</i>
25	Wed Nov 17	Okasha: 5: Scientific change and scientific revolutions	Final version due
26	Mon Nov 22	Schimel 19: Writing global science; 20: Writing for the public	<i>None</i>
27	Wed Nov 24	<i>Optional session - Self Critiques and Next Steps</i>	<i>None</i>
28	Mon Nov 29	<del>Kelsky</del> 24: Rules of the Academic CV; 60: 100+ skills that translate outside the academy	<i>None</i>
29	Wed Dec 1	<del>Kelsky</del> 14: Take control of your CV; 15: Getting teaching experience; 16: Publish this, not that; 17: Why you want and need grants; 18: Cultivating your references	<i>None</i>
30	Mon Dec 6	Schimel 21: Resolution	Future CV
31	Wed Dec 8	<i>Synthesis and Paths Forward</i>	<i>None</i>

## Grading Scale and Policies

Grading for the course will be as follows:

Class participation:	30%
Readings bullet points (3 may be dropped):	20%
Other writing homework:	30%
<u>Final paper:</u>	<u>20%</u>
TOTAL	100%

Grading will be on the scale of A ( $\geq 90\%$ ); B ( $\geq 80\%$  and  $< 90\%$ ); C ( $\geq 70\%$  and  $< 80\%$ ); D ( $\geq 60\%$  and  $< 70\%$ ); and E C ( $< 60\%$ ). University policy regarding grades and grading systems is available at <http://catalog.arizona.edu/policy/grades-and-grading-system>

All assignments are due before class begins on the day assigned.

Readings bullet points will be evaluated for consistency with the material, for specification of a statement, not a topic; and inclusion of points from multiple readings when there are multiple readings or from multiple parts within a single chapter when there is only a chapter. Three assignments of this type can be dropped.

Writing assignments will be graded based on concepts discussed in class, with the expectation that they will build toward a publication quality "Mini Review" by the final paper. No assignments of this type can be dropped.

All assignments are due before class begins on the day assigned. Late work will be reduced by 10% per day late, up to a maximum of 5 days, at which time a 0 will be applied; homework turned in a partial day late will still receive a full 10% reduction in grade.

**Requests for incomplete (I) or withdrawal (W)** must be made in accordance with University policies, which are available at <http://catalog.arizona.edu/policy/grades-and-grading-system#incomplete> and <http://catalog.arizona.edu/policy/grades-and-grading-system#Withdrawal> respectively.

### Absence and Class Participation Policy

The UA's policy concerning Class Attendance, Participation, and Administrative Drops is available at: <http://catalog.arizona.edu/policy/class-attendance-participation-and-administrative-drop>

The UA policy regarding absences for any sincerely held religious belief, observance or practice will be accommodated where reasonable, <http://policy.arizona.edu/human-resources/religious-accommodation-policy>.

Absences pre-approved by the UA Dean of Students (or Dean Designee) will be honored. See: <https://deanofstudents.arizona.edu/absences>

Participating in the course and attending lectures and other course events are vital to the learning process. As such, attendance is required at all lectures and discussion section meetings. Students who miss class due to illness or emergency are required to bring documentation from their health-care provider or other relevant, professional third parties. Failure to submit third-party documentation will result in unexcused absences.

### Makeup Policy for Students Who Register Late

Students who register after the first class meeting may make up missed assignments within 1 week of registering.



## **Classroom Behavior Policy**

To foster a positive learning environment, students and instructors have a shared responsibility. We want a safe, welcoming, and inclusive environment where all of us feel comfortable with each other and where we can challenge ourselves to succeed. To that end, our focus is on the tasks at hand and not on extraneous activities (e.g., texting, chatting, reading a newspaper, making phone calls, web surfing, etc.).

## **Threatening Behavior Policy**

The UA Threatening Behavior by Students Policy prohibits threats of physical harm to any member of the University community, including to oneself. See <http://policy.arizona.edu/education-and-student-affairs/threatening-behavior-students>.

## **Accessibility and Accommodations**

At the University of Arizona we strive to make learning experiences as accessible as possible. If you anticipate or experience physical or academic barriers based on disability or pregnancy, you are welcome to let me know so that we can discuss options. You are also encouraged to contact Disability Resources (520-621-3268) to explore reasonable accommodation. If our class meets at a campus location: Please be aware that the accessible table and chairs in this room should remain available for students who find that standard classroom seating is not usable.

## **Code of Academic Integrity**

Students are encouraged to share intellectual views and discuss freely the principles and applications of course materials. However, graded work/exercises must be the product of independent effort unless otherwise instructed. Students are expected to adhere to the UA Code of Academic Integrity as described in the UA General Catalog. See: <http://deanofstudents.arizona.edu/academic-integrity/students/academic-integrity>.

The University Libraries have some excellent tips for avoiding plagiarism, available at <http://new.library.arizona.edu/research/citing/plagiarism>.

*Selling class notes and/or other course materials to other students or to a third party for resale is constitute copyright infringement.*

## **UA Nondiscrimination and Anti-harassment Policy**

The University is committed to creating and maintaining an environment free of discrimination; see <http://policy.arizona.edu/human-resources/nondiscrimination-and-anti-harassment-policy>

Our classroom is a place where everyone is encouraged to express well-formed opinions and their reasons for those opinions. We also want to create a tolerant and open environment where such opinions can be expressed without resorting to bullying or discrimination of others.

## **Additional Resources for Students**

UA Academic policies and procedures are available at <http://catalog.arizona.edu/policies>

Student Assistance and Advocacy information is available at <http://deanofstudents.arizona.edu/student-assistance/students/student-assistance>

## **Confidentiality of Student Records**

<http://www.registrar.arizona.edu/personal-information/family-educational-rights-and-privacy-act-1974-ferpa?topic=ferpa>

## **Subject to Change Statement**

Information contained in the course syllabus, other than the grade and absence policy, may be subject to change with advance notice, as deemed appropriate by the instructor.