



FAS 5901: Scientific Thinking

SCHOOL OF FOREST, FISHERIES, AND GEOMATIC SCIENCES
UNIVERSITY OF FLORIDA
FALL 2021

Learning Outcomes

Distinguish ecology from other endeavors and better identify "good" science

Formulate & Deliver higher quality verbal and written arguments

Demonstrate an ability to learn from other fields

Interact effectively as a part of a team exploring important issues

Dr. Carolina "Carol" Baruzzi

Pronouns: She/Her/Hers
375A Newins-Ziegler
(662) 694-0604 cell
carolina.baruzzi@ufl.edu

Help Sessions: Individual meetings are available upon request. Contact instructor(s) for appointment.

Email Correspondence: Please send emails to both instructors to ensure you receive a prompt response.

Dr. Raelene "Rae" Crandall

Pronouns: She/Her/Hers
355 Newins-Ziegler Hall
(352) 273-3416 office/ (225) 937-7000 cell
raecrandall@ufl.edu

Credits: 2

Class Hours: Wednesday | Periods 8-9 (3:00-4:55pm)

Class Location: 219 Newins-Ziegler Hall

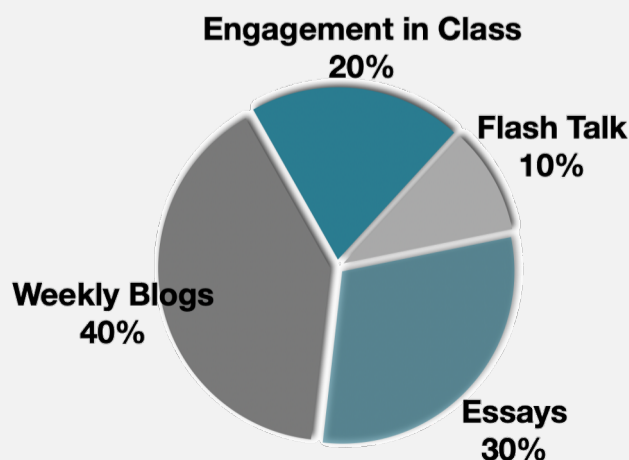
Prerequisites: One ecology course

Course Description

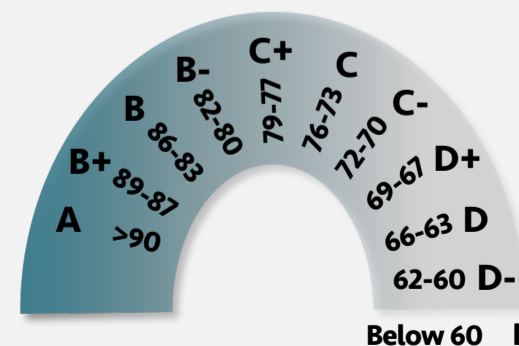
This course examines general philosophical foundations of science, the nature of scientific disputes, and the relevance of these to ecology. Assigned readings, class discussions and essays provide background, tools, opportunities and feedback designed to help students deliberately develop their professional philosophy. The goals of this course are to:

- 1 Foster** critical thinking while developing each student's scientific philosophy
- 2 Enable** students to recognize philosophical differences among scientists, particularly ecologists
- 3 Help** students place ecological science in the context of intellectual pursuits and human nature
- 4 Make explicit** for students the foundations of public trust in ecology as a science

Grade Distribution

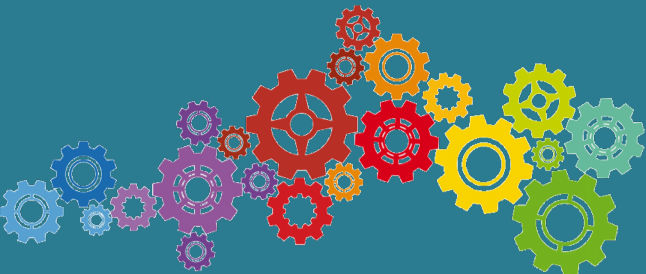


Grading Scale



Grades are not rounded. For information on current UF policies for assigning grade points, see: <https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>



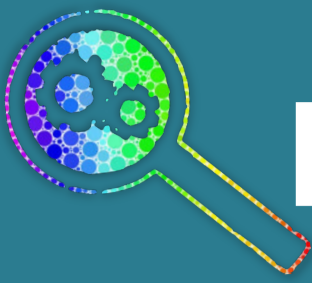


Class Schedule

Date	Topic	Readings & Assignments
Aug. 25	1 Course goals, outcomes, evaluation and feedback; Critical thinking and intellectual standards	
	 SECTION I: Why Ponder Science as an Ecologist?	
Sept. 1	2 Why study science per se? What is the aim of science? What is the aim of ecology?	Rigler & Peters (1995) Ch.1, pp. 5-20 Peters (1991) Ch. 2., pp. 17-37
Sept. 8	3 Relationship between science and philosophy	Rosenberg & McIntyre (2019) Ch. 1 & 2, pp. 1-35
Sept. 15	4 Distinguishing science (ecology) and religion	Barbour (1997) Ch. 1-3, pp. 3-74
	 SECTION II: Applying Philosophy to Ecology	
Sept.22	5 Popper's contribution	Popper in Boyd et al. (1995) pp. 98-119 1st Essay due Sunday, Sept. 26 by 11:59 pm
Sept. 29	6 Strong inference and multiple working hypotheses	Chamberlin (1890); Platt (1964)
Oct. 6	7 Paradigms and scientific revolution	Rosenberg & McIntyre (2019) Ch. 12, pp. 206-222
Oct. 13	8 Lakatos' scientific research programs	Lakatos & Musgrave (1970) pp. 91-196
Oct. 20	9 Feyerabend's anarchism	Lakatos & Musgrave (1970) pp.197-230
Oct. 27	10 A "Kuhnian" look at ecology	Cooper (2003) Ch. 2, pp. 27-74
Nov. 3	11 The current status of the philosophy of biology	Takacs & Ruse (2013)
	 SECTION III: Diversity and Scientific Thinking	
Nov. 10	12 Ecological paradigms and gender discrimination	Saini (2017) pp. 13-28 2nd Essay due Sunday, Nov. 14 by 11:59 pm
Nov. 17	13 Decolonizing scientific thinking	Trisos et al. (2021)
Nov. 24	14 Holiday	
Dec. 1	15 Five-minute flash talks I	
Dec. 8	16 Five-minute flash talks II	3rd Essay due Sunday, Dec. 12 by 11:59 pm



The syllabus represents current plans and objectives for this course. As the semester progresses, changes may need to be made to accommodate timing, logistics, or to enhance learning. Such changes, communicated clearly, are not unusual and should be expected.



References

Required Textbook:

Rosenberg, A. and McIntyre, L., 2019. *Philosophy of science: A contemporary introduction*. Routledge, New York, NY. 308 pp.

Required Readings:

Chamberlin, T.C. 1890 (reprinted 1965). The method of multiple working hypotheses. *Science* 148:754-759.

Cooper, G.J. 2003. *The Science of the Struggle for Existence: On the Foundations of Ecology*. Cambridge University Press, Cambridge. 319 pp.

Boyd, R. P. Gaspar and J.D. Trout. 1995. *The Philosophy of Science*. MIT Press, Cambridge. 800 pp.

Lakatos, I., and A. Musgrave (eds). 1970. *Criticism and the Growth of Knowledge*. Cambridge Univ. Press, New York. 282 pp.

Peters, R.H. 1991. *A Critique for Ecology*. Cambridge Univ. Press, New York. 366 pp.

Platt, J.R. 1964. Strong inference. *Science* 146:347-353.

Rigler, F.H. and R. H. Peters. 1995. *Science and Limnology*. Ecology Inst., Oldendorf/Luhe, Germany. 239 pp.

Saini, A. 2017. *Inferior: How Science Got Women Wrong and the New Research That's Rewriting the Story*. Beacon Press, Boston. 213 pp.

Takacs, P., and Ruse, M. 2013. The current status of the philosophy of biology. *Science & Education* 22:5-48.

Trisos, C.H., Auerbach, J., and Katti, M. 2021. Decoloniality and anti-oppressive practices for a more ethical ecology. *Nature Ecology & Evolution*, pp.1-8.

Supplemental Readings (Optional):

Kuhn, T.S. 1970. *The Structure of Scientific Revolutions*. (2nd Ed.) Univ. of Chicago Press, Chicago. 210 pp.

Longino, H.E. 1987. Can there be a feminist science?. *Hypatia*, 2: 51-64.

Motterlini, M. (ed.). 1999. *For and Against Method*. Univ. of Chicago Press, Chicago. 451 pp.

Powell, J.L. 1998. *Night Comes to the Cretaceous: Dinosaur Extinction and the Transformation of Modern Geology*. W.H. Freeman & Co. 325 pp.

Powell, K., Terry, R., & Chen, S. (2020). How LGBTQ+ scientists would like to be included and welcomed in STEM workplaces.

Reiners, W.A. and J.A. Lockwood. 2010. *Philosophical Foundations for the Practices of Ecology*. Cambridge Univ. Press, New York. 212 pp.

Tuhiwai Smith, L. 2012. *Decolonizing Methodologies: Research and Indigenous Peoples*. Zen Books, London. 240 pp.



COVID-19 Safety

This course will be conducted in-person. During all face-to-face activities, the following public health and safety protocols are expected of all students and instructors:

Always bring and wear a mask when indoors or within 6 feet of others



Wash hands (>20 sec) before and during class



Maintain at least 6 feet distance from others when possible



If you feel sick or have symptoms, stay home

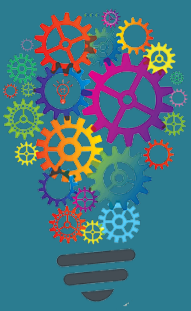


We kindly ask individuals who are unable or unwilling to meet these requirements not to participate in face-to-face activities. If you are experiencing [COVID-19 symptoms](#), please use the UF Health screening system and follow the instructions on [whether you are able to attend class](#). Course materials will be provided to you with an *excused absence*, and you will be given a reasonable amount of time to make up work.



Frequently Asked Questions

<p>How will we teach?</p>	<p>Wednesdays During Class: We will have weekly class discussions with Socratic questioning derived from assigned readings. Students will be asked to lead the weekly discussions. Class engagement is expected as discussions cannot be “made up.”</p>	<p>On Canvas: Read peer-reviewed papers and book chapters, review and comment on other student’s blog plots, and submit essays.</p>
<p>How will you be evaluated?</p>	<p>During class, grades for engagement will be assigned using participation in activities and responses to questions. These will be reinforced by student blogs written after each discussion. Everyone is expected to read everyone else’s blog prior to the next class period.</p>	<p>Three essays are due after each section. Essays will be evaluated by the instructors for critical thinking and intellectual standards, as reviewed at the beginning of the course and throughout the discussions. Essays will be compiled and posted for review.</p>
<p>What if you must miss a class?</p>	<p>PLEASE contact us before the missed class. Discussions are more enjoyable when more people are present and participating, but we do understand if you need to occasionally miss class for illness or research. We allow TWO missed classes with no prior approval.</p>	<p>Do not fall behind! Blogs will be accepted from students absent from discussions due to illness. Communicate with your classmates, keep up with the readings, visit the class Canvas page, and turn in assignments.</p>
<p>What if you must miss many classes?</p>	<p>PLEASE communicate with us as soon as you think you will need to miss multiple classes or assignments. We will allow TWO missed classes and blog entries/responses with no grade penalty (i.e., two lowest grades are dropped)</p>	<p>We care and want to see you succeed. Thus, if we notice you are falling behind or not attending class, expect an email. If you are experiencing a hardship, we will work with you to develop a plan for completing the course without undue stress.</p>
<p>How will we communicate?</p>	<p>Canvas announcements ONLY! Make sure you are signed up to receive Canvas updates. You will only receive emails for individual conversations.</p>	<p>Individual meetings are available upon request. Email instructor(s) for an appointment. Note: Email responses during evenings and weekends will be limited</p>
<p>What if you miss a due date?</p>	<p>Unless PRIOR arrangements have been made with your instructors, there will be a 10% grade reduction each day an assignment or blog is late up to one week.</p>	<p>Seven days after the due date, the submission page will lock and a zero will be assigned. For example, if the assignment is due on the 5th, it will lock on the 12th at 11:59pm.</p>
<p>How can you provide <i>anonymous</i> feedback?</p>	<p>To provide comments and suggestions related to this class, complete a survey at: https://ufl.qualtrics.com/jfe/form/SV_249BMRhY8yutRXf Password: FALL2021</p>	<p>To report a bias incident or hate crime to the UF Respect Team or UFPD, complete appropriate form at: https://respect.ufsa.ufl.edu/</p>



Resources to Help You Succeed

Diversity & Inclusion

Modern ecological concepts were built from a small subset of voices. Therefore, integrating a diverse set of experiences is important for a more comprehensive understanding of ecology and scientific thinking. We acknowledge that it is possible that there may be both overt and covert biases in the material due to the lens with which it was written, even though the material is primarily of a scientific nature. We will strive to address these issues by including material from diverse perspectives when possible and by creating a classroom environment conducive to respectful, professional communication.

Just as in any professional environment, meaningful and constructive dialogue is expected in this class and requires a degree of mutual respect, willingness to listen, and tolerance of opposing points of view. Respect for individual differences and alternative viewpoints will be always maintained in this class. One's words and use of language should be temperate and within acceptable bounds of civility and decency. Friendly persuasion wins friends and influences people. Aggressively arguing your point often does the opposite and stops dialogue.

This course embraces the University of Florida's Non-Discrimination Policy, which reads,

The University shall actively promote equal opportunity policies and practices conforming to laws against discrimination. The University is committed to non-discrimination with respect to race, creed, color, religion, age, disability, sex, sexual orientation, gender identity and expression, marital status, national origin, political opinions or affiliations, genetic information and veteran status as protected under the Vietnam Era Veterans' Readjustment Assistance Act.

Inclusive Learning Environment

If you have questions or concerns about your rights and responsibilities for inclusive learning environment, please see the instructor or refer to the Office of Multicultural & Diversity Affairs website: <http://multicultural.ufl.edu>.

In-Class Recording

Students are allowed to record video or audio of class lectures. However, the purposes for which these recordings may be used are strictly controlled. The only allowable purposes are (1) for personal educational use, (2) in connection with a complaint to the university, or (3) as evidence in, or in preparation for, a criminal or civil proceeding. All other purposes are prohibited. Specifically, students may not publish recorded lectures without the written consent of the instructor.

A "class lecture" is an educational presentation intended to inform or teach enrolled students about a particular subject, including any instructor-led discussions that form part of the presentation, and delivered by any instructor hired or appointed by the University, or by a guest instructor, as part of a University of Florida course. A class lecture does not include lab sessions, student presentations, clinical presentations such as patient history, academic exercises involving solely student participation, assessments (quizzes, tests, exams), field trips, private conversations between students in the class or between a student and the faculty or lecturer during a class session.

Publication without permission of the instructor is prohibited. To "publish" means to share, transmit, circulate, distribute, or provide access to a recording, regardless of format or medium, to another person (or persons), including but not limited to another student within the same class section. Additionally, a recording, or transcript of a recording, is considered published if it is posted on or uploaded to, in whole or in part, any media platform, including but not limited to social media, book, magazine, newspaper, leaflet, or third-party note/tutoring services. A student who publishes a recording without written consent may be subject to a civil cause of action instituted by a person injured by the publication and/or discipline under UF Regulation 4.040 Student Honor Code and Student Conduct Code.

Communication Courtesy

All members of the class are expected to follow rules of common courtesy in all email messages, threaded discussions and chats (i.e., Netiquette). Failure to do so may result in loss of participation points and/or referral to the Dean of Students' Office. https://www.cise.ufl.edu/wp-content/uploads/2019/08/CISE_Netiquette_Guide.pdf

Late Submissions & Make-up Requests

It is important that you be present for every class meeting, so you can interact with your classmates and participate in discussions. Requirements for class attendance and make-up exams, assignments and other work are consistent with university policies that can be found at: <https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>

Computer or other hardware failures, except failure of the UF e-Learning system, will not excuse students for missing assignments. Any late submissions due to technical issues MUST be accompanied by the ticket number received from the Helpdesk when the problem was reported to them. The ticket number will document the time and date of the problem. You MUST e-mail your instructor within 24 hours of the technical difficulty if you wish to request consideration.

For computer, software compatibility, or access problems call the HELP DESK phone number at 352-392-HELP = 352- 392-4357 (option 2).

Help for Technical Difficulties

For issues with technical difficulties for e-learning in Canvas, please post your question to the Technical Help Discussion in your course, or contact the UF Help Desk at:

Learning-support@ufl.edu | (352) 392-HELP - select option 2 | <http://elearning.ufl.edu>
Library Help Desk support <https://uflib.ufl.edu/find/ask/>
SFFGS Academic Hub <https://ufl.instructure.com/courses/303721>

Software Use

All faculty, staff and students at the university are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against university policies and rules, disciplinary action will be taken as appropriate.



More Resources to Help You Succeed

Academic Honesty Policy

As a student at the University of Florida, you have committed yourself to uphold the Honor Code, which includes the following pledge:

"We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity."

You are expected to exhibit behavior consistent with this commitment to the UF academic community, and on all work submitted for credit at the University of Florida, the following pledge is either required or implied: *"On my honor, I have neither given nor received unauthorized aid in doing this assignment."*

It is assumed that you will complete all work independently in each course unless the instructor provides explicit permission for you to collaborate on course tasks (e.g., assignments, papers, quizzes, exams). Furthermore, as part of your obligation to uphold the Honor Code, you should report any condition that facilitates academic misconduct or appropriate personnel. It is your individual responsibility to know and comply with all university policies and procedures regarding academic integrity and the Student Honor Code. Violations of the Honor Code at the University of Florida will not be tolerated.

Violations will be reported to the Dean of Students Office for consideration of disciplinary action. For more information regarding the Student Honor Code, please see: <http://www.dso.ufl.edu/sccr/process/student-conduct-honor-code>.

Student Life, Wellness, and Counseling Help

Students experiencing crises or personal problems that interfere with their general well-being are encouraged to use the university's counseling resources. The Counseling & Wellness Center provides confidential counseling services at no cost for currently enrolled students. Resources are available on campus for students having personal problems or lacking clear career or academic goals, which interfere with their academic performance.

Counseling and Wellness resources <http://www.counseling.ufl.edu/cwc/>

U Matter, We Care <http://www.umatter.ufl.edu/>

Career Connections Center <http://career.ufl.edu/>

Other resources are available at <http://www.distance.ufl.edu/getting-help> for online students.

Services for Students with Disabilities

The Disability Resource Center coordinates the needed accommodations of students with disabilities. This includes registering disabilities, recommending academic accommodations within the classroom, accessing special adaptive computer equipment, providing interpretation services and mediating faculty-student disability related issues. Students requesting classroom accommodation must first register with the Dean of Students Office. The Dean of Students Office will provide documentation to the student who must then provide this documentation to the Instructor when requesting accommodation. 0001 Reid Hall, 352-392-8565, www.dso.ufl.edu/drc/

UF/IFAS Field and Fork Food Pantry

The Pantry (<http://pantry.fieldandfork.ufl.edu>) is a resource on the University of Florida campus committed to eradicate food insecurity. Food insecurity is not having a reliable access to nutritious foods for yourself on a regular basis. If you, or anyone you know is experiencing food insecurity, the Pantry is a resource to visit. We offer non-perishable food, toiletries and fresh vegetables grown at the Field and Fork Gardens to provide a well-balanced diet. Protecting the privacy of its guests and providing food to those in need within our campus community is our priority. Our guests do not need any proof of need to use this resource, all that is needed is a Gator 1 ID to prove you are a current Student, Faculty or Staff at the University of Florida.

Semester Evaluation Process

Student assessment of instruction is an important part of efforts to improve teaching and learning.

At approximately the mid-point of the semester, the School of Forest, Fisheries, and Geomatic Sciences will request anonymous feedback on student satisfaction on various aspects of this course. These surveys will be sent out through Canvas and are not required but encouraged. This is not the UF Faculty Evaluation!

At the end of the semester, students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at <https://gatorevals.aa.ufl.edu/students/>. Students will be notified when the evaluation period opens and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via <https://ufl.bluera.com/ufl/>. Summaries of course evaluation results are available to students at <https://gatorevals.aa.ufl.edu/public-results/>.

Student Complaint Process

The School of Forest, Fisheries, and Geomatic Sciences cares about your experience, and we will make every effort to address course concerns. We request that all our students complete a course satisfaction survey each semester, which is a time for you to voice your thoughts on how your course is being delivered.

If you have a more urgent concern, your first point of contact should be the SFFGS Academic Coordinator or the Graduate/Undergraduate Coordinator for the program offering the course. You may also submit a complaint directly to UF administration:

Students in online courses: <http://www.distance.ufl.edu/student-complaint-process>

Students in face-to-face courses: <https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/>