

SCI 100 Discovery Science
Theme: The Future of Natural Resources
Syllabus

COURSE DESCRIPTION:

In this freshman-level lecture and lab-based natural science course, students will study how science can contribute to solutions to contemporary issues and experience how the scientific process unfolds to make such contributions. In particular, students will study the theme (The Future of Natural Resources) through readings, classroom activities, lectures, laboratories, and student research projects. Topics covered will include factors that influence real world decisions made about the course theme (e.g. political, economic, ethical factors). During the six hours of class meetings each week, lecture and lab components will be integrated. Field trips will be required.

TEXTS:

**The Perfect Protein: the Fish Lover's Guide to Saving the Oceans and Feeding the World*, Andy Sharpless & Suzannah Evans, 2013, Rodale Inc, NY. NY.

Extracted: How the Quest for Mineral Wealth is Plundering the Planet, Ugo Bardi, 2013, Chelsea Green Publishing, White River Junction, VT, 299 pp.

The Big Thirst: The Secret Life and Turbulent Future of Water, Charles Fishman, 2011 or 2012, Free Press, NY, NY.

Scientific and resource management reports provided in course canvas site.

*Note: this book is not assigned with the intention that students be convinced they should eat fish!

Learning objectives for this course:

The course will benefit students by providing deep learning experiences through the use of an inquiry-based approach to science, best delivered in a laboratory-based natural science course. It will facilitate student learning of science content and the process of scientific discovery. Specific learning objectives include the following.

Students will...

- understand essential scientific principles and concepts related to fisheries, mineral resources and water resources
- understand the fundamentals of the scientific process (“scientific literacy”) and the value it can add to solving contemporary issues
- communicate about the natural world, the scientific practice and variables relevant to addressing issues about natural resources in a meaningful way
- begin to make informed and responsible conclusions and decisions through the critical study of data/evidence (quantitative literacy & scientific reasoning) regarding natural resources
- identify opportunities for professionals in other disciplines to help address ocean-related issues
- develop an appreciation for the complexities of the broader context around contemporary issues.

The following learning objectives for all the academic programs that the Geological, Environmental and Marine Science Dept. offers will be addressed as well.

- Apply scientific and technical knowledge to specific tasks and problems.
- Cultivate specific scientific and technical skills.
- Develop increased capacity in the skills of independent learning, critical thinking, problem definition, and problem solving.

- Develop enhanced numerical skills and computer literacy as part of an undergraduate program designed to deliver current and relevant knowledge of the discipline.
- Communicate effectively ... through oral, written, and graphical means, and to participate effectively ... in individual and team-related activities.
- Understand the importance of ethics in the practice of the profession.

EVALUATION:

Students will be engaged in numerous learning activities integrated into “lectures.” Participation and work produced will be graded. Weekly quizzes addressing required readings required will be available in the course Canvas site. The student research project work will span several weeks. Work collected from activities done in class will be the equivalent of traditional “lab work”.

10%	Class activities
20%	Research Reports
10%	Weekly quizzes
20%	Independent Research project & presentation
10%	Science practices 10 sec video project
5%	Participation
25%	Tests

Letter Grade Distribution: A: 100-93; A-: 92-90; B+: 89-86; B: 85-83; B-: 82-80; C+: 79-76; C: 75-73; C-: 73-70; D: 69-60; F: 0-59

Weekly Plan

The class will meet for two 3-hour sessions excluding holidays.

Week	SCI 100 Topics	Readings (& content for quizzes)
1. Sept 10 (1 mtg)	Intro Structure of course; expectations Science practices “inquiry” activity	Syllabus; SP
2. Sept 15	Fisheries Guest speaker	PP 1-3 http://tinyurl.com/ogyu5b http://tinyurl.com/o6qsrt
3. Sept 22	Fisheries Lake Fish survey (9/24 rain date)	PP 4 & 5 http://eol.org/info/445 http://eol.org/info/444
4. Sept 29	Fisheries	PP 6-8
5. Oct 6	Fisheries Guest speaker Test 1	PP 9-“Your Part”
6. Oct 13	Mineral Resources	Ex 1 & 2 http://tinyurl.com/o5axuaz
7. Oct 20	Mineral Resources	Ex 3 & 4 http://tinyurl.com/o5axuaz
8. Oct 27	Mineral Resources 10/23 Sterling Hill Mine Trip	Ex 5 & 6 http://tinyurl.com/cjqvr5s
9. Nov 3	Mineral Resources Test 2	Ex 7
10. Nov 10	Water Resources Guest speaker Field Trip	BT 1-3
11. Nov 17	Water Resources	BT 4-6
12. Nov 24	Water Resources 11/26 Turkey day!	BT 7 & 8
13. Dec 1	Water Resources	BT 9-Afterword
13b. Dec 8	Final Projects Final work & Presentations	Readings to complete project
~Dec 16	Test 3	

“SP” = Science Practices resources provided in class and available on the Canvas site, Module 1.

“PP” = *The Perfect Protein*

“Ex” = *Extracted: How the Quest for Mineral Wealth is Plundering the Planet*

“BT” = *The Big Thirst: The Secret Life and Turbulent Future of Water*

COURSE POLICIES

Communication during the semester: The course Canvas site and email messages will be used for communications with students, provide new documents, and post grades when they are ready. Please pay attention to your Rider email account and visit the Canvas site regularly. Students looking to contact me via email should anticipate that while I check email regularly, I do have other frequent commitments that prohibit me from being online continuously. Expect a reply ASAPossible. Don't expect replies to messages sent after 10pm any weekday until the following morning, although exceptions may be made on occasion (e.g. night before tests); weekends may be.

Attendance to class is mandatory. If you must miss a class, arrive late or leave early, do your best to speak with, or at least inform the instructor beforehand if possible. Some of the activities you will complete will be dependent upon the number of students present thus it is important for me to know if I will have fewer students attending than originally planned for to make last minute adjustments. If you miss class for legitimate reasons, contact me to work out a plan to make up work missed but know that in some instances, there may be a limit to how much I can help you with work intended for groups, not individuals. *It is your responsibility to contact me to work out a plan for any classes you might miss. It is highly recommended that you do not miss class if you can help it, and be responsible and proactive when/if you do!*

Participation in class will be expected. Please come to every class meeting ready to work hard and *THINK HARD* for the entire meeting time. Typically all students have very challenging schedules that at times leave them tired and/or distracted. But you do need to focus and work and think hard in every class! Groups will normally be set up by the instructor who may on occasion make adjustments to group membership as work unfolds.

The **withdrawal policy** of the School of Liberal Arts and Sciences will be followed: after the 11th week of the semester, dropping the course will not be approved except for medical reasons certified by the College.

Academic Integrity: For any work you produce in this class (individual or group work), you are expected to acknowledge the sources of your information when it does not come from you directly. Details will be discussed in class, but the course policy is the same as that of the university:

“Academic dishonesty includes any unauthorized collaboration or misrepresentation in the submission of academic work. In all written work, whether in class or out of class, the student’s name on the work is considered to be a statement that the work is his or hers alone, except as otherwise indicated. Students are expected to provide proper citations for the statements and ideas of others whether submitted word for word or paraphrased. Failure to provide proper citations will be considered plagiarism and offenders will be subject to the charge of plagiarism specified in the statement of regulations.

Similarly, students are expected to adhere to all regulations pertaining to examination conduct. These regulations are designed to insure that the work submitted by the student on examinations is an honest representation of that student’s effort and that it does not involve unauthorized collaboration, unauthorized use of notes during the exam, or unauthorized access to prior information about the examination.” (*The Source, Rider University*)

Student “cheating” is indeed an uncommon occurrence but it important that all students understand expectations in this course: Any form of cheating in this class is completely unacceptable, will not be tolerated, and will be dealt with appropriately according to the

policy cited above and the significance of the work and infraction committed. The university urges all instructors to report any instances of cheating/plagiarism or other dishonorable behavior so that it is recorded in a student's file.

Acquiring work from an online source, periodicals &/or another person and submitting without any acknowledgement of the source(s) [intentional or accidental] is a form of plagiarism and a serious offense. You must cite all your sources appropriately. If you are uncertain how to do so, please check in with the instructor. [Submitting cited work for an assignment that is expected to be your own work, while not plagiarism, will not be acceptable.] Posting your work from this course online &/or sharing it with other students with the intent that they will submit it to an instructor as if it were their own work is also a serious offense.

Phone use: During some classes, you may be asked to use your cell phone to participate in activities. In particular you will be encouraged to photodocument some of your work, and may be asked to participate in online polling. If you do not have a cell phone with either capability, please promptly let the instructor know so an alternate plan can be devised. When phones are not needed for class work, please refrain from texting or placing or receiving phone calls. If you need to respond to something urgent, please leave the room to handle a call. During exams and quizzes, use of a phone in any way is absolutely not permitted.

ADA: If you have a disability and believe you will need academic accommodations in this course, please make an appointment for an Intake Interview with Services for Students with Disabilities in the Vona Academic Annex, Room 8, (609) 895-5492, serv4dstu@rider.edu. They will ask for documentation of your disability to support your accommodation requests and to recommend services as appropriate to your individual situation.

Student support: If you find yourself struggling at any point or wish to avoid problems before they arise, be proactive and seek out help. Some options include: visiting the instructor during office hours or another time arranged; requesting help at the Student Success Center, the office of Services for Students with Disabilities, and/or the Counseling Center; arranging an informal study group with other students in the class or asking the instructor for help in setting up.

Adjustments to topics and/or work required: As the semester progresses, adjustments may be made to the specifics provided in the weekly plan above. Advance notice or adjustments in deadlines will be made for any work required of you (e.g. cancel week's assignments if a hurricane leaves some or all of us without power for a week). The intent of the adjustments will be to ensure that you have at least the same amount of time to complete the work that you would for any other week's work (e.g. at least one week) and to ensure the workload is reasonable and similar to previously planned work.

GRADED WORK

Class activities/lab work: During most class meetings, students will engage in one or more activities. Work from some of these activities will be collected and evaluated. While you will work in groups for many of these exercises, each individual student will be expected to compose their own responses to questions/instructions. Grades for this component of the class will include participation.

Weekly reading quizzes: The quizzes are used for fairly obvious reasons. You will be expected to come to class with background information needed to complete exercises during class and/or follow along for any lecturing provided. Nearly all quizzes will be offered through

the Canvas course site and should be completed during the week assigned (or before) as you complete the relevant reading(s). Quizzes will focus on your comprehension of some of the main ideas of the readings.

Individual Research project: Each student will conduct a scientific research project that they choose and design. Some class time is reserved for the end of the semester for students to complete some of their investigation; expect that additional time outside of class will be needed to complete the project and report. As the semester unfolds, keep an eye out for project ideas as they come up through the semester. Guidance in digging into the relevant literature and in designing and implementing the experiment will be provided. At the end of the semester at a time the class selects, each student will present their project results. When other students are presenting, colleague students will be expected to listen, ask questions and/or make comments about these presentations (and not finalize preparations for their own presentation).

Science practices 10 second video project: In our first class, students will be introduced to some of the practices that scientists use to “do” science. During a variety of activities through the semester, students will continue to practice the practices. As this activity occurs, try to photo/video-document yourself (or partner with other students to document each other’s work) so digital images are available for this video project. By the end of the semester, students are expected to produce a video sequence of themselves performing each of the practices as best they with additional audio &/or text explaining their performance of each practice, and a written analysis of their performance. “10 second” will be explained in class. Each student will present their video at the end of the semester. Strategies to produce the video sequence will be discussed early in the semester and students will develop a grading scale for this assignment by mid-semester. Students are encouraged to partner with a colleague in the class to help them record their “practices” and do so often. Students will need to find ways to video-capture their performance of the science practices without disrupting work in classes.

Tests: Tests will include multiple choice reasoning questions and problems/essays. Expect every test to include one or more questions requiring data analysis. Test 2 and 3 will include questions that ask students to connect content for the tests to appropriate content addressed earlier in the semester so expect these 2 tests to be partly cumulative. We will talk about relevant connections to earlier material as new content is addressed. Class time will likely not be used for test reviews. To provide additional support for your test preparations, approximately 2 weeks before the dates of each exam, we will set up “review” times during which students’ questions can be answered. Students who have attended these sessions with prepared questions have typically found the sessions beneficial. Tests will also include questions that draw from the readings.