

Course Code & No. - Section: BIOL/ ENV5 471 (1)
Course Title (Credits): Research Methods (3)
Term & Year: Spring 2016
Course Ref. No. (CRN): 10060/10061

Instructor: Dr. Andy Rost
Phone(s): 775 831 1314 x 7532
Email: arost@sierranevada.edu
Office: 2nd floor TCES – SNC Faculty Area
Office Hours: M-W 1:30-4:00 and by appointment

Class Meeting Time: F 10:00-12:45
Location: TCES 205

Prerequisites (from Catalog): Senior Standing or consent of the instructor
Corequisites (from Catalog):

Course Description:

Students will practice major steps of scientific research including literature searches, framing a research question, developing an experimental approach, creating a research schedule, documenting work, testing hypothesis using statistics, and presenting a research project in oral and written format. Course assignments may apply to student's senior research projects.

Student Outcomes:

Upon successful completion of this course, a student will be able to:

1. search Prim Library resources and online peer-reviewed journals to assess the most current understanding of a potential research topic;
2. frame original and logical research questions that lead to predictions that can be tested;
3. develop a feasible experimental or observational research approach;
4. create a research schedule by which a hypothesis can be tested by mid spring semester;
5. document work in a professional manner;
6. analyze data with Minitab statistical tools to accept or reject a hypothesis; and
7. write a research proposal
8. present research proposal in an oral presentation and written.

Methods of Assessing Student Outcomes

Student outcomes will be assessed using the following:

1. class attendance and participation
2. oral and written critics of peer reviewed literature;
3. conduct small group research project;
4. writing assignment(s), submitted in stages, both based on library and lab work;
5. written and oral presentation of research proposal

Instructional Strategies

Students will prepare for class by reading assigned materials and answering class preparation questions provided by the instructor. Class time will be spent on 1) clarifying questions about the reading assignment or homework, 2) small group and individual activities in class, some using laptop computers, 3) discussions, 4) case studies, and 5) preparing a research proposal, and oral presentation. The course makes use of the *Moodle* course management system.

Required Texts and Materials

1. *Research Methods in Science*, Michael Marder, 2011. Cambridge University Press ISBN 978-0-521-14584-8
2. *How Science Works*, Stephen Jenkins, 2004. Oxford University Press, ISBN 978-0-19-515894
3. Laptop computer (one that meets the published SNC Laptop Requirements)

Prim Library Resources

Using the library's resources effectively (not just Internet resources) contributes to developing each of SNC's core themes by exposing students to high quality academic resources, diverse opinions, new ideas, and a future that includes building on a liberal arts education. In this course, you will be expected to utilize the library's resources (either on-site or remotely) as you complete your assignments.

Prim Library Resources for ENV5/BIOL/ENVP 471 includes but are not limited to:

1. Books (can be checked out):
 - a. In general, books related to biology have Library of Congress Classification numbers ranging from QH through RC. Books about biotechnology have LCC numbers beginning with TP. However, you will find books related to our course with other LCC numbers, so search the Prim Library Catalog using key words related to the topic that you are researching.
 - b. Robson C. *How to do a research project: a guide for undergraduate students*. Oxford (UK): Blackwell Publishing; 2007. LCC number LB 2369.R575 2007. Although written for students doing research in the social sciences, with examples from history, psychology, and humanities, this is an excellent discussion of the research process equally applicable to the natural sciences.
 - c. Laake P, Haakon BB, Olsen BR. *Research methodology in the medical and biological sciences*. Amsterdam: Academic; 2007. LCC number: NetLibrary Click on web link in Prim Library electronic database for books to access full-text. This English translation of a Danish text has a general introduction to research methods that is very easy to understand. The discussion of ethics in research with human and animal subjects is especially good. Specific methods used in medical and molecular biology research are then described. This is an eBook that can be read on any device that can access the Prim Library electronic catalog for books.
 - d. Lipson C. *Cite Right: a Quick Guide to Citation Styles*. Chicago: University of Chicago Press; 2006. LCC number PN171. F56L55 2006.
2. Electronic databases (for peer-reviewed research articles, reviews, newspaper and magazine articles): Electronic databases most likely to include articles related to your term paper topics are EBSCO: Academic Search Premier, Environment Complete, General Science Collection, GreenFILE, Health Source, Newspaper Source, and TOPICsearch; BioOne; and GREENR.
3. Hardcopy periodicals: Prim Library has current subscriptions for Science, New Scientist, Science News, and National Geographic Magazine. Any of these are likely to have articles on your term paper topic. Full-text articles from many more periodicals are available through the electronic databases.
4. Lib Guides: <http://Libguides.sierranevada.edu> These web pages contain instructions about how to use resources available at Prim Library, how to evaluate the appropriateness of information from the Internet for a research paper, how to cite sources, and other topics related to finding and using information.

Attendance

Success in Research Methods is collaborative and significantly influenced by participation in class and outside collaboration with your team, therefore your attendance is required. Students may seek to excuse an absence and have an opportunity to do make up work for missed points. Absences will be excused for documented illness (of the student or a dependent), military duty, a family bereavement, or at the instructor's discretion. Excused absences will NOT be granted for employment conflicting with class times or oversleeping.

Class Requirements

Assignments are due at the beginning of class, no exceptions. Students are required to bring a hard copy of assignments to class. A letter grade will be deducted for each day the assignment is late. Students are required to bring laptops to class, however laptops and phone are to remain off unless otherwise noted. Please dress appropriately and be prepared to spend some time outside.

Grading Policy

Students may earn points in the following ways*:

Assignment	Number	Points		% of total grade
Class Participation	15	10	140	17.5 %
Assignments	12	30	360	45.0 %
Written Research Proposal	1	200	200	25.0 %
Oral presentation of research proposal	1	100	100	12.5 %
			800	

*subject to change

Sanctions for Cheating and/or Plagiarism

The Honor Code

The faculty of SNC believes students must be held to high standards of integrity in all aspects of college life in order to promote the educational mission of the College and to encourage respect for the rights of others. Each student brings to the SNC community unique skills, talents, values and experiences which, when expressed within the community, contribute to the quality of the educational environment and the growth and development of the individual. Students share with members of the faculty, administration and staff the responsibility for creating and maintaining an environment conducive to learning and personal development, where actions are guided by mutual respect, integrity, responsibility and trust. The faculty and students alike must make diligent efforts to ensure high standards are upheld by their colleagues and peers as well as themselves. Therefore faculty and students accept responsibility for maintaining these standards at Sierra Nevada College and are obligated to comply with its regulations and procedures, which they are expected to read and understand. If writing is turned in by you, without citation or shared credit, it means you wrote it. Any shared work should be credited, paragraph by paragraph.

Consequences of Violating the Student Honor Code

SNC students and faculty share the responsibility for maintaining an environment of academic honesty. Thus, all are responsible for knowing and abiding by the SNC Faculty/Student Honor Code published in the current SNC Catalog. Faculty are responsible for presenting the Honor Code and the consequences of violating it to students at the start of their classes AND for reporting all incidences of academic dishonesty to the Provost. Students are responsible for knowing what constitutes CHEATING, PLAGIARISM and FABRICATION and for refraining from these and other forms of academic dishonesty. Violations of the Honor Code become part of a student's academic record.

1st Offense: Student receives a zero for assignment/exam and counseling with faculty on the honor code, consequences for violating the honor code, and the value of academic honesty in learning.

2nd Offense: Student fails course and receives counseling with faculty on the honor code, consequences for violating the honor code, and the value of academic honesty in learning.

3rd Offense: Student is expelled.

Moodle Course Site: <http://moodle.sierranevada.edu/moodle/>

In class electronics

During scheduled meeting times, including class time, students are not allowed to use electronic media unless otherwise stated. The first offense will result in a reprimanding, the second offense will result in a removal of instrument for the duration of the class, and the third offense will result in a loss of points.

ADA Accommodations

In accordance with the Americans with Disabilities Act and Section 504 of the Rehabilitation Act of 1973, students with a documented disability are eligible for support services and accommodations. If a student wishes to request an accommodation, please contact the Director of Academic Support Services, Henry Conover, at (775) 831-1314 x7534, hconover@sierranevada.edu or go to the OASIS offices on the third floor of Prim Library within the first week of the semester.

The SNC Email System

The SNC email system is the official communication vehicle among students, faculty members and administrative staff and is designed to protect the confidentiality of student information as required by the Family Educational Rights and Privacy Act of 1974 Act (FERPA). Students should check their college email accounts daily during the school year.

Students have a right to forward their SNC e-mail to another e-mail account (for example, @hotmail or @gmail). However, confidentiality of student information protected by FERPA cannot be guaranteed for SNC e-mail forwarded to an outside vendor. Having email redirected does not absolve a student from the responsibilities associated with official communication sent to his or her SNC email account.

Week	Date	Day	Topics	Class	Assignments (due)
1	1/22	F	Introductions Idea mapping-taking measurements	1	
2	1/29	F	Case Study #1 Vitamin C Defining a research question Types of Studies	2	Assignment 1 Find an article
3	2/5	F	Case Study #2 Frogs Research Design Understanding Introductions	3	State of the Science 'What we know'
4	2/12	F	Case Study # 3 Refining Research Questions Understanding Discussions	4	State of the Science 'What we don't know'
5	2/19	F	Case Study #4 Framing Research Questions Understanding Results	5	Draft of your Introduction
6	2/26	F	Case Study # 5 Understanding Stats Understanding Methods	6	Follow a researcher
7	3/4	F	Case Study #6	7	Methods: Introduction
8	3/11	F	Case Study # 7 Citation Styles	8	Methods cont.
SPRING BREAK					
9	3/25	F	Case Study # 8	9	Science of Science Writing
10	4/1	F	Case Study # 9	10	2 nd Draft of Intro+Methods
11	4/8	F		11	The Other Stuff
12	4/15	F	Case Study # 10	12	Draft of the 'Other Stuff'
13	4/22	F	Edits and rewrites due	13	Full Draft Due
14	4/29	F	Final Proposals are due	14	Final Proposals
15	TBA		Final proposals presentations		