



California Ecology and Conservation Spring 2017 Syllabus

Science Instruction and Research Training for Undergraduates from across the University of California

Course Summary:

Science is a process for generating new understanding. This process can be put into practice in any setting; in this course, we employ it outdoors among protected wilderness areas of the University of California Natural Reserve System. Students work to answer questions and solve challenges of their own conceiving, and receive the training and guidance to do so in a rigorous manner supported by empirical evidence and sound statistical analyses. They learn to contextualize their research within existing scientific understanding, and to contribute to this understanding through visual, oral, and written presentation of their research. We work in every part of the scientific process, including—as participatory follow-up after the conclusion of the course—publication of a permanent record of your research in the course journal, and, if and when possible, the professional literature.

Training begins with a focus on the process of science and the places we are going to be doing science in this course. We learn about California – its geology, climate, and natural history, its landscapes and biological diversity, and the conservation measures and protected areas implemented to preserve all of these in support of humanity. We discuss the key role of hypotheses in science, and practice turning observations and ideas into testable hypotheses that can help us gain new understanding of the world. We discuss the different types of data and variables we can measure, appropriate sampling methods and equipment, and research designs to minimize bias, and we learn and gain practice in statistics, setting up a spreadsheet for data entry, determining appropriate tests, and analyzing data to answer our hypothesis tests. We take several practice runs through that process of observation-hypothesis-sampling design-data collection-analysis for questions conceived by students during multi-day visits to two different reserves before making an extended visit to a new reserve to put it all into practice in the first research project.

To prepare for the first research project, students conduct independent study into different components of the natural history of our new study site—the environment and landscapes, the plants, and the birds, herps, and mammals—and present this information to their classmates. We hike into the different landscapes to explore this natural history first hand, and read journal articles from professional scientists' and research papers from past course students' research on the reserve. We continue instruction in statistics and introduce key concepts in ecology and conservation relevant to the site and surrounding landscapes, and students break into groups to conduct pilot observations and measurements as they begin to devise new hypotheses for testing. Following discussions and peer feedback, students settle on a set of research questions, undertake background reading and more pilot study, and then propose their hypotheses and methods to the class for critical review and discussion. Research groups have two to three days to complete their study before we pack up for a new field site, this time for a short visit for instruction and practice in delivering a research presentation.

Instruction at our fourth site focuses on science communication and presentation of research in the slide-show format typical of scientific conferences and other professional meetings. We continue to provide statistical instruction, as students work to devise appropriate statistical frameworks for analyses of the results from their first research projects, and each group presents its findings to their classmates in a professional-style research presentation.

As we visit a new site for another extended research visit, the second research project follows the same basic steps as the first, but with new landscapes, new research groups, and new questions. Having trained in crafting a research presentation after the first research project, our training upon completion of the second is writing a research paper. Instruction and practicals at our sixth site focus on write-up of research findings for a scientific journal. We take advantage of the opportunity provided by student research papers to gain experience in an additional area of science, the peer review. Students conduct peer reviews of each other's papers, with each student reviewing the manuscripts of two classmates and each author getting two sets of feedback from the peer review process. Students then revise and resubmit their research papers for marking by the instructors before we depart for our final research site and the major research projects of term.

At the final research site, students marshal all of the training from term for a research project of their own choosing. Final research projects are undertaken in groups of three to five, and will culminate with a full-length coauthored paper in the style of journal articles published in the professional literature and with a conference-style research presentation in a symposium for students and guests at the Blue Oak Ranch Reserve.

By the end of term, students have gained training and practice in:

- Hypothesis formulation and research design
- Critical reading and presentation of scientific work
- Research proposal and peer review
- Scientific sampling and methods to minimize bias
- Statistical analysis, visualization, and graphing of scientific data
- Narrative composition and public speaking in science, and
- Scientific writing and presentation

The course concludes with a workshop focused on what comes next, providing instruction and demonstrations for finding exciting career opportunities, constructing an effective resume or CV, and composing a successful cover letter and personal statement.

The following pages provide an overview of the course itinerary, describing the location, focus and major coursework of each day across term, and then a detailed syllabus that includes specific activities and readings from the three course references. The course references are as follows:

- Gotelli & Ellison's *Primer of Ecological Statistics* (student responsibility)
- de Nevers, Edelman & Merenlender's *California Naturalist Handbook* (provided)
- Elzinga, Salzer, & Willoughby's *Measuring and Monitoring Plant Populations* (provided)

Purple font signifies marked coursework

Green font signifies project work for students from semester campuses (Merced and Berkeley)

Summary Itinerary

Day	Date	Reserve	Focus	Coursework (marked)
1	3-Apr	Blue Oak	Welcome; Course Overview; Logistics & Safety	
2	4-Apr	Blue Oak	California Natural History, Ecology, and Conservation	Instruction/Practicals/Readings
3	5-Apr	Blue Oak	Formulating Hypotheses; Sampling Designs & Methods	Instruction/Practicals/Readings
4	6-Apr	Blue Oak	Data Practices; Statistical Analysis	Instruction/Practicals/Readings
5	7-Apr	to Sedgwick	Sedgwick Reserve Use and Safety	Travel Day
6	8-Apr	Sedgwick	Sedgwick Natural History, Ecology, and Conservation	Instruction/NH Presentations
7	9-Apr	Sedgwick	Formulating Hypotheses; Sampling Designs & Methods	Instruction/Practicals/Readings
8	10-Apr	Sedgwick	Data Practices; Statistical Analysis	Instruction/Practicals/Readings
9	11-Apr	to Anza	Anza-Borrego Use and Safety	Travel Day
10	12- Apr	Anza	Anza-Borrego Natural History, Ecology, and Conservation	Instruction/NH Presentations
11	13- Apr	Anza	Critical Reading and Presentation of Anza Research	Article Presentations
12	14- Apr	Anza	Rapid Research Explorations of Anza-Borrego	Field Research/Presentations
13	15- Apr	Anza	Hypotheses and Pilot Studies for New Research at Anza	Pilot Research
14	16- Apr	Anza	Proposals and Setup for Anza-Borrego Research Projects	Research Proposals/Setup
15	17- Apr	Anza	Anza-Borrego Research Projects	Field Research
16	18- Apr	Anza	Anza-Borrego Research Projects	Field Research
17	19- Apr	Anza	Data Analysis; Science Communication	Analysis/Instruction
18	20- Apr	to Yosemite	Yosemite Field Station Use and Safety	Travel Day
19	21- Apr	Yosemite	Anza-Borrego Research Project Presentations	Research Presentations
20	22- Apr	Yosemite	Rest and Recharge, Yosemite National Park	Day Off
21	23- Apr	Yosemite	California Conservation Projects Draft Paper Due 5 p.m.	Conservation Projects
22	24- Apr	to Pt. Reyes	Point Reyes Field Station Use and Safety	Travel Day
23	25- Apr	Pt. Reyes	Pt. Reyes Natural History, Ecology, and Conservation	Instruction/NH Presentations
24	26- Apr	Pt. Reyes	Critical Reading and Presentation of Pt. Reyes Research	Article Presentations
25	27- Apr	Pt. Reyes	Rapid Research Explorations of Pt. Reyes/Cons. Projects	Field Research/Presentations
26	28- Apr	Pt. Reyes	Hypotheses & Pilot Studies for New Research at Pt. Reyes	Research Proposals/Setup
27	29- Apr	Pt. Reyes	Proposals and Setup for Pt. Reyes Research Projects	Field Research
28	30- Apr	Pt. Reyes	Pt. Reyes Research Projects	Field Research
29	1-May	Pt. Reyes	Pt. Reyes Research Projects/Final Conservation Paper Due	Travel Day
30	2- May	Pt. Reyes	Pt. Reyes Research Project Research Papers	Instruction/Paper Preparation
31	3- May	Pt. Reyes	Pt. Reyes Research Project Research Papers	Instruction/Paper Preparation
32	4- May	to MCC	Mendocino College Coastal Field Station Use and Safety	Research Papers
33	5- May	MCC	Research Paper Peer Review	Peer Reviews/Half-Day Off
34	6- May	to Angelo	Conservation Presentations/ Angelo Use and Safety	Research Paper Revisions
35	7- May	Angelo	Angelo Reserve Natural History, Ecology and Conservation	Instruction/NH Presentations
36	8- May	Angelo	Critical Reading and Presentation of Angelo Research	Article Presentations
37	9- May	Angelo	Rapid Research Explorations of Angelo	Field Research/Presentations
38	10- May	Angelo	Hypotheses and Pilot Studies for New Research at Angelo	Pilot Research
39	11- May	Angelo	Proposals and Setup for Angelo Reserve Research Projects	Research Proposals/Setup
40	12- May	Angelo	Angelo Reserve Research Projects	Field Research
41	13- May	Angelo	Angelo Reserve Research Projects	Field Research
42	14- May	Angelo	Angelo Reserve Research Projects	Field Research
43	15- May	Angelo	Angelo Reserve Research Projects	Field Research
44	16- May	to Blue Oak	Narrative Framing for Research Papers and Presentations	Travel Day
45	17- May	Blue Oak	Data Analysis; Background Reading	Data Checks/Analysis/Reading
46	18-May	Blue Oak	Write-Up and Slide Preparation	Write-Up/Slide Preparation
47	19-May	Blue Oak	Write-Up and Slide Preparation	Write-Up/Slide Preparation
48	20-May	Blue Oak	Write-Up and Slide Preparation	Final Research Papers
49	21-May	Blue Oak	Careers; Research Presentations; Course Evaluations	Final Research Presentations
50	22-May	to SJC	Course Conclusion and Departure	

Detailed Syllabus

*Note that we can never anticipate prior to term what kinds of opportunities we will encounter as we travel the state and meet researchers in the field at the various reserves, so some specifics of the syllabus are subject to change in the interest of pursuing the richest possible whole-term experience.

<p>Day 1 – Welcome and Overview</p> <p>2pm Arrival at Blue Oak Ranch Reserve, Campsite Setup</p> <p>4pm Manager’s Welcome and Introductions</p> <p>6pm Dinner</p> <p>8pm Course Overview, Structure, Logistics, and Safety</p>	<p>Readings</p>
<p>Day 2 – California Natural History, Ecology, and Conservation</p> <p>9:30 Orientation to California</p> <p>11am Orientation to Blue Oak Ranch Reserve</p> <p>12pm Blue Oak Ranch Reserve Natural History Exploration</p> <p>4pm Hypothesis Development Practical</p>	<p>de Nevers 1-3, 27-45</p>
<p>Day 3 – Formulating Hypotheses; Sampling Designs & Methods</p> <p>9:30 Formulating Hypotheses for Testing</p> <p>10am Lecture - Sampling Designs & Methods</p> <p>11am Lecture - Field Notes and Data Curation</p> <p>12pm Sampling and Data Collection Practical</p> <p>2pm Sampling and Data Collection Practical</p> <p>4pm Sampling and Data Collection Practical</p> <p>8pm Data Entry in JMP</p>	<p>Elzinga Chapter 7 (to page 144)</p>
<p>Day 4 – Data Practices; Statistical Analysis</p> <p>9:30 Lecture - Data Types, Variables, and Basic Comparisons</p> <p>11am Statistical Analysis Practical</p> <p>2pm Sampling and Data Collection Practical</p> <p>3pm Statistical Analysis Practical</p> <p>8pm Use and Maintenance of Course Equipment; Travel Logistics; Sedgwick Natural History Introductions Assigned</p>	<p>Gotelli 57-69, 74-77 91-98, 164-166</p>
<p>Day 5 – <i>Travel Blue Oak Ranch Reserve to Sedgwick Reserve</i></p> <p>9am Clean Course-Use Facilities at Blue Oak</p> <p>11am Depart for Sedgwick Reserve</p> <p>8pm Sedgwick Reserve Use and Safety</p>	
<p>Day 6 – Sedgwick Natural History, Ecology, and Conservation</p> <p>9:30 Sedgwick Manager’s Welcome</p> <p>11am Introductions to Sedgwick’s Plants, Animals, and Landscapes (5)</p> <p>1pm Sedgwick Natural History Exploration</p> <p>4pm Hypothesis Development Practical</p> <p>8pm Lecture - California Geology and Climate</p>	

<p>Day 7 – Formulating Hypotheses; Sampling Designs & Methods</p> <p>9:30 Formulating Hypotheses for Testing</p> <p>11am Lecture - Sampling Designs & Methods</p> <p>1pm Sampling and Data Collection Practical</p> <p>3pm Sampling and Data Collection Practical</p> <p>5pm Data Entry in JMP (TA)</p> <p>8pm Lecture - California Vegetation and Landscapes</p>	<p>Elzinga Chapter 8 (to page 188)</p>
<p>Day 8 – Statistical Analysis</p> <p>9:30 Lecture – Statistical Tests and Comparisons (KBS)</p> <p>11am Statistical Analysis Practical</p> <p>1pm Sampling and Data Collection Practical</p> <p>3pm Statistical Analysis Practical</p> <p>8pm Statistics Review and Student Questions Anza-Borrego Natural History Introductions Assigned</p>	<p>Gotelli 239-253 257-261, 289-298</p>
<p>Day 9 – <i>Travel Sedgwick Reserve to Anza-Borrego</i></p> <p>9am Clean Course-Use Facilities at Sedgwick</p> <p>11am Depart for Anza-Borrego Desert Reserve</p> <p>8pm Anza-Borrego Reserve Use and Safety</p>	
<p>Day 10 – Anza-Borrego Natural History, Ecology, and Conservation</p> <p>9:30 Manager’s Welcome</p> <p>11am Introduction to Anza-Borrego’s Plants, Animals, and Landscapes</p> <p>1pm Anza-Borrego Natural History Exploration</p> <p>4pm Ecology Lecture & Discussion – Climate Change</p> <p>8pm Conservation Roundtable - Extreme Temperature & Vertebrates</p>	<p>Assigned Article</p>
<p>Day 11 – Critical Reading and Presentation of Anza Research</p> <p>9:30 Articles Assigned, Independent Reading</p> <p>12pm Article Reading Group Discussions</p> <p>2pm Prepare Article Presentations</p> <p>4pm Article Presentations (5 points)</p> <p>8pm Article Presentations</p>	<p>Assigned Articles</p>
<p>Day 12 – Rapid Research Explorations of Anza-Borrego</p> <p>9:30 Lecture – California Biodiversity and Conservation</p> <p>10:30 Rapid Research Groups Assigned</p> <p>11am Rapid Research</p> <p>3pm Prepare Rapid Research Presentations</p> <p>4pm Rapid Research Presentations</p> <p>8pm Lecture – Multi-Factor Comparisons in Statistics</p>	

<p>Day 13 – Hypotheses and Pilot Studies for New Research at Anza</p> <p>9:30 Lecture - Experimental Design (KBS)</p> <p>10:30 Research Groups Assigned</p> <p>11am Formulate Hypotheses and Methods</p> <p>12pm Hypothesis & Methods Check with Instructors</p> <p>1pm Pilot Investigations and Background Reading</p>	
<p>Day 14 – Proposals and Setup for Anza-Borrego Research Projects</p> <p>9:30 Prepare Research Proposal Presentations</p> <p>12pm Research Proposal Presentations</p> <p>2pm Begin Research Setup</p>	
<p>Day 15 – Anza-Borrego Research Projects</p> <p>9-5 Field Research</p>	
<p>Day 16 – Anza-Borrego Research Projects</p> <p>9-5 Field Research</p> <p>8pm Data Entry</p>	
<p>Day 17 – Anza-Borrego Research Project Data Analysis; Science Communication</p> <p>9:30 Data Analysis</p> <p>11am Results Check and Graphing Advisories with Instructors</p> <p>12pm Research Checklist</p> <p>8pm Lecture - Science Communication</p>	
<p>Day 18 – <i>Travel Anza-Borrego to Yosemite Field Station</i></p> <p>9am Clean Course-Use Facilities at Anza-Borrego</p> <p>11am Depart for Yosemite Field Station</p> <p>8pm Yosemite Field Station Use and Safety</p>	
<p>Day 19 – Anza-Borrego Research Project Presentations</p> <p>9:30 Lecture - Research Presentations (DLR)</p> <p>11-3 Prepare Research Presentations</p> <p>3pm Practice Research Presentations</p> <p>4pm Anza-Borrego Research Project Presentations (10 points)</p> <p>8pm Anza-Borrego Research Project Presentation Celebration</p>	
<p>Day 20 – Rest and Recharge in Yosemite National Park</p> <p>9-5 Off</p> <p>8pm Big Creek Natural History Introductions Assigned</p>	
<p>Day 21 – California Conservation Projects</p> <p>9-5 California Conservation Projects (Semester-Campus Students)</p>	Cons. Paper Drafts

<p>Day 22 – <i>Travel Yosemite Field Station to Point Reyes Field Station</i></p> <p>9am Clean Course-Use Facilities at Yosemite Field Station</p> <p>11am Depart for Point Reyes Field Station</p> <p>8pm Big Creek Reserve Use and Safety</p>	
<p>Day 23 – Point Reyes Natural History, Ecology, and Conservation</p> <p>9:30 Manager’s Welcome</p> <p>11am Introduction to Point Reyes Plants, Animals, and Landscapes</p> <p>1pm Point Reyes Natural History Exploration</p> <p>4pm Ecology Lecture & Discussion – Top-Down & Bottom-Up Effects</p> <p>8pm Conservation Roundtable – Regional Scale Conservation</p>	Assigned Article
<p>Day 24 – Critical Reading and Presentation of Point Reyes Research</p> <p>9:30 Articles Assigned, Independent Reading</p> <p>12pm Article Reading Group Discussions</p> <p>2pm Prepare Article Presentations</p> <p>4pm Article Presentations (5 points)</p> <p>8pm Article Presentations</p>	Assigned Articles
<p>Day 25 – Rapid Research Explorations of Pt. Reyes</p> <p>9:30 Rapid Research Groups Assigned</p> <p>10am Rapid Research</p> <p>3pm Prepare Rapid Research Presentations</p> <p>4pm Rapid Research Presentations</p> <p>8pm Formulate Hypotheses for Big Creek Research Projects</p>	
<p>Day 26 – Hypotheses and Pilot Studies for New Research at Point Reyes</p> <p>9:30 Lecture – open lecture slot</p> <p>11am Brainstorm Hypotheses for Point Reyes Research Projects</p> <p>12pm Refine Hypotheses and Recruit Research Groups</p> <p>1pm Pilot Investigations and Background Reading</p> <p>8pm Present Refined Hypotheses and Methods</p>	
<p>Day 27 – Proposals and Setup for Point Reyes Research Projects</p> <p>9:30 Prepare Research Proposals</p> <p>12pm Research Proposals</p> <p>2pm Begin Research Setup</p>	
<p>Day 28 – Point Reyes Research Projects</p> <p>9-5 Field Research</p>	
<p>Day 29 – Point Reyes Research Projects</p> <p>9-5 Field Research</p> <p>5pm California Conservation Project Papers – Final Drafts Due</p>	Conservation Papers

<p>Day 30 – Point Reyes Research Project Research Papers</p> <p>9:30 Lecture – Writing a Scientific Paper: The Big Picture</p> <p>11-5 Individual Work on Papers</p>	
<p>Day 31 – Point Reyes Research Project Research Papers</p> <p>9:30 Lecture – Writing a Scientific Paper: The Finer Elements</p> <p>11-5 Individual Work on Papers</p> <p>8-10 Individual Work on Papers</p> <p>10pm Submit Research Paper Drafts</p>	
<p>Day 32 – Coastal Drive Point Reyes to Point Arena</p> <p>9am Clean Course-Use Facilities at Point Reyes Field Station</p> <p>11am Depart for Mendocino College Coastal Field Station</p> <p>3pm Mendocino College Coastal Field Station Use and Safety</p> <p>4pm Research Paper Drafts Handed Out for Peer Reviews</p> <p>Peer Reviews</p>	
<p>Day 33 – Peer Reviews and Research Paper Revisions</p> <p>11am Submit Peer Reviews (5 points)</p> <p>1pm Research Papers Returned with Peer Reviews</p> <p>Revision of Research Papers</p> <p>10pm Submit Revised Research Papers (20 points)</p>	
<p>Day 34 – Coastal Drive Point Arena to Angelo Coast Range Reserve</p> <p>9am Conservation Project Presentations</p> <p>11am Clean Course-Use Facilities at MCC Field Station</p> <p>Angelo Reserve Natural History Introductions Assigned</p> <p>1pm Depart for Angelo Coast Range Reserve</p> <p>5 pm Manager’s Welcome</p> <p>8pm Angelo Coast Range Reserve Use and Safety</p>	
<p>Day 35 – Angelo Reserve Natural History, Ecology, and Conservation</p> <p>9:30 Introduction to Big Creek’s Plants, Animals, and Landscapes</p> <p>11am Angelo Reserve Natural History Exploration</p> <p>4pm Ecology Lecture – Grassland Invasion, Life History & Diversity</p> <p>8pm Conservation Roundtable – Anadromous Fishes in California</p>	
<p>Day 36 – Critical Reading and Presentation of Angelo Reserve Research</p> <p>9:30 Articles Assigned, Independent Reading</p> <p>12pm Article Reading Group Discussions</p> <p>2pm Prepare Article Presentations</p> <p>4pm Article Presentations (5 points)</p> <p>8pm Article Presentations</p>	Assigned Articles

<p>Day 37 – Rapid Research Explorations of Angelo</p> <p>9:30 Rapid Research Groups Assigned</p> <p>10am Rapid Research</p> <p>3pm Prepare Rapid Research Presentations</p> <p>5pm Rapid Research Presentations</p>
<p>Day 38 – Hypotheses and Pilot Investigations for New Research at Angelo</p> <p>9:30 Brainstorm Hypotheses for Angelo Research Projects</p> <p>11am Refine Hypotheses and Recruit Research Groups</p> <p>1pm Form into Research Groups</p> <p>Begin Pilot Investigations and Background Reading</p>
<p>Day 39 – Proposals and Setup for Angelo Reserve Research Projects</p> <p>9:30 Prepare Research Proposal Presentations</p> <p>12pm Research Proposal Presentations</p> <p>2pm Begin Research Setup</p>
<p>Day 40 – Angelo Reserve Research Projects</p> <p>9-5 Field Research</p>
<p>Day 41 – Angelo Reserve Research Projects</p> <p>9-5 Field Research</p>
<p>Day 42 – Angelo Reserve Research Projects</p> <p>9-5 Field Research</p>
<p>Day 43 – Angelo Reserve Research Projects</p> <p>9-5 Field Research</p> <p>5pm Conclude Field Research</p>
<p>Day 44 – <i>Travel Angelo Reserve to Blue Oak Ranch Reserve</i></p> <p>9am Clean Course-Use Facilities at Angelo Reserve</p> <p>11am Depart for Blue Oak Ranch Reserve</p> <p>Discuss Narrative Framing for Project with Research Group</p> <p>8pm Instructor Edits and Marks on Research Papers Returned</p> <p>Data Entry</p>

<p>Day 45 – Angelo Reserve Research Project Data Analysis & Narrative Framing</p> <p>9-10 Spreadsheet Check with Instructors</p> <p>10-12 Analysis of Final Project Data</p> <p>12-2 Analysis and Results Checks with Instructors</p> <p>2pm Class Discussion - Narrative Framing for Research Projects</p> <p>4pm Follow-on Analyses and Background Reading</p>
<p>Day 46 – Write-Up and Slide Preparation</p> <p>9-5 Write-Up and Slide Preparation</p> <p>Individually Scheduled Introduction Draft Reviews with Instructors</p>
<p>Day 47 – Write-Up and Slide Preparation</p> <p>9-5 Write-Up and Slide Preparation</p> <p>Individually Scheduled Practice Talks with Instructors</p>
<p>Day 48 – Final Project Papers</p> <p>9-5 Write-Up and Slide Preparation</p> <p>10pm Submit Final Project Papers (20 points)</p>
<p>Day 49 – Career Skills Workshop; Final Project Presentations; Course Evaluations</p> <p>9-11 Careers, Cover Letters, and CVs Workshop</p> <p>1pm Presentation Run-Throughs</p> <p>3pm Final Project Presentations (20 points)</p> <p>4pm Course Evaluations</p>
<p>Day 50 – Course Conclusion and Departure</p> <p>9-11 Clean Course-Use Facilities at Blue Oak</p> <p>11am Goodbyes and Shuttle Departure for SJC</p>

Evaluations & Grading

Reserve Natural History Introduction	5%
Anza Article Presentation	5%
Anza Research Presentation	10%
Point Reyes Article Presentation	5%
Manuscript Peer Review	5%
Point Reyes Research Paper	20%
Angelo Article Presentation	5%
Final Research Project Presentation	20%
Final Research Project Paper	20%
Engagement and Research Effort	5%



Critical Conservation Issues in California Syllabus - Spring 2017

Supplemental Course for Semester Students enrolled in California Ecology and Conservation

Course Summary:

California's varied ecosystems house diverse ecological communities that support complex interactions between species and their environments. This course will explore the connections between ecological research and conservation policy and practice in a rapidly changing world and enhance your understanding about the importance of integrated research to solve complex environmental problems.

Students will read from peer-reviewed journal articles (both assigned and through your own literature search) but can also include reputable governmental and non-governmental reports on a conservation biology topic of their choosing. Students will synthesize across the readings to address environmental issues from multi-scale and multi-disciplinary perspectives. The culmination of your individual literature review and synthesis research will result in a minimum 5- to 7-page paper and an oral presentation completed during the Spring course.

Before the 7-week California Ecology and Conservation field course begins, students are asked to select a topic of conservation interest and relevance to California. With guidance from Dina Roberts, the conservation biology instructor, each student will research a selected topic and find 8-10 peer-reviewed papers on that topic to bring with them when the course begins on April 3, 2017. There are three, pre-course assignments described on the following page. Please complete each one and email to Dina at dinaroberts@ucsc.edu on the due date.

Example research topics (other topics of your own choosing and interest are encouraged): *Invasive Species Impacts on Ecological Communities; Conservation and Management of Threatened and Endangered Species (Plant or Animal); Terrestrial or Marine Protected Area Strategies; Corridor Ecology; Wildlife Management and Policy Issues; Restoration Ecology; Riverine Ecosystem Ecology; Forest Ecology and Practice; Climate Change and Species Movements; Environmental and Social Justice Issues Related to Agriculture and Conservation Practices; Urban Ecology and Exurban Development; Conservation Genetics; Island Biogeography and Conservation; Fragmentation and Species Loss; Grassland and Oak Savannah Habitat Restoration; Wildlife Conservation Principles; The Role of UC Reserves in Conservation of California Biodiversity; Wildland Fire and Ecological Communities; Private and Public Lands Conservation Partnerships; How does Science influence Policy and Practice of Species Conservation? Renewable Energy Development and Species Conservation, etc....*

Evaluations & Grading (50 points total):

Seminar prompts to guide Group Discussions on Assigned Readings (5 points)
Conservation Project Proposal and Annotated Bibliography (10 points)
Peer-review of Draft Conservation Research Paper (5 points)
Conservation Research Paper (15 points)
Conservation Research Presentations (15 points)

Project Assignments and Due Dates:

Pre-Course Assignments:

Due March 10: In email consultation with Dr. Dina Roberts (dinaroberts@ucsc.edu) students choose a topic(s) and email topic idea(s) to instructor for feedback.

Due March 20: Provide a two-paragraph Conservation Project Proposal with a minimum of 5 peer-reviewed papers on the topic included as a bibliography. Instructor will provide feedback by March 22. The proposal will include what your topic will be, why the topic is relevant to conservation in California and how you will work to integrate natural and social science elements in your paper.

Due March 27: An annotated bibliography with minimum of 8 sources. For *each* source, the student will provide a short summary paragraph describing the central theme or question of the paper and how it informs their research along with a full citation of that source. Instructor will provide feedback on April 4 at Blue Oak Ranch Reserve.

The field course, California Ecology and Conservation, begins Monday, April 3. By this time, students will have submitted their research proposal and received feedback and guidance from Dr. Roberts. Students are expected to bring the peer-reviewed papers on their topic, either printed or in electronic form, with them at the start of the field course. We will have a weekly seminar (during the first 4 weeks) on each of the papers assigned but best to get a jump start on the papers and writing 5 seminar prompts for each paper (questions or comments on specific aspects of each paper to share with the group during our seminars). Our first seminar will be on April 4, and your seminar prompts will be turned in via email the day of each seminar.

On-course Assignments (After April 3):

Due April 23: Draft Conservation Research Paper. A peer-review will follow along with feedback from instructor. You will have allocated time once the course starts to work on this paper, but starting an outline as you develop your topic idea is recommended.

Due May 1: Revised Conservation Research Projects papers (minimum 5 pages) emailed to Dr. Roberts.

May 5: Conservation Project Presentations (15 minutes) which will be given to the entire CEC class.