



THE SCHOOL
FOR FIELD STUDIES

Directed Research

SFS 4910

Syllabus
4 credits

The School for Field Studies (SFS)
Center for Climate Studies (CCS)
Puerto Natales, Chile

This syllabus may develop or change over time based on local conditions, learning opportunities, and faculty expertise. Course content may vary from semester to semester.

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COURSE CONTENT SUBJECT TO CHANGE

Please note that this is a copy of a recent syllabus. A final syllabus will be provided to students on the first day of academic programming.

SFS programs are different from other travel or study abroad programs. Each iteration of a program is unique and often cannot be implemented exactly as planned for a variety of reasons. There are factors which, although monitored closely, are beyond our control. For example:

- Changes in access to or expiration or change in terms of permits to the highly regulated and sensitive environments in which we work;
- Changes in social/political conditions or tenuous weather situations/natural disasters may require changes to sites or plans, often with little notice;
- Some aspects of programs depend on the current faculty team as well as the goodwill and generosity of individuals, communities, and institutions which lend support.

Please be advised that these or other variables may require changes before or during the program. Part of the SFS experience is adapting to changing conditions and overcoming the obstacles that they may present. In other words, this is a field program, and the field can change.

Center Research Direction

The Center for Climate Studies' research plan addresses the question: How can Chile respond to local, and global challenges while securing the functionality of its natural, and human systems? Staff, and students of SFS-CCS investigate this topic by engaging in research under three core components:

1. Understanding earth, ecological, and social systems
2. The effects of climatic change at multiple scales
3. Effective response to change

Through our research, we collaborate with a range of stakeholders, and research partners. These connections develop over time and may include governmental organizations such as CONAF, international NGOs, grassroots organizations, local universities, and community groups.

Intellectual Property: There are many implications about intellectual property and the use of data and research frameworks beyond your semester experience. Many DR projects form part of ongoing and developing research lines at SFS Centers, the work of which is the intellectual property of SFS faculty. However, faculty are always interested in continuing collaborations, and there is often the possibility for student *co-authorship* on future academic publications. We will discuss the ethics of data gathering and academic publications during the semester, but you can also review in advance SFS's [data policy](#).

Course Overview

The aim of this course is to provide students with the opportunity to apply the scientific process in a field research project addressing a local issue related to the environment. This course prepares students to distinguish hidden assumptions in scientific approaches, and separate fact from interpretation, cause from correlation, and advocacy from objectivity.

The course is an intensive practical field experience conducting research on a topic of immediate relevance to specific clients working in the context of climatic change, earth and geological systems, ecological concerns, and conservation (protected areas, government offices, local groups).

Each student will join a faculty-led team that will carry out field research, data analysis, and communication of results in one or across several of the following disciplines: ecology, earth systems, and conservation. The course is designed to build on the information students have learned in the core courses, Directed Research lectures, and workshops to assist students in understanding the scientific process, data analysis, and presenting results. Students will pass through a condensed version of the research process: identification of relevant questions; experimental design; field data collection; methods of statistical data analyses; and presentation of results to academic peers and the public. The students will be working on research projects that are part of each SFS faculty member's field of expertise, and any particular DR project may be part of ongoing research projects.

Learning Objectives

The core skills students will learn in this course are field techniques, analytical methods, skills, and critical thinking, as well as teamwork, and time management. The specific objectives of the course are:

1. Understand the process of **designing** a field research project
2. **Conduct** field sampling
3. Manage, interpret, and analyze **data** sets
4. **Communicate** research results to diverse audiences
5. Manage teamwork within the context of **collaborative** research

Assessment

We expect active participation in all aspects of DR, from the discussion, and analysis of assigned readings, and associated literature, the review of new literature, classes, and field components (data collection, data compilation, and data analyses).

The DR experience is both an individual, and group effort. All members of the DR group work together to collect data in the field as appropriate for their project. Students will identify and address a distinct question within the overall research project, and will be responsible for data analysis, interpretation, and communication of their own results. Each topic will address the overall objectives of the research problem at hand, and may use the current data, previous research if available, or a combination of the two. The aim is to provide enough room to develop your own creativity within the context of the DR project at hand. All topics must be related to the overall research project of your DR faculty mentor.

Performance in the Directed Research course will be evaluated based on the assessment items, and their proportional weight to your final grade described below. As each DR project is unique, landmark items will be discussed and shared as the semester and projects evolve.

Assessment Item	Value (%)
Landmark 1: Faculty-determined	15
Landmark 2: Faculty-determined	15
Landmark 3: Final Paper Rough Draft	15
DR Final Paper	20
SFS-Chile Presentation	15
Field notebook – research notes	10
Research Participation	10
TOTAL	100

Landmarks 1 & 2 (15% each)

Each DR project will use progress metrics based on that project's needs. The exact item to be handed in will be given to you by your faculty mentor at the beginning of the DR process and may include those discussed below. Your DR mentor may assign more specific topics.

- **Annotated Outline:** As a first step in the process, developing an annotated is one way to help you direct your research. This annotated outline will help guide you in the construction of your final paper and help develop your argument in relationship to the literature.
- **Literature Review:** Your DR mentor will indicate the number, and type of scientific sources you will be exploring to support your research topic for your DR paper. It is expected that you will find, read, interpret, and provide criticism of the scientific literature.
- **Data Management:** It is important to record and store research data in a useful manner. You will need to provide (as applicable) spreadsheets with your data in a format intelligible to someone else. You may need to provide both raw and manipulated data you used to create figures, tables, and run statistical tests. You need to annotate your files (use text boxes if appropriate) so an outsider can understand your data. You may be required to provide field notes on your findings for review.

Landmark 3: Final Paper Rough Draft (15%)

The rough draft of the DR final paper is to be written in the style of an academic paper or report to be read by practitioners of the appropriate field. Students will have ample opportunity for guidance from their DR faculty mentor throughout the DR, especially during data analysis. The rough draft must be the

result of developing multiple prior drafts to the point of being of a high enough standard to be considered for academic evaluation. This is not a first draft.

DR Final Paper (20%)

The final report is written in the style of a technical paper or journal submission in the appropriate field. Students should respond to all the observations made to their rough draft, either on their own, or in consultation with their faculty mentor. The final paper must have all tables and figures completed; it must have all relevant components of an academic paper; and it must be free of formatting and layout errors.

SFS-Chile Presentation (15%)

You will present your DR work in the style of an academic conference presentation of 10-15 min length with 5 mins of additional time for questions. Unless the scope of your DR project is very small, you should not attempt to squeeze in everything from your final report into this presentation. Making sure that you are within the time limit is a very important skill therefore thorough rehearsal is important. Your grade will be based on communication, clarity, presentation structure, quality and clarity of graphics, and overall information delivery.

Field notebook – research notes (10%)

Your field notebook will serve as a repository for notes that you take in the field related to your DR project and as a tool for consulting prior experiences and the opportunities to utilize them. The specifics of these notes will depend on the project that you are working on, and the role that you will play in that project. Your DR faculty mentor will outline the requirements of the field notebook.

Participation (10%)

Work on a research project presents a very different set of challenges, compared against a regular course. The adage “a chain is only as strong as its weakest link” can be especially visible during research, and the success of each professor’s group will require active participation and involvement by all group members. This may include helping to develop and practice sampling logistics and procedures, optimize field sampling protocols to maximize the sampling potential in the field, distributing sample and data analyses to diminish workflow bottlenecks, focusing on post-analysis activities (e.g., write-up, presentations), and more.

Grading Scheme

Grade corrections in any of the above items should be requested in writing at least 24 hours after assignments are returned. No corrections will be considered afterwards.

A	95.00 - 100.00%	B+	86.00 - 89.99%	C+	76.00 - 79.99%	D	60.00 - 69.99%
A-	90.00 - 94.99%	B	83.00 - 85.99%	C	73.00 - 75.99%	F	0.00 - 59.99%
		B-	80.00 - 82.99%	C-	70.00 - 72.99%		

General Reminders

Plagiarism – Using another’s ideas and material without due credit is plagiarism and is not tolerated. A grade of zero will be assigned in all cases of plagiarism. Plagiarism may result in a written warning.

Deadlines – Deadlines for assignments are instated for several reasons: they are a part of working life to which students need to become accustomed and promote equity among students. Late assignments will incur a 10% penalty for each day that they are late. No assignment will be accepted after three days. Assignments will be handed back to students after a one-week grading period.

Participation – Participation in all components of the program is mandatory because your actions can significantly affect the experience you, and your classmates have while at SFS. Therefore, it is important that you are prompt for all DR activities, bring the necessary equipment, and simply get involved.

Course Content

L: Lecture presentation, CA: class activity

Research Skills and DR Information: The lecture and discussion part of DR helps prepare students to conduct scientific research. Classes are held throughout the semester, in conjunction with the core courses, so that students are well prepared to work with their faculty mentor on meaningful research.			
No	Title and outline	Type	Hours
DR01	Course introduction Presentation of DR course topics, DR syllabus, and discussion of the course objectives	L	1.0
DR02	What is research and what is DR Covering the framework of academic research and what the Directed Research course will entail.	L	1.5
DR03	Basic statistics (mean, median, T-test, ANOVA) Use examples to evaluate basic statistical methods of data analysis. Discuss the assumptions of parametric data analysis. Learn when to apply t-tests vs. ANOVAs and how to use the statistical result tables generated in R.	CA	1.5
DR04	Discourse analysis Use discourse data to evaluate patterns in interview data.	CA	1.5
DR05	Risk & Time Management Understand the challenges that are inherent with field research, from physical risk to the challenges of developing links between research questions and research methods.	L	1.0
DR06	Ethics in Research Introduce all students to an overview of ethical considerations for research, regardless of discipline.	L	1.5
DR07	Simple linear regression Use examples to learn how and when to use linear regression. Evaluate statistical assumptions, and understand how to use statistical result tables generated in R.	CA	1.5
DR08	Managing large datasets Use climate station data to understand how to use acquire, manage, and evaluate large datasets. Also learn how to understand statistical results tables generated in R.	CA	1.5
DR09	Styles of Academic Writing Academic writing is a specific writing format that is used to transmit results and ideas to academic peers. Activities will allow students to practice tools and techniques to improve their skills with academic writing.	CA	1.0

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No	Title and outline	Type	Hours
DR10	Project Descriptions Faculty members will introduce the various research projects, what methods they will use, and where their group will go for sampling.	L	0.5
DR11	Project Selection Students will have the opportunity to select their DR project, using ranked choice selection.	D	0.5
Total		13 Hours	
DR Research Component This portion of the DR course is made up of research time, which includes data collection, synthesis, and dissemination. Given the intense nature of the Directed Research project, students receive over 140 contact hours during this period.			Days Allocated
DR Project Background and Field Prep Students work to develop the theoretical and methodological background for their DR projects, determine logistics, plan research collection, and practice methods		7 days	
Sampling & Data Development Students collect samples or develop data. This can be in the field or with lab-based work in the Center.		8 days	
DR Analysis, Writeup, and Presentation preparation Students will develop the analysis of their DR data, progress with their write-ups, and put together their academic presentations.		14 days	
SFS Academic Presentations Students will present the major findings of their DR projects in an academic presentation style.		1 day	
SFS Public Presentations The Center will host a Public Open House, during which each faculty member's groups will present the highlights of their research.		1 day	
Total		31 days	