



S F S THE SCHOOL
FOR FIELD STUDIES

Directed Research

SFS 4910

Syllabus
4 credits

The School for Field Studies (SFS)
Center for Climate and Sustainable Futures (CCSF)
Paro, Bhutan

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

SFS Bhutan is operated in partnership with the College of Natural Resources of the Royal University of Bhutan (CNR, RUB) and the Bhutan Ecological Society (BES). The research efforts of the SFS Bhutan Center aim to contribute to the mission and goals of both RUB and BES. The research focus of RUB seeks “...to understand and uncover the ecological, socio-economic and policy dimensions of biophysical systems and their impact on human ecology” focusing on the key areas of climate change, conservation biology, natural resources management, forest ecology and socio-economic dimensions of development. BES research is aimed at understanding the interplay between development and environment and pays particular attention to issues such as demographic changes, climate change, energy, food, water, forests, and urban landscapes.

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 Directed Research is to provide students with the opportunity to apply ecological, biological, and/or social-scientific methods to field research projects that address local environmental issues. This course prepares students to experience the research process and distinguish hidden assumptions in scientific approaches. We will also investigate the ways that various methods and theories differentiate (or do not) fact from interpretation, cause from correlation, and advocacy from objectivity. Through the Directed Research projects, students will contribute to a growing body of scientific research that informs local and national conservation and resource management decisions.

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, natural resource management, and human geography. The Directed Research course is designed to build on the information students have learned in the topical courses, as well as Directed Research lectures and workshops specifically designed to assist students in understanding the scientific process, hypothesis testing, and results presentation in written and spoken formats (see below for these courses).

The specific research projects conducted each semester vary, pending discussions with collaborators, current work being carried out at the Center, and student interests.

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

You will present your DR projects in the standard scientific formats of a peer-review style report and a conference style presentation. You will also be graded on your data management and your positive contribution to the class. Comprehensive details of all assignments will be provided separately, see below for the general descriptions and expectations.

Assessment Item	Value (%)
Draft Project Proposal	10
Final Project Proposal	15
Final Project Report	35
Data Management	10
Project Presentation	20
Peer Evaluation	10
TOTAL	100

Project Proposal (Draft, 10%; Final, 15%)

The project proposal has two elements: a *Literature Review* and a *Project Summary*.

1. Literature Review

The main objective of the literature review is for students to familiarize themselves with previous research and publications in the area of their chosen Directed Research project. The literature review should draw upon a literature base (where possible) to firstly review the current status of research in the field and then to build a setting and justification for research that still remains to be done. The literature review should include:

- A full literature review: A critical evaluation of knowledge in subject area
- An exploration of the DR project status within the literature: Highlight knowledge gaps and how the proposed project fits within the current literature

2. Project Summary

The main objective of the project summary is for students to develop a detailed outline (framework) for their Directed Research. The DR project summary must include the following items:

- Aims/Hypotheses: A list of questions that the student would like to answer as a result of the research project they will design.
- Materials & Methods: A detailed description of the methods to be used in their study and why these methods will be used over other potential methods. This should include sampling design, as well as the physical data collection methods to be employed.
- Predicted Findings & Importance: A list of 'predicted findings' and implications for each

Final Report (35%)

The final report is written in the style of a peer-review submission to a journal in the appropriate field. The report will have a word limit of 3500-4000 (excluding references). You will have ample opportunity for guidance from your DR supervisors throughout the DR period and during DR data analysis week. The analytical tools for research workshops in the DR course (and complementary classes in other courses) are designed to prepare you for producing the results section and improve the quality of your work.

Data Management (10%)

It is important to record and store research data in a manner that is useful. You will need to provide (as applicable) Excel sheets with your research data in a format that is intelligible to someone else. You may need to provide both raw and manipulated data you used to create figures, tables and to run statistical

tests. You need to annotate your spreadsheets (use text boxes if appropriate) so that an outsider can understand what the data are. You may be required to provide field notes on your findings for review.

Project Presentation (20%)

You will present a subset of your DR work in a conference style presentation of 10 min length with 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 and so thorough rehearsal is important.

Directed Research Skills (10%)

Your Directed Research Skills will be graded throughout the DR course by your supervisor. Your final grade will depend upon your attendance to all DR activities, active involvement and competencies in field data collection, data interpretation and group participation/support.

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 the ideas and material of others without giving due credit is cheating and will not be tolerated. A grade of zero will be assigned if anyone is caught cheating or aiding another person to cheat actively or passively (e.g., allowing someone to look at your exam). All assignments unless specifically stated should be individual pieces of work. In the case of DR projects, careful referencing is of essence.

Deadlines – Deadlines for written and oral 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. Deadlines allow faculty ample time to review and return assignments before others are due. **All DR related assignments must be delivered by deadline.**

Participation – Participation in all components of DR is mandatory because your actions can significantly affect the experience you and your classmates have as well as the outcome of the project. Therefore, it is important that you are prompt and prepared for all aspects of DR, bring the necessary equipment, and simply get involved and make the most of the experience.

Course Content

L: Lecture, D: Discussion

<p>DR Coursework Component: The coursework component of the DR is designed to prepare the students to conduct scientific research. The lectures are delivered throughout the semester, in conjunction with the topical courses, so that students are well prepared to work with their faculty mentor on meaningful research. Some of the course activities below will be delivered to the whole class, or as part of your specific DR group once you have selected a given project.</p>			
No	Title and outline	Type	Hours
DR01	DR Course Introduction Students will be introduced to the DR topics, process, including deliverables and dates.	L	1 hour, 15 min
DR02	Project & Proposal Development Faculty will lay out expectations of student proposals and students and faculty will form discussion groups to further DR proposals	D	1 hour, 15 min
DR03	Introduction to Science & the Scientific Method This discussion with familiarize students with the process of science, both in theory and in practice	L; D	1 hour, 15 min
DR04	Introduction to Scientific Writing & Reading Explore the difference between primary and secondary sources; expectations and standards of practice; describe expectations for paper	L; D	1 hour, 15 min
DR05	Qualitative & Quantitative research Introduction of data collection methods and when each is appropriate, as well as a discussion of student's current experiences in scientific data collection.	L; D	1 hour, 15 min
DR06	Statistics A brief introduction to basic statistical theory and use of statistical software	L	1 hour, 15 min
DR07	Effective Scientific Communication Skills Students will understand the importance of practicing scientific communication skills and start to think about how to address different audiences.	L	1 hour, 15 min
DR08	Research Ethics Introduce students to the ethical considerations involved in research (e.g. human subject's protection, data integrity and management).	L	1 hour, 15 min
DR09	Risk & Time Management in DR	L	1 hour
Total			11 Hours
<p>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.</p>			Days Allocated
Preliminary Data Collection			2 days
Data Collection Students work within their DR group to go into the field to collect data			11 days
Data Synthesis Students work closely with their faculty mentors to analyze their collected data and write up their findings in a structured scientific paper			4 days
Research Dissemination Students prepare, practice, and deliver presentations for SFS and community audiences.			3 days
Total			20 days