



**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

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***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.

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## Center Research Direction

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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.

## Course Overview

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The aim of Directed Research is to provide students 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.

**Intellectual Property:** Directed Research (DR) projects contribute to ongoing faculty-led research at SFS Centers and are not independent student research projects. Data, research frameworks, and project outputs are part of the intellectual property of SFS faculty and their research programs. Any future use of project data or continuation of the research must occur in collaboration with SFS faculty. Faculty often welcome continued student involvement, and opportunities for *co-authorship* on future publications may arise. We will discuss research ethics, data use, and publication practices during the semester; students should also review SFS’s data policy in the SFS Academic Handbook.

## Learning Objectives

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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

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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         |
| Participation          | 10         |
| <b>TOTAL</b>           | <b>100</b> |

### 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.

### Participation (10%)

Your participation will be graded throughout the DR course by your supervisor and peers. 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

**Honor Code/Plagiarism** – SFS places high expectations on their students and we hold students accountable for their behaviors. SFS students are held to the honor code below. SFS has a zero-tolerance policy towards student cheating, plagiarism, data falsification, and any other form of dishonest academic and/or research practice or behavior. Using the ideas or material of others without giving due credit is cheating and will not be tolerated. Any SFS student found to have engaged in or facilitated academic and/or research dishonesty will receive no credit (0%) for that activity.

*"I approach coursework, fieldwork, and research with integrity and commit to full participation. I do my own work with honesty and give credit where it's due. I use tools and technology responsibly and only as permitted. I speak up when something conflicts with our shared values. I respect the communities we learn from and commit to ethical, non-extractive research that keeps knowledge connected to the places and people who share it with us."*

**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. 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. Grade corrections for any assessment item should be requested in writing at least 24 hours after assignments are returned. No corrections will be considered afterwards.

**Content Statement** – Every student comes to SFS with unique life experiences, which contribute to the way various information is processed. Some of the content in this course may be intellectually or emotionally challenging but has been intentionally selected to achieve certain learning goals and/or showcase the complexity of many modern issues. If you anticipate a challenge engaging with a certain topic or find that you are struggling with certain discussions, we encourage you to talk about it with faculty, friends, family, the HWM, or access available mental health resources.

**Participation** – Since we offer a program that is likely more intensive than you might be used to at your home institution, missing even one lecture can have a proportionally greater effect on your final grade simply because there is little room to make up for lost time. 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 for field research, and simply get involved.

**AI Usage for Assignments** – SFS acknowledges the growing role of artificial intelligence (AI) tools in education and professional settings. While AI can be a valuable resource for learning and productivity, its use must align with the learning goals and integrity of each assignment. For this reason, students are encouraged to discuss the acceptable uses of AI for each assignment with the instructor. If you wish to use AI for any part of an assignment, consult with the instructor beforehand to ensure that its use adheres to the academic expectations of the course. Let's work together to navigate this evolving landscape responsibly!

## Course Content

**L:** Lecture, **D:** Discussion

| <b>DR Coursework Component:</b> 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. |                                                                                                                                                                                                                 |             |              |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|--------------|
| <b>No</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>Title and outline</b>                                                                                                                                                                                        | <b>Type</b> | <b>Hours</b> |
| <b>DR01</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>DR Course Introduction</b><br>Students will be introduced to the DR topics, process, including deliverables and dates.                                                                                       | L           | 1.0          |
| <b>DR02</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>Project &amp; Proposal Development</b><br>Faculty will lay out expectations of student proposals and students and faculty will form discussion groups to further DR proposals                                | D           | 1.0          |
| <b>DR03</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>Introduction to Science &amp; the Scientific Method</b><br>This discussion will familiarize students with the process of science, both in theory and in practice                                             | L; D        | 1.0          |
| <b>DR04</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>Introduction to Scientific Writing &amp; Reading</b><br>Explore the difference between primary and secondary sources; expectations and standards of practice; describe expectations for paper                | L; D        | 1.0          |
| <b>DR05</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>Qualitative &amp; Quantitative research</b><br>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        | 1.0          |
| <b>DR06</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>Statistics</b><br>A brief introduction to basic statistical theory and use of statistical software                                                                                                           | L           | 1.0          |
| <b>DR07</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>Effective Scientific Communication Skills</b>                                                                                                                                                                | L           | 1.0          |

|                                                                                                                                                                                                                                                                                 |                                                                                                                                                                   |                       |     |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-----|
|                                                                                                                                                                                                                                                                                 | Students will understand the importance of practicing scientific communication skills and start to think about how to address different audiences.                |                       |     |
| <b>DR08</b>                                                                                                                                                                                                                                                                     | <b>Research Ethics</b><br>Introduce students to the ethical considerations involved in research (e.g. human subject's protection, data integrity and management). | L                     | 1.0 |
| <b>DR09</b>                                                                                                                                                                                                                                                                     | <b>Risk &amp; Time Management in DR</b>                                                                                                                           | L                     | 1.0 |
| <b>Total</b>                                                                                                                                                                                                                                                                    |                                                                                                                                                                   | <b>9 Hours</b>        |     |
| <b>DR Research Component</b><br>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. |                                                                                                                                                                   | <b>Days Allocated</b> |     |
| <b>Preliminary Data Collection</b>                                                                                                                                                                                                                                              |                                                                                                                                                                   | 2 days                |     |
| <b>Data Collection</b><br>Students work within their DR group to go into the field to collect data                                                                                                                                                                              |                                                                                                                                                                   | 11 days               |     |
| <b>Data Synthesis</b><br>Students work closely with their faculty mentors to analyze their collected data and write up their findings in a structured scientific paper                                                                                                          |                                                                                                                                                                   | 4 days                |     |
| <b>Research Dissemination</b><br>Students prepare, practice, and deliver presentations for SFS and community audiences.                                                                                                                                                         |                                                                                                                                                                   | 3 days                |     |
| <b>Total</b>                                                                                                                                                                                                                                                                    |                                                                                                                                                                   | <b>20 days</b>        |     |