THE SCHOOL FOR FIELD STUDIES

Rainforests of Australia
SFS 3262

Syllabus

The School for Field Studies (SFS)
Centre for Rainforest Studies (CRS)
Queensland, Australia

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.

www.fieldstudies.org

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 may present. In other words, the elephants are not always where we want them to be, so flexibility is key.

Center Research Direction

The Centre for Rainforest Studies' research plan addresses the question: *How can the future of the Wet Tropics in a changing world be ensured?* Staff and students of SFS-CRS investigate this topic by engaging in research under three core components:

1. Understanding ecological and social systems;
2. Conflict, vulnerability and change;
3. Effective response to change.

Through our research, we aim to assist a range of stakeholders and research partners. These include local landholders; non-government conservation organisations conducting rainforest restoration or having a special interest in flora and fauna; several levels of government, particularly local and state government; regional research organisations, including universities and the Commonwealth Scientific and Industrial Research Organisation.

We aim to improve stability, sustainability, environmental awareness, and concern for natural resources in the Wet Tropics, in particular on the Atherton Tablelands. Our goal is to strengthen research, technical and practical collaboration between SFS-CRS and other research organizations, governmental agencies and non-governmental organizations to carry out this agenda.

Course Overview

In Rainforests of Australia, you will obtain a broad appreciation of the diversity and dynamics of tropical terrestrial biomes and marine life. You will be introduced to the current and past distributions of tropical rainforests, their biodiversity, and their relationships with the abiotic environment, human use, present threats, and restoration practices. This course aims to bring together an understanding of the underlying ecological processes that affect rainforests (and other tropical vegetation) with the role of human society in shaping the present and future rainforests of the Wet Tropics. The course will take the Australian Wet Tropics as a case study to investigate this field, yet many of the skills you learn here can be transferred to other systems. Topics covered will include: biophysical determinants of which vegetation type occurs where; past, present, and future threats to Wet Tropics rainforests; and the theory and practice of rainforest restoration.

The course also has a practical component. You will be taught field techniques for carrying out field research, data analysis, and communication of results.

The course is a mixture of class lectures, field lectures, field laboratory courses, workshops, field trips, and readings to complement the material presented in the lectures. A major emphasis is on field skills, the collection, management and analyses of data, and skills of writing a scientific paper. A wide range of material will be provided and should be used to study the class topics and to acquire the desired skills. Be aware that all material covered in class, lectures, field lectures, and field trips.

Learning objectives

Following this course, students should have an understanding of:

1. the factors that influenced the origin of the Wet Tropics rainforests and its flora and fauna;
2. the ecology of rainforest and freshwater ecosystems;
3. the threats to these ecosystems and the GBR in Australia and the impacts these may have on ecological processes;
4. restoring terrestrial and marine ecosystems

Themes

Rainforests of Australia is divided into two themes, which address the history of human impacts in the Wet Tropics and the justifications for conservation and restoration, followed by looking at issues of management of tropical forest, freshwater and marine landscapes to maximize the ecological and economic effectiveness of restoration efforts.

The first theme is used to give you a background in the processes that shaped the rainforests, freshwater and marine ecosystems of the Wet Tropics and gives you an insight in how these ecosystems work. With this understanding, the human impacts on the Wet Tropics are put into an ecological context. In short, this half is designed to familiarize you with the various ecosystems of the Wet Tropics and how humans have affected them.

The second theme puts you into the role as "manager" and attempts to train you to be part of the solution. As such, we critically evaluate the different techniques used today to try and mitigate the threats to these ecosystems in a most effective way.

Assessment

Most of the assessments will be based on individually written or orally presented work.
Below is a table of the assessments for this course.

Assessment Item	Value (%)
FEX 1	15
FEX 2	25
Plant ID quiz	10
Reflective blog post	10
3-minute talk	5
Final Exam	25
Participation	10
Total	**100**

FEX 1: Vegetation profiling and data interpretation (15%)
One of the main aims of our program is to give you a keen appreciation of the diversity of tropical forests and their structure. One of the best ways to get such an appreciation is to construct a profile of a forest using data collected in the field. This includes setting up plots to sample vegetation and measuring and identifying plants. By going through such an exercise, you will learn valuable skills in

setting up research plots. You will also learn to analyse and interpret data you collect from your study plots during the course. In this assignment you will be required to submit a profile diagram that your will construct from your own data, and also write a short report that presents and interprets the data you collect. Note that participation in fieldwork and peer review contributes towards your grade in this assignment.

FEX 2: iNaturalist assignment & plant collection (25%)
This assignment brings you back to the basics. Good science is good observation. Good observations come with good notes. The greatest scientists in the fields of natural science such as botany and zoology are known for their careful collections of specimens and meticulous notes. This assignment therefore aims to give you a keen appreciation of this fundamental practice of making biological collections and observation recording. Also, your observations will contribute towards a global (and also local) database.

Plant ID Quiz (10%)
The purpose of this quiz is to develop your skills in identifying the flora of our rainforest by using spot characters and identification tools. As the rainforest of Atherton Tablelands is home to a diverse flora the familiarization with the most common species will help to better understand the roles these plants play in the ecosystems of this region. Plant ID skills depends on attention to detail and trains your observational powers. These skills are applicable in forest regions beyond the Australian tropics. We will conduct an intensive plant ID workshop early in the course to practice techniques of plant identification.

Reflective blog post and 3MT (10%)
The purpose of these examinable components are to help you develop your skills in scientific outreach. Also, by keeping good reflective notes of your time at CRS, you will have the chance to synthesize your experiences into a reflective blog post. For the 3 minute talk, a range of topics related to the Wet Tropics will eb available for your to choose from.

Final Exam (25%)
During the final exam you will be tested on material presented in lectures, field lectures and excursions. Answering questions will require critical and analytical thinking across the various teaching units.

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.

Grading Scheme

A	95.00 - 100%	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 either actively or passively (e.g., allowing someone to look at your exam).

Deadlines: Deadlines for written and oral assignments are instated to promote equity among students and to allow faculty ample time to review and return assignments before others are due. As such, deadlines are firm and extensions will only be considered under extenuating circumstances. If you believe that you have been prevented from completing your work on time for reasons beyond your control (e.g. illness), make sure that you discuss this with the relevant faculty member as soon as possible, and certainly before the assignment is due. Late assignments will incur a penalty proportional to the length of time that they are late. This means an assignment that is one day late when students were given two days to work on it will have 50% of total points removed from the grade awarded for that assignment, and an assignment that is 2 hours late when two full days (16 hrs) were allocated to work on it will have 12.5% of total points removed from the grade.

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 course is mandatory, it is important that you are prompt for all activities, bring the necessary equipment for field exercises and class activities, and simply get involved.

Course components

The column Readings contains suggestions to deepen and expand the knowledge. **Compulsory reading material (indicated below in bold) is provided as Pdf files on the Student Drive.**

L: Lectures, **FL:** Field Lectures, **FW:** Fieldwork, **EX**: Exams, **REV:** Review, **FLAB:** Field Lab **WS:** Workshop, **GL**: Guest lecture

Code	*Titles of Lectures /Field Exercises*	*Time (hrs.)*	*Type*	*Readings*
	Course Overview This lecture gets you into the swing of discovering Australia's natural assets and exploring ecological patterns and processes	1.0	L	Woinarski et al. (2015; 2016); Reside et al (2017) Fisher et al. (2014) Recommended: Cox (2017); Strahan et al. (2016)
	Past and current landscapes of the Atherton Tablelands A tour on the Tablelands will show you the main land formations of this area. We will see different geology and soil types and discuss how their distribution has affected the rainforest distribution and land uses. We will watch a video to see how local communities became aware of the values of their forests and trying to restore them.	4.5	FL and Video	**Atherton Seven Sisters** Stephensons, P.J. (1989): Rocks and Landscapes of the Cairns District.- Qld Dept. of Mines – CRS Library ECO081; **Haberle (2005)**
	Biomes 1: The Tropical Rainforest You will understand the main factors that determine the occurrence of a	2.0	L	**Richards, P. W. (1952).** The tropical rain forest. *The tropical rain forest: an ecological study.* Cambridge University Press.

Code	*Titles of Lectures /Field Exercises*	*Time (hrs.)*	*Type*	*Readings*
	Rainforest in an area. You will learn how to recognize and classify this important biome and learn about its relevance			**Tracey, J. G. (1982).** Vegetation of the humid tropical region of north Queensland. CSIRO, Melbourne. **Adam, P. (1992).** *Australian rainforests*. Oxford University Press.
	Biomes 2: Wetlands and Mangroves We will explore what is considered a freshwater and a coastal wetland, and understand in which environmental conditions each type occurs. You will learn why this is such a unique habitat where the plants need to deal with a waterlogged condition. We will explore the connection between land and sea	2.0	L	**Keddy, P.A. (2010).** Wetland ecology: principles and conservation (2nd ed.). New York: Cambridge University Press. **Mcleod, E., et al. (2011).** A blueprint for blue carbon: toward an improved understanding of the role of vegetated coastal habitats in sequestering CO2. *Frontiers in Ecology and the Environment*, *9*(10), 552-560.
	Biomes 3: Dry forests and Savanna Let's talk about fire: you will navigate on one of the most widespread biome in Australia, the Savanna, and understand how fire plays an important role in this Biome. You will also learn the specific features of Dry forest and why this important biome has it biodiversity neglected.	2.0	L	**Skarpe, C. (1992).** Dynamics of savanna ecosystems. *Journal of vegetation Science*, *3*(3), 293-300. **Sunderland, T., Apgaua, D., et al. (2015).** Global dry forests: a prologue. International Forestry Review, 17(2), 1-9.
	Plant ID workshop Introduction to plant collection assignment	1.5 4	FL/WS/FLAB	Henderson (2003): Practical Methods in Ecology; CRS Library ECO075 (also see ECO064); See also: Fauna Field Guides on Student Drive; **Lindenmayer et al. (2001); Fuller et al. (2015); Cilulko et al.(2013)**

Code	*Titles of Lectures /Field Exercises*	*Time (hrs.)*	*Type*	*Readings*
	Meet the early birds An introduction on how to best familiarize yourself with an unknown bird fauna. We also will participate in a local crane count to see how bird abundances can be assessed.	4.00	FL	Various Field Guides to the Birds of the Wet Tropics and material on the students' drive
	Spotlighting & Lightsheeting Gain an appreciation of the diversity of nocturnal life in the Wet Tropics	3	FW	
	Biomes 4 : Marine Biomes and wildlife	1	GL	
	Documenting biodiversity using a citizen science app Also you will be given your iNat assignment	1	L	
	The scientific method & designing ecological studies	1.5	L/WS	**Kent, M. (2011).** *Vegetation description and data analysis: a practical approach*. John Wiley & Sons. **Ellenberg, D., & Mueller-Dombois, D. (1974).** ***Aims*** *and methods of vegetation ecology*. New York: Wiley.
	Field Exercises	10	L/FL/FW	
	Make sense of your data	2	L/WS	
	Consequences of habitat fragmentation for plants and animals Habitat fragmentation has profound impacts on ecological communities – we will consider some theoretical aspects of these impacts and consider some examples from flora and fauna.	1.0	L	Latch, P. (2008): Recovery Plan for Mabi Forest- Mabi Forest Recovery Team, Queensland Government, EPA- Pdf file Laurance (2008b); **Couvet (2002); Harding and Gomez (2006); Pettit et al. (2016); Goosem and Turton (2000)**
	Climate change & anthropogenic impacts on natural ecosystems Understanding climate change has become crucial for critical thinking about a more sustainable future. In this class you are going to understand the anthropogenic climate change causes and its consequences on natural	2.0	L	**Rahmstorf, S., et al. (2007).** Recent climate observations compared to projections. *Science*, *316*(5825), 709-709. **Thuiller, W. (2007).** Climate change and the ecologist. *Nature* 448, 550–552 **Swain, D. L., et al. (2020).** Attributing extreme events to climate change: A new frontier

Code	Titles of Lectures /Field Exercises	Time (hrs.)	Type	Readings
	environments.			in a warming world. *One Earth*, *2*(6), 522-527.
	Invasive species You will learn about the concept of invasive species and how and why species become invasive. You will learn to think critically about whether this issue is the cause or the consequence of a bigger problem, and what the international community is doing about invasive species.	1.00	L	**Colautti, R. I., & MacIsaac, H. J. (2004).** A neutral terminology to define 'invasive'species. Diversity and distributions, 10(2), 135-141. **Didham, R. K., Tylianakis, J. M., Hutchison, M. A., Ewers, R. M., & Gemmell, N. J. (2005).** Are invasive species the drivers of ecological change?. *Trends in ecology & evolution*, *20*(9), 470-474.
	Regenerative agriculture and climate resilience In this class you are going to learn a brief history of industrial agriculture and its consequences on the environment. We will explore alternative ways of growing food that are more aligned with nature.	2.0	L/FL/GL	**Götsch, E. (1995).** *Break-through in agriculture* (p. 22p). Rio de Janeiro: AS-PTA. **Andrade, D., et al. (2020).** Syntropy and innovation in agriculture. *Current Opinion in Environmental Sustainability*, *45*, 20-24.
	Coastal ecosystems and Reef Ecology (Fitzroy Island) Explore the ecology of the reef and adjacent ecosystems.	7.5	Excursion	Wooldridge and Brodie (2017); Turton (2019); **Cheal et al. (2012); Georgiou et al. (2015); Jones et al. (2018)** Reef Guardian Councils' Report
	Plant ID quiz Utilize your knowledge acquired during the plant ID course and the provided resources to prepare yourself for the plant ID quiz.	2.0	EX	
	Reversing Fragmentation: Theory and Practice You will be introduced to the principles of mitigating fragmentation effects. We will then explore factors which determine how an organism responds to a fragmented landscape and how to mitigate the effects of fragmentation on species.	3.0	L + FL	Soule, M.E. et al. (2004): The role of connectivity in Australian conservation.- *Pacific Conservation Biology* 10: 266-279. CRS Library JPCB104 **Jones et al. (2011); Goosem et al. (2005); Pascual-Hortal and Saura (2006); Villard-Metzger (2014); Cattarino et al. (2016); Zeller et al. (2012)**
	Management of rainforest,	1.5	L	**Heyword and Norbury (1999);**

Code	*Titles of Lectures /Field Exercises*	*Time (hrs.)*	*Type*	*Readings*
	freshwater and marine ecosystems in Far North Queensland This lecture will introduce you to some mitigation measures to address threats to terrestrial, freshwater and marine ecosystems in Far North Queensland.			**Cooke (2012); Nelson et al. (2011); Van Bommel and Johnson (2016; 2017); Managing Great Barrier Reef; Januchowsky-Hartley et al. (2011); Jollymore et al. (2017)** **Extra folder "Dingo" provides material on the Dingo debate:** Please check a few of the articles provided there
	Exam Review Consult your faculty during exam preparation.	2.0	REV	
	Final Exam	1.0	EX	
	TOTAL	**62.5**		