Rainforest Ecology
SFS 3690

Syllabus

The School for Field Studies (SFS)
Center for Rainforest Studies (CRS)
Yungaburra, 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.

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 be present. In other words, the elephants are not always where we want them to be, so be flexible!

Course Overview

This component of the program focuses on rainforest and freshwater ecology, with emphasis on the fauna. To formulate a background understanding of rainforests and freshwater ecosystems, we will explore the origin of the main landscape formations of this part of Australia by looking at geological and biogeographical factors that shaped the landscape and its biota. We will get familiar with the different types of freshwater and terrestrial habitats on the Atherton Tablelands and how they are linked to the Great Barrier Reef. We will deal with some basic ecological concepts of biodiversity and why so many species can co-exist in one place. This will also involve learning skills to test the health of freshwater systems, to describe spatial features of habitats, and to observe and identify local fauna. We will then look at how habitat loss, fragmentation and introduced species affect faunal biodiversity and ecological processes in rainforest, freshwater and marine ecosystems. To examine this, we will be conducting field trips and field work in various parts of the Atherton Tablelands and the coast.

In order to mitigate threats to the fauna of local rainforests and freshwater systems we will consider the role of corridors or landscape linkages, particularly along riparian areas, and ways in which restoration and landscape rehabilitation can overcome negative effects of human driven landscape modification on these ecosystems. We will consider options on how to efficiently control pest animals and their impacts on native flora and fauna.

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, field trips and readings is examinable.

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 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. the issues associated with managing rainforest, freshwater and marine ecosystems

Themes

The Tropical Rainforest Ecology Course (RFE) 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 (%)
Animal Identity Assignment	25
Bird quiz	20
Scientific writing	25
Final Exam	30
Total	**100**

Animal Identity Assignment
One of the main aims of our study abroad program is to make you familiar with the local fauna. This includes observations of wildlife and collating information on its ecology. In this assignment you will be required to write a report about the animal assigned to you. You will describe the animal's behavior and provide information about the species' habitat, the usual social structure it is living in, and how it will respond to changes of its habitat and climate change. You will use material presented within the courses and resources from the literature and internet.

Scientific Writing
This assignment will help you to better understand and apply principles of scientific writing. We will have a workshop on scientific writing in which we will analyze the different parts of a scientific paper. Introducing the topic of a study to a reader is often the most complicated part of the writing process and thus should be practiced. In this assignment you will be required to write an introduction for a paper for which you will receive its goal and information on the applied methods.

Bird Quiz
The purpose of this quiz is to develop your skills in identifying birds of our rainforest by sound and visual cues. As the Atherton Tablelands is home to a diverse fauna the familiarization with the most common species will help to better understand the roles these animals play in the ecosystems of this region. We will conduct bird walks to practice techniques to quickly identify birds by sight and/or sound. The quiz will give you some familiarity with the Wet Tropics fauna, most of which will be new to you.

Final Exam
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.

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 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.

Course Content

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,

No.	*Titles of Lectures /Field Exercises*	*Time (hrs.)*	*Type*	*Readings*
RFE 01	**Rainforest Ecology: 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)
RFE 02	**Geological processes that shaped the landscapes and fauna of the Tablelands and the GBR** Let's dive into the past and see how geological events created the various landscape elements we are seeing today along the coast of Far North Queensland, and how they have affected the fauna of this area.	1.5	L	**Whitehead et al. (2007); Winter, J. (1997);** Moritz et al. (2009); **Macqueen et al. (2012);** The rise of Australian marsupials
RFE 03	**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 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)**
RFE 04	**Fauna of rainforests and freshwater ecosystems of the Wet Tropics**	2.5	L and field	Ramsey, D. (2005): Rainforests of tropical Australia. Ecosystem

No.	Titles of Lectures /Field Exercises	Time (hrs.)	Type	Readings
	We will talk about the lives of some faunal elements of the rainforest and water streams around you. Keep your eyes open and explore the fauna at all times. Contact your faculty for assistance in identifying your observations		identifications	Manual series; CRS Library TRF072 Wildlife of Tropical North Queensland; Cooktown to Mackay, Queensland Museum 2000 -CRS Library TRF 066 **Pearson et al. (2015)** Further articles on student drive, e.g.; Cramb et al. (2009); Heise-Pavlov et al. (2011); **Freeman and Freeman (2009); Heise (2017)**
RFE 05	**Biodiversity and Life in the Jungle:** We will explore the different meanings/types of biodiversity and some ecological terms related to biodiversity. We will analyze the different roles animals play in an ecosystem and mechanisms that ensure that species can all co-exist.	1.5	L	Attiwill, P. and Wilson, B. (2006): Ecology – an Australian Perspective.- pages 550 – 554, CRS Library ECO086 **Kitching et al. (2007); Sekercioglu (2006)** Perry, D. (1990). Tropical Biology: A science in the sidelines – pgs 26 – 29- CRS Library TRF008 Attiwill, P. and Wilson, B. (2006): Ecology – an Australian Perspective.- chapters 18 to 22; CRS Library ECO086 **Williams (1997); Gordon et al. (2010); Graham et al. (2010); Tingley et al. (2014); Zavaleta et al. (2009)** Sax and Gaines (2003)
RFE 06	**Field Lab Course** This course consists of two components: A: You will be given an introduction to the study and description of animal behavior – this will set you up for your Animal ID assignment RFE16 B: We will go out to explore the nocturnal fauna of a rainforest habitat. Your will become familiar with the technique of spotlighting.	1.0 2.5	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)**
RFE 07	**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
RFE	**Introduction to spatial tools in ecology**	6.0	WS	Kozak et al. (2008)

No.	Titles of Lectures /Field Exercises	Time (hrs.)	Type	Readings
08	**(GPS/Topographic maps/GIS):** In this workshop we will learn about ways to describe and retrieve spatial data, to measure accurately the location of habitat characteristics and to present this information using appropriate software. You will learn about some of the available spatial analytical tools.			O'Kane et al. (2014) Heise-Pavlov and Gillanders (2016)
REF 09	**Connecting waters – the effects of the Tableland's economy on the GBR (Green Island)**	6.0	FL	Atherton Tablelands Industry History; **Resides et al. (2017**); **Wright et al. (2017)**
RFE 10	**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)**
RFE 11	**Introduced species** We learn about the impact of non-native plant and animal species on the Australian ecosystems and the tropical rainforests and freshwater ecosystems of the Atherton Tablelands in particular.	1.00	L	Harrison, D.A. and Congdon, B.C. (2002): Wet Tropics Vertebrate Pest Risk Assessment Scheme.- CRC, Cairns, chapters 1.2.1; 2.1 and 2.2 Attiwill, P. and Wilson, B. (2006): Ecology – an Australian Perspective.- Chapter 26; CRS Library ECO086 **Pest Animals WHA (docx file); Brown and Sax (2004); Petersen et. al (2006); Clavero (2014); Shea and Chesson (2002),** Heise-Pavlov and Longway (2011)
RFE 12	**Directed Research Skills:** **In this course you will acquire skills that will help you to do your directed research. This includes principles of scientific writing, the design of data sheets and the acquisition of skills to work in the field.** Through lectures and workshops you will become familiar with skills to write scientific papers, with steps to prepare a research project and how to prepare data collections in the field. You will learn about parameters to assess freshwater quality and will prepare and practice some	12.0	WS/L /FW	Many resources related to the taught material are available on the student drive.

No.	Titles of Lectures /Field Exercises	Time (hrs.)	Type	Readings
	data collection on these parameters using the introduced techniques. You will be introduced to an assignment in which you can test your skills in applying principles of scientific writing.			
RFE 13	**The outback of Australia** In this component you will get a taste of the Australian outback with its typical landscapes and vegetation.	2.5	FL	Some interesting articles are provided on the student drive (including articles about termites, how animals can survive fires etc.)
RFE 14	**Reef Ecology (Orpheus Island)** You will visit a swamp ecosystem on our way to the Island and will explore the ecology of the reef and adjacent ecosystems.	4.0	Excursion	Wooldridge and Brodie (2017); Turton (2019); **Cheal et al. (2012); Georgiou et al. (2015); Jones et al. (2018)** Reef Guardian Councils' Report
RFE 15	**Bird quiz** Contact your faculty for assistance.	2.0	EX	Utilize your knowledge acquired during the bird walk and the provided resources on the student drive to prepare yourself for the bird quiz.
RFE 16	**Animal Identity Assignment** Contact your faculty for assistance.	2.0	EX	Use provided literature resources for the lectures, the library and the internet
RFE 17	**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)**
RFE 18	**Management of rainforest, 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.	1.5	L	**Heyword and Norbury (1999); 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
RFE 19	**Exam Review** Consult your faculty during exam preparation.	2.0	REV	
RFE	**Final Exam**	1.0	EX	

No.	*Titles of Lectures /Field Exercises*	*Time (hrs.)*	*Type*	*Readings*
20				
	TOTAL	**62.5**		