THE SCHOOL FOR FIELD STUDIES

Rainforests of Australia

SFS 3262

Syllabus
4 credits

The School for Field Studies (SFS)
Center for Rainforest Studies
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.

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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 may present. Please be flexible.

Course Overview

In *Rainforests to 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; fauna of the Wet Tropics; 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 presentation of your findings. A wide range of material will be provided and should be used to study the class topics and to acquire the desired skills.

Learning Objectives

Following this course, students should have an understanding of:

- the factors that influenced the origin of the Wet Tropics rainforests and its flora and fauna
- the impacts of human settlement in the Wet Tropics bioregion and the Great Barrier Reef
- the ecology of rainforest and associated ecosystems in the Wet Tropics Bioregion
- the threats to these ecosystems and the GBR in Australia and the impacts these may have on ecological processes
- restoring terrestrial and marine ecosystems

Assessment

The evaluation breakdown for the course is as follows:

Assessment Item	Value (%)
Biodiversity Assignment	20
Field Exercises	35
3-Minute Talk	10
Fauna Quiz	10
Final Quiz	20
Participation	5
TOTAL	**100**

Biodiversity Assignment (20%)

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 is done as a

group and aims to give you a keen appreciation of this fundamental practice of making biological collections and observation recording. Your observations will contribute to local and global databases.

Field Exercises (FEXs) (35%)

One of the main aims of our study abroad 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 appreciation is to construct a profile of a forest using data collected in the field. This includes setting up plots to sample vegetation and assess habitat structure. Other FEXs involve measuring plant functional traits and studying community level attributes of terrestrial systems. By going through these exercises, you will learn valuable skills in setting up research plots. You will also learn to analyze and interpret data you collect from your study plots during the course. Peer review contributes to your grade in this assignment.

3MT (10%)

These individually assessed 3-minute talks provide an opportunity to practice your presentation skills and learn about miscellaneous but important topics in rainforest ecology and conservation.

Fauna Quiz (10%)

The purpose of this quiz is to develop your skills in identifying the fauna of our rainforest by using spot characters and identification tools. As the rainforest of Atherton Tablelands is home to a diverse fauna, the familiarization with the most common species will help us to better understand the roles they play in the ecosystems of this region. ID skills depend on attention to detail and train your observational powers. These skills are applicable in forest regions beyond the Australian tropics. We will introduce you to the most common species in some workshops.

Final Quiz (20%)

During the final quiz 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.

Participation (5%)

Everybody should be prepared for each academic session. This implies reading the materials for each session with enough detail to be able to ask relevant questions, and to participate in analytical discussions about the key issues. Active participation during classes, discussions, assignments, and hikes is expected. Participation will be evaluated by looking at students' attention during classes, appropriate and timely questions and comments, contribution to teamwork and respectful behavior.

Grading Scheme

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.

> *"SFS does not tolerate cheating or plagiarism in any form. While participating in an SFS program, students are expected to refrain from cheating, plagiarism and any other behavior which would result in a student receiving credit for work which they did not accomplish on their own. Students are expected to report any instance of cheating or plagiarism by others."*

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; extensions will only be considered under extreme circumstances. Late assignments will incur a penalty of 10% of your grade for each day you are late. After two days past the deadline, assignments will no longer be accepted. 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 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.

AI Usage in 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: Lectures, **FL:** Field Lecture, **FW:** Fieldwork, **EX:** Exams, **REV:** Review, **FLAB:** Field Lab, **WS:** Workshop, **GL:** Guest lecture
*Readings in **Bold** are required.

Code	*Titles of Lectures /Field Exercises*	*Time (hrs.)*	*Type*	*Readings*
01	**Course Overview** Begin to discover Australia's natural assets, ecological patterns, and processes.	1.0	L	Attiwill & Wilson (2006).
02	**Landscapes of the Atherton Tablelands** A tour of 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 value their forests and how they are trying to restore them.	4.5	FL; Video	**Haberle, S. (2005).** Stephensons, P.J. (1989).
03	**Biomes 1: The Tropical Rainforest** Identify the main factors that determine the occurrence of a rainforest. You will learn how to recognize and classify this important biome and learn about its relevance.	2.0	L	**Bowman, D.M. (2000).** Richards, P. W. (1952). Tracey, J. G. (1982). Adam, P. (1992).
04	**Fauna of rainforests and freshwater ecosystems of the Wet Tropics** We will talk about the lives of some faunal elements of the rainforest and water streams around you. You will also be introduced to the preservation of invertebrate specimen which will be part of one of your assignments.	5.0	L, FLAB; WS	**Ramsey, D. (2005).** Select topic articles
05	**Socio-cultural elements of tropical rainforests - Malanda field trip** Using the township of Malanda as a case study, we will experience first-hand the effects of human land-use on rainforests of the area, gain an understanding of the Rainforest Aboriginal Ngadjon-Jii people, and learn how changing socio-economics have shifted the focus from utilization of the land to habitat restoration.	4.0	FL	Pannell and Johnson (2006).
06	**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 species co-existence.	1.0	L	Select topic articles

Code	Titles of Lectures /Field Exercises	Time (hrs.)	Type	Readings
07	**Biomes 2: Wetlands and Mangroves** We will explore what is considered freshwater and coastal wetlands 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, (2010).** **Mcleod, et al. (2011).**
08	**Biomes 3: Dry forests and Savanna** Let's talk about fire: you will navigate on one of the most widespread biomes 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 its biodiversity neglected.	2.0	L	**Skarpe (1992).** **Sunderland, Apgaua, et al. (2015).**
09	**Meet the early birds** An introduction on how to best familiarize yourself with an unknown bird fauna.	2.0	FL	Various Field Guides to Birds of the Wet Tropics
10	**Biomes 4: Marine Biomes and wildlife** An overview of marine biomes and marine diversity. This session will be an introduction for your excursion to an offshore island in the Great Barrier Reef.	1.0	GL	**Castro & Huber (2016).** Hayden, Ray, & Dolan (1984).
11	**Documenting biodiversity** You will be given your iNat assignment	1.0	L	**Callaghan, et al. (2021).** **Mesaglio & Callaghan, (2021).**
12	**Spotlighting & Lightsheeting** Gain an appreciation of the diversity of nocturnal life in the Wet Tropics	3.0	FW	Richardson (2016). Lindenmayer et al. (2001). Underwood, Derhé, and Jacups (2022).
13	**Scientific method & designing ecol. studies** How to plan and design an ecological study and the main techniques used in this field.	2.0	L/WS	**Kent, M. (2011).** Ellenberg & Mueller-Dombois (1974). Elzinga et al. (2001).
14	**Field Exercises** These exercises are designed to give you practical experience in ecological field studies.	10.0	L/FL/FW	Ellenberg & Mueller-Dombois (1974). Elzinga et al. (2001). Kent (2011).
15	**Make sense of your data** It is time to understand how to analyze your data. You will learn about some necessary steps to make sense of your data, since the data exploration until more refined analysis to test your hypotheses like GLM, LM and NMDS.	2.0	L/WS	**Zuur, Ieno, & Elphick (2010).** Chatfield (1998).
16	**Invasive species** You will learn about the concept of invasive species and how and why species become	1.0	L	**Colautti & MacIsaac (2004).** **Didham et al. (2005).**

Code	Titles of Lectures /Field Exercises	Time (hrs.)	Type	Readings
	invasive. You will learn to think critically about whether this issue is the cause or the consequence of a bigger problem, and how the international community is responding.			
17	**Climate change & anthropogenic impacts** Understanding climate change has become crucial for critical thinking about a more sustainable future. Understand the causes of anthropogenic climate change and its consequences on natural environments.	2.0	L	Rahmstorf et al. (2007). Thuiller (2007). Swain et al. (2020).
18	**Coastal Ecosystems and Reef Ecology** During this offshore island excursion, we will explore the ecology of the reef and adjacent ecosystems.	7.5	Excursion	**Cheal et al. (2012).** **Georgiou et al. (2015).** **Jones et al. (2018).** Wooldridge and Brodie (2017). Turton (2019).
19	**Fauna ID quiz** Utilize your acquired knowledge, observations and provided ID resources as prep!	2.0	EX	Hyland, et al. (2010). Jackes (2001).
20	**Reversing Fragmentation: Theory and Practice** 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. We will explore the factors which determine how organisms respond to fragmented landscapes and how to mitigate the effects of fragmentation.	3.0	L + FL	**Soule, et al. (2004).** Jones et al. (2011). Goosem et al. (2005). Pascual-Hortal and Saura (2006). Villard-Metzger (2014). Cattarino et al. (2016). Zeller et al. (2012).
21	**Exam Review** Consult your faculty during exam preparation.	2.0	REV	Notes will be provided
	TOTAL	**60**		

Reading List

*Readings in **Bold** are required

1. Adam, P. (1992). Australian rainforests. Oxford University Press.
2. Attiwill & Wilson (2006). Ecology. An Australian Perspective. (2nd ed). Oxford University Press.
3. Attiwill, P. and Wilson, B. (2006).
4. **Bowman, D.M.J.S. (2000).** Australian rainforests: islands of green in a land of fire. Cambridge University Press. (Selected chapters)
5. **Callaghan, C. T., et al. (2021).** Three frontiers for the future of biodiversity research using citizen science data. BioScience, 71, 55-63.
6. **Castro & Huber (2016).** Marine Biology. (10th ed.). McGraw-Hill Education. (Selected chapters)
7. Chatfield, C. (1998). Problem Solving: A Statistician's Guide. Chapman & Hall, BocaRaton, FL.
8. **Colautti, R. I., & MacIsaac, H. J. (2004).** A neutral terminology to define 'invasive' species. Diversity and Distributions, 10, 135-141.
9. **Didham, R. K., et al. (2005).** Are invasive species the drivers of ecological change?. Trends in ecology & evolution, 20, 470-474.
10. Ellenberg, D., & Mueller-Dombois, D. (1974). Aims and methods of vegetation ecology. New York: Wiley.
11. Ellenberg, D., & Mueller-Dombois, D. (1974). Aims and methods of vegetation ecology. New York: Wiley.
12. Elzinga et al. (2001). Monitoring plant and animal populations. Blackwell Science, Inc.
13. Elzinga et al. (2001). Monitoring plant and animal populations. Blackwell Science, Inc.
14. **Haberle, S. (2005).** A 23,000-yr pollen record from Lake Euramoo, wet tropics of NE Queensland, Australia. Quaternary Research, 64, 343-356.
15. Hayden, B. P., Ray, G. C., & Dolan, R. (1984). Classification of coastal and marine environments. Environmental Conservation, 11, 199-207.
16. Heise-Pavlov et al. (2011).
17. Hyland, B.P.M., et al. (2010). Australian tropical rainforest plants. Trees, shrubs and vines. Version, 6.
18. Jackes, B.R. (2001). Plants of the tropics : rainforest to heath ; an identification guide. Townsville, Qld: James Cook University, School of Tropical Biology.
19. **Keddy, P.A. (2010).** Wetland ecology: principles and conservation (2nd ed.). New York: Cambridge University Press.
20. Kent, M. (2011). Vegetation description and data analysis: a practical approach. John Wiley & Sons. (Selected chapters)
21. **Kent, M. (2011).** Vegetation description and data analysis: a practical approach. John Wiley & Sons.
22. **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, 552-560.
23. **Mesaglio, T., & Callaghan, C. T. (2021).** An overview of the history, current contributions and future outlook of iNaturalist in Australia. Wildlife Research.
24. Richards, P. W. (1952). The tropical rain forest. The tropical rain forest: an ecological study. Cambridge University Press.
25. Richardson, B. (2016). Tropical Queensland Wildlife from Dusk to Dawn
26. **Skarpe, C. (1992).** Dynamics of savanna ecosystems. Journal of Vegetation Science, 3, 293-300.
27. **Soule, M.E. et al. (2004).** The role of connectivity in Australian conservation.- Pacific Conservation Biology 10: 266-279. CRS Library JPCB104
28. Stephensons, P.J. (1989). Rocks and Landscapes of the Cairns District.- Qld Dept. of Mines – CRS Library ECO081;
29. **Sunderland, T., Apgaua, D., et al. (2015).** Global dry forests: a prologue. International Forestry Review, 17, 1-9.
30. Tracey, J. G. (1982). Vegetation of the humid tropical region of north Queensland. CSIRO, Melbourne.
31. Underwood, A.H., Derhé, M.A. and Jacups, S. (2022). Thermal imaging outshines spotlighting for detecting cryptic, nocturnal mammals in tropical rainforests. Wildlife Research, 49(6), pp.491-499.
32. **Zuur, A. F., Ieno, E. N., & Elphick, C. S. (2010).** A protocol for data exploration to avoid common statistical problems. Methods in ecology and evolution, 1(1), 3-14.

Select topical readings:

1. Alamgir et al. (2018).
2. Attiwill, P. and Wilson, B. (2006).
3. Cattarino et al. (2016).
4. Cheal et al. (2012).
5. Ellenberg, D., & Mueller-Dombois, D. (1974). (duplicate of #13, likely same required reading)
6. Elzinga et al. (2001). (duplicate of #15, likely same required reading)
7. Freeman and Freeman (2009).
8. Frith and Frith (1990).
9. Georgiou et al. (2015).
10. Goosem et al. (2005).
11. Gordon et al. (2010).
12. Graham et al. (2010).
13. Heise-Pavlov et al. (2011).
14. Jones et al. (2011).
15. Jones et al. (2018).
16. Kenyon et al. (2016).
17. Kiley et al. (2019).
18. Kitching et al. (2007).
19. Kitching et al. (2023).
20. Lawes et al. (2017).
21. Lindenmayer et al. (2001).
22. Pannell and Johnson (2006).
23. Pascual-Hortal and Saura (2006).
24. Pearson et al. (2015).
25. Pearson et al. (2015). (duplicate)
26. Pepper et al. (2018).
27. Pettit et al. (2016).
28. Rahmstorf, S., et al. (2007).
29. Ramsey, D. (2005).
30. Sekercioglu (2006).
31. Swain, D. L., et al. (2020).
32. Thuiller, W. (2007).
33. Tingley et al. (2014).
34. Turton (2019).
35. Vernes et al. (2005).
36. Vernes et al. (2005). (duplicate)
37. Villard-Metzger (2014).
38. Wooldridge and Brodie (2017).
39. Yeates and Monteith (2008).
40. Zavaleta et al. (2009).
41. Zeller et al. (2012).