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Rainforest, Reef, and Cultural Ecology Seminar

ENVI-3000 (6 credits)

Australia: Rainforest, Reef, and Cultural Ecology

This syllabus is representative of a typical semester. Because courses develop and change over time to take advantage of unique learning opportunities, actual course content varies from semester to semester.

Course Description

The goal of the Rainforest, Reef and Cultural Ecology seminar is to introduce students to the natural and cultural values of the globally significant bioregions of Far North Queensland: the Wet Tropics and Great Barrier Reef World Heritage Areas. Through lectures and numerous field excursions to ecologically significant sites, we emphasize an understanding of key ecological patterns and processes involved in the evolution and biogeography of the region's diverse biota, and search for common principles that can be applied at the local, landscape and global scale. The course also analyzes the long-term protection and conservation strategies for the region's living resource base by considering Aboriginal and non- Aboriginal relationships to the land and sea country of the region. In addition, a wider range of topics, including human ecology, ecological economics, and politics enable students to acquire a broader understanding of the relationships between human actions and natural systems in Far North Queensland, in particular, and Australia in general.

The Rainforest, Reef, and Cultural Ecology Seminar (RRCES) is presented in close association with the Environmental Field Study Seminar (EFSS). The RRCES seminar provides students with access to a wide range of professionals, environments, and learning resources both in a classroom and field setting. It also provides traditional and field-based learning, and challenges students to synthesize observations from fieldwork with readings and lectures, and to use creativity and curiosity to question assumptions and generate original ideas. The themes of rainforest, coral reef, and cultural ecology are investigated in depth during three, week to ten day-long modules in the field, as well as during a week- long orientation trip and lectures at our home base in Cairns.

Learning Outcomes

Upon completion of the course, students will be able to:

- Summarize the important historical and contemporary ecological patterns and processes affecting the ecology of north Queensland's terrestrial and marine habitats and biota.

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- Explain the conservation implications of natural and anthropogenic disturbance regimes to Australian ecosystems in general and coral reefs, rainforest, and sclerophyll forest systems.
- Discuss World Heritage listings as a conservation tool, and critically assess the strengths and weaknesses of the World Heritage concept as a means to protect natural and cultural assets of universal value to humanity.
- Demonstrate the roles that Aboriginals and non-Aboriginal Australians can play in the conservation and management of the Wet Tropics and the Great Barrier Reef World Heritage Areas.
- Operate responsibly, safely, objectively, and with ecological sensitivity in relation to natural environments.
- Apply an analysis of ecological, political, and economic considerations to critically evaluate the conflicts associated with conservation of biological diversity.
- Construct questions that promote inquiry and facilitate independent study.
- Integrate the content of formal lectures with current events, readings, and field experiences through written assignments and discussions.

Language of Instruction
This course is taught in English.

Course Schedule

**Please be aware that topics and excursions may vary to take advantage of any emerging events, to accommodate changes in our lecturers' availability, and to respect any changes that would affect student safety. Students will be notified if this occurs*

Introduction to Natural and Human Systems: Cairns, Port Douglas, The Daintree and Mossman (15 contact hours)
This module provides a background to the field-based approach to integrating the topics of rainforest, reef and cultural ecology by focusing on each of these topics in the Cairns region. After a brief introduction to the logistics and rationale of the course in Cairns, we leave on a series of day excursions and visit several sites which introduce the natural and human systems in the region. We focus our field trip in the watershed of the Barron River to introduce the concept of Integrated Catchment Management as a practical approach for illustrating the fundamental ecological connections between the globally significant terrestrial and marine systems within which the program operates. We also investigate the human communities found within the catchment and investigate how livelihoods may affect the rainforest and reef. Field excursions to local sites, national parks, Aboriginal tourism enterprises, and a day excursion to coral reefs, set the stage for the main themes of the program which are investigated in greater detail in the subsequent portions of the course.

Sample lecture: 'The Wet Tropics Bioregion: Geological History and the Making of a Biodiversity Hotspot.'

Assignments: Field Project Workbook – Port Douglas to Yungaburra landscape transect analysis. Orientation excursion quiz.

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Australia's Biota and Human-Environment Interaction (20 contact hours)
Sessions in Cairns focus on building a knowledge base on the Australian environment and biota, as well as understanding local and national economic and political systems. We investigate the context and unique aspects of the evolution of Australia's biota and investigate how Australia's environment has shaped human communities both pre- and post- arrival of Europeans. Lectures emphasize the history of Australia and the wet tropics bioregion from a biophysical and human perspective and help to provide the basis for telling the story of how Australia came to be. Particular emphasis on the conservation of the Wet Tropics and Great Barrier Reef World Heritage Areas and their significance to the ecology and economies of Queensland are emphasized. We also look to understand how Australians can work to combat environmental degradation in an ecologically fragile country, in hopes of preserving Australia's natural heritage in perpetuity. Field excursions to the Cairns Botanic Gardens help to illustrate concepts from the classroom.

Sample lectures: 'Introduction to Tropical Rainforests I Structure and Introduction to Tropical Rainforests II Function', 'Disturbance Ecology in the Wet Tropics'.

Required readings:
WTMA State of Wet Tropics Report 2024-25

Legge, S., Rumpff, L., Garnett, S. T., & Woinarski, J. C. (2023). Loss of terrestrial biodiversity in Australia: magnitude, causation, and response. *Science*, *381*(6658), 622-631.

Williams, S. E., & de la Fuente, A. (2021). Long-term changes in populations of rainforest birds in the Australia Wet Tropics bioregion: A climate-driven biodiversity emergency. *PLoS One*, *16*(12), e0254307.

Assignments: Flora and Fauna Expertise research for rainforest module,

Cultural Ecology Field Module (16 contact hours)
This module is undertaken on a week-long camping trip in which students travel to remote bushland with Aboriginal guides. The camping trip deeply immerses students in the outdoors in order to allow them to better experience an Aboriginal perspective toward Australia's natural resources, history, culture, and contemporary social and environmental problems. Aboriginal culture was a spoken culture of stories, and so students' learning is based on the principles of close observation, discussions, and firsthand experience, in order to acquire a better understanding of the First Australians' intimate understanding of ecology, environmental management, and Aboriginal cultural conservation and restoration. There is also a strong focus on the value of indigenous knowledge systems from an ecological and ethnobotany perspective. Students are asked to contrast these learning with indigenous groups from their home environment. These issues are of extreme importance, as government conservation authorities and agencies have placed increased importance on Aboriginal involvement in managing the naturals systems of the Wet Tropics and Great Barrier Reef World Heritage Areas.

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Sample lecture: Views of Colonisation of the Australian Continent.', 'Rainforest Ethnobotany of North Queensland.', 'Local Aboriginal history and context.'

Required reading:
Aboriginal and Torres Strait Islander Peoples' voices and engagement in the Intergovernmental Panel on Climate Change.

Assignment: Indigenous Quiz, field trip workbook.

Rainforest Field Module (23 contact hours)
Background lectures in Cairns provide the basis for a 10-day long field module entitled "Exploring the Wet Tropics Bioregion: A Landscape Ecology Perspective". Each day a variety of field sites are visited to assess biodiversity and site characteristics. Observations made on these visits are coupled with emphasizing key points related to the ecology and evolution of Australian rainforests in the global context, the importance of plant-animal adaptations and interactions to understanding the patterns and processes of rainforests in general and the Wet Tropics in particular. Ecosystem structural and functional attributes are emphasised as a basis for understanding the speciation processes and biogeography of the Wet Tropics as well as the dynamic environment which has led to a diversity of structural forest types at the sites visited. Discussions and field lectures provide an integrated approach to understanding the ecology of the region from a landscape perspective and inevitably lead to investigating the important principles justifying rainforest conservation and sustainable management. The importance of land management systems and practices to the health of the aquatic and marine systems in the region is also emphasized.

Sample lecture: 'Implementing rainforest restoration to combat habitat fragmentation: case study of Lakes Corridor', 'The impacts of climate change on rainforest ecology- flora and fauna', 'The Ecology of Eucalypts: Evolution and Ecosystem Function in Australia'.

Required reading:
Exploring the Wet Tropics Bioregion: a landscape ecology perspective. SIT Cairns, Australia.

Assignments: Flora and Fauna expertise; Rainforest excursion quiz, Paper presentations and critique.

Coral Reef Ecology Field Module (19 contact hours)
The Great Barrier Reef is considered one of the natural wonders of the world. The coral reef ecology module investigates the evolution, ecology, management, and threats to the reef over the course of a 10-day field visit to Lizard Island Research Station. Daily lectures on understanding the Great Barrier Reef within the local and global context of coral reefs complement students' field work to assess reef types and habitat features found at Lizard Island. An overall understanding of the importance of this living system to global biodiversity and marine resources conservation is considered paramount to students understanding of coral reefs as a globally threatened ecosystem. The complex and multiple drivers of reef degrading processes are investigated within management contexts of the social and political systems of Australia and other countries with coral reef systems.

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Sample lectures: ‘The Ecology of Coral Reefs’, ‘How a changing environment impacts marine species interactions.’

Required reading:
Richardson, L. E., Graham, N. A., Pratchett, M. S., Eurich, J. G., & Hoey, A. S. (2018). Mass coral bleaching causes biotic homogenization of reef fish assemblages. *Global Change Biology*, *24*(7), 3117-3129.

Cinner, J. E., Huchery, C., MacNeil, M. A., Graham, N. A., McClanahan, T. R., Maina, J., ... & Mouillot, D. (2016). Bright spots among the world’s coral reefs. *Nature*, *535*(7612), 416-419.

Assignments: Marine field project, Marine ecology quiz.

Cairns - Synthesis of Seminar (4 contact hours)
Our time in Cairns focuses on summarizing the information presented in the seminars and assessing the applications and transferability of course principles to ecological and cultural settings beyond north Queensland.

Final Exam - covering material from lectures, readings and field trips from weeks 1 through 9.

Instructional Methods
This course is designed around the principle that learning is an active, holistic process that extends well beyond the classroom. Seminars introduce key concepts and interpretive frameworks that are then examined, complicated, and enriched through direct engagement with people, places, and contexts — field visits, expert briefings, guided observation, and community-based learning. Field-based learning is integrated into course design rather than treated as enrichment: faculty prepare students for each engagement, guide interpretation on location, and facilitate the reflection that connects experience to course themes. Students move through cycles of experience, observation, and analysis, progressively taking greater ownership of their own inquiry. This process is not always linear, and that is by design — developing the capacity to learn from unpredictable, context-dependent situations is itself a transferable skill and a foundation for lifelong learning.

Assignments and Evaluation

Assignment Descriptions and Grading Criteria

Field Trip Workbook

The field trip workbook consists of formal question sheets associated with each field excursion. These act as records of the excursions and will assist students in remembering places and their significance. The questions are designed to instigate analytical thinking about observations in the field, presenters, and readings.

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Flora and Fauna Expertise

Prior to the rainforest field trip, students are required to research and present the natural history of two plant taxa and two animal taxa to their peers. Through this activity, each student will develop expertise in the biology, ecology, ecological significance, human uses, conservation status, and management of their assigned species. Students are expected to share this knowledge with the group, thereby contributing to the collective understanding of the biodiversity encountered during the field course.

Paper presentation and critique

Student groups will be assigned one scientific paper to critically review and present to the class. In addition to being assessed on the quality of their presentation, students will also be evaluated on their participation in the discussion by asking informed questions of other groups about their assigned papers. Consequently, students are expected to read and critically engage with all four papers examining the impacts of climate change on rainforest taxa in preparation for this assessment.

Quizzes

There are four quizzes during the program on important material most recently covered in the program.

Exam

One final exam is given before the beginning of the ISP. The exam covers all the lectures, visits, and topics discussed during the program.

A full description of the expectations and assessment guidelines for each of these assignments can be found on Canvas.

<u>Assessment:</u>

Four quizzes on covered material - 20%

Flora and Fauna presentations - 15%

Field trip workbook - 15%

Paper presentation and critique - 10%

ANOVA assignment - 15%

Final exam - 25%

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Attendance and Participation

Participation is assessed based on consistent, informed engagement in class sessions, simulation activities, and experiential learning. This includes preparation for discussions, constructive collaboration within teams, responsiveness during simulations, and professional conduct during site visits and guest engagements. Students are expected to contribute thoughtfully, listen actively, and engage respectfully with peers and external partners throughout the course.

Consistent participation in classes, site visits, and required program activities is essential to the academic experience. Students are expected to participate fully and may not opt out of required components, as these activities are integral to course learning and collective discussion. If circumstances such as illness affect attendance, students must communicate promptly with the Program/Academic/Center Director or a designated staff member. Absences may affect academic performance and course grades, and repeated or unexcused absences may result in additional academic or programmatic consequences. When absences are unavoidable, alternative academic work may be required.

Late Assignments

Because this program integrates classroom learning with site visits and debriefs, assignments are designed to build on one another and connect directly to learning on location. *Timely submission is therefore important for maintaining continuity and full participation in the academic experience*. Extensions may be granted *in limited circumstances and on a case-by-case basis* with approval from the Center/Academic/Program Director or a designated staff member. Requests should be made in writing as early as possible and no later than 12 hours before the posted due date. Students are expected to communicate proactively if challenges arise. Work submitted after an approved extension period may receive a reduced or failing grade, depending on the circumstances.

Grading Scale

94-100%	A
90-93%	A-
87-89%	B+
84-86%	B
80-83%	B-
77-79%	C+
74-76%	C
70-73%	C-
67-69%	D+
64-66%	D
below 64	F

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Program Expectations
To support a respectful, engaging, and academically rigorous learning environment, students are expected to approach this program with professionalism, preparation, and openness. Because this is an intensive, field-based program, individual conduct directly shapes the quality of the shared academic experience.

- Attendance in all aspects of the scheduled program is mandatory. Failure to attend and participate in program components is grounds for probation and/or dismissal from the program.

- Show up prepared. The seminar is based on group learning so you must participate fully. Be on time for all lectures, workshops and field trips. There are many long days so you must be well rested and have a clear head and have your readings completed and points in mind for discussion or clarification. Reading and observation will be tested regularly with quizzes.

- Complete assignments on time. Assignments are due by 5pm unless otherwise instructed. Assignments are docked 5% for each day or part of a day that they are late. Contact the Academic Director in advance if health or other issues prevent you from submitting an assignment on time. All assignments must be completed to get a passing grade. Graded assignments will be returned within two weeks of submission.

- The whole time we are on field trips we are in class. You are expected to act appropriately, including refraining from using mobile phones etc. You are also not allowed to drink alcohol on field trips until we are finished class for the day.

- Comply with academic integrity policies (no plagiarism or cheating, nothing unethical).

- Respect differences of opinion (classmates', lecturers, local constituents engaged with on the visits). You are not expected to agree with everything you hear, but you are expected to listen across difference and consider other perspectives with respect.

SIT Policies and Resources

Please refer to the SIT Study Abroad Handbook and the Policies section of the SIT website for all academic and student affairs policies. Students are accountable for complying with all published policies. Of particular relevance to this course are the policies regarding: academic integrity, Family Educational Rights and Privacy Act (FERPA), research and ethics in field study and internships, late assignments, academic status, academic appeals, diversity and disability, sexual harassment and misconduct, and the student code of conduct.

Credit Hours: School for International Training (SIT) adheres to the standard that 1 credit hour equals no less than 45 hours of coursework. The calculation is based on the standard 50-minute academic hour. The number of credits each course carries determines how many total hours each course involves in a semester. Of the 45-hours for 1-credit hour, one third is designated for direct faculty instruction. Direct faculty instruction includes all learning activities

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led by the faculty whether in the classroom or in the field — lectures, guest speakers, site visits, hands-on field activities, etc.
The full policy on credit hours can be found here.

AI Usage: SIT's policy on Generative AI and Academic Programs is included as an addendum to the academic integrity policy.

Please refer to the SIT Study Abroad Handbook and SIT website for information on important resources and services provided through our central administration in Vermont, such as Library resources and research support, Accessibility Services, Counseling Services, Title IX information, and Equity, Diversity, and Inclusion resources.

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