

## **Culture and Ecology of the Oceans: Islands, Reefs and Mangroves**

Fall Semester, 2021

### Course Description

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The oceans and coastal ecosystems are some of the most important and critically threatened ecosystems on the planet. This course examines coastal and island communities as well as the near shore ecologies that they are embedded within — mangroves, sea grasses, coral reefs, as the surrounding ocean. Fishing — both small scale artisanal fishing and larger commercial enterprises — shape the communities as well as the ecosystems on which they depend. Multiple competing stakeholders and overlapping and transient resources make this a complex topic to study. All of this is happening in the broader context of climate change, ocean acidification, and rising sea levels.

In Southern Thailand coastal communities are working to conserve their traditional fishing practices through mangrove, reef, and seagrass conservation and restoration. This area, composed of extensive mangroves, beaches, reefs, islands, and rubber plantations, is under increasing pressure from the expansion of shrimp farms, commercial fishing, tourism, and the impact of climate change. The communities in Southern Thailand are also distinctive in that many are primarily Muslim, a minority group in predominantly Buddhist Thailand, facing both religious and ethnic discrimination.

By the end of the course students will understand the key issues in resource conservation and restoration in tropical coastal and islands ecosystems, the function and interrelationships between coral reefs, seagrass and mangroves, the role and limitations of both state and community management, and the broader challenges facing coastal communities in the context of climate change.

### Course Objectives

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The objectives for this course are to:

- Understand the key issues and challenges to ocean and coastal ecosystems
- Have specific knowledge about field research and experiential studies of reefs, seagrasses and mangroves
- Understand the sociopolitical dynamics of resource management in Southern Thailand
- Understand the ecological context and constraints on fishing and resource use in Southern Thailand
- Be competent in both biological and social field research methods
- Understand the struggles of marginalized communities in Southern Thailand that depend on the oceans for their livelihood
- Be able to articulate the key challenges facing coastal and island communities in Southeast Asia and how it applies to global issues and climate change

### Methodology

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The course will integrate course lectures and readings with group discussions and seminars. Experiential field studies will be an important component of the course, both formal and informal. Guest lecturers will be a part of the course to share their experiences and perspective with students. Keeping up with readings, materials presented in class, and assignments is critical for success during this course.

## Grading and Assessment

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Course Component Details	Total
<b>Participation</b>	
<b>In class participation:</b> This means being an active participant in classes, contributing meaningfully to the discussions, questions, and ongoing learning.	5
<b>Projects:</b> Throughout the class participating in a meaningful way in projects and assignments in-class.	5
<b>Field Studies:</b> Participating in field studies outside of the classroom, both through asking questions in the field, engaging in activities, and being an active and engaged learner during field studies.	5
<b>Total Participation</b>	<b>15</b>
<b>Writing</b>	
<b>Journal/Notes:</b> An important component of learning to observe and analyze the issues during this course is taking notes in class as well as keeping an on-going journal of observations outside the classroom. This means writing daily in your journal, even if only for brief or significant observations.	10
<b>Experiential Learning Workbook:</b> A more structured way of taking notes and learning outside the classroom, ELWs will be assigned to specific field studies and experiential learning opportunities.	15
<b>Essays:</b> For this course essays are longer reflections and analysis. There are four (4) essays during the course, generally one each week. Essays should be 4-5 pages long in your journal, and cover the following points: <ul style="list-style-type: none"> <li>• How this issue or topic links to the overall topic of the course.</li> <li>• Why you are interested in this specific issue or topic.</li> <li>• An analysis of a specific issue observed or learned about during that week — describe this and why it is important.</li> <li>• Reference to a reading either from the course reader or outside sources.</li> <li>• Other questions that this issue raises for you to explore further.</li> </ul>	20
<b>Total writing</b>	<b>45</b>
<b>Independent Research Project/Focused Inquiry</b>	
<p>Each student will choose an issue related to the course to study independently. This should be a combination of research, observations, and analysis of a topic that the student is interested in. The <b>emphasis is primarily on field observations</b> broadly defined, drawing on both class related field studies as well as independent observations in Thailand on your own time. This is not a book report or literature review, but a field study.</p>	
<b>Proposal:</b> The IRP proposal will be a written outline and a short presentation to the class explaining a statement of intent, how data will be gathered, the feasibility of studying this during the course, and any potential challenges you may anticipate running into.	10
<b>Progress update:</b> This part of the IRP is a short update during the course (both an outline and a presentation) on what the student has discovered about their topic so far, what further questions this raises, any challenges they have faced and how they have overcome them, as well as further information they will be looking for during the second half of the field study.	10

Course Component Details	Total
<p><b>Final Presentation:</b> On the last day of the course each student will give a presentation on their topic, focusing on the initial question, methods, challenges, and the outcome of their focused inquiry. This should be presented with supporting slides. This will be followed by questions and comments from fellow students and instructors.</p> <p><b>Rubric for final presentation</b></p> <ol style="list-style-type: none"> <li>1. Clarity and organization — is the issue clearly explained, linked to the topic and readings of the course, and well organized?</li> <li>2. Experiential learning/field studies/observations — does the presentation link to specific examples of observations?</li> <li>3. Interviews — does the presentation reflect discussions, interviews, and talks with local people and community members?</li> <li>4. Depth — is the issue analyzed and explained well and thoroughly?</li> </ol>	20
<b>Total Independent Research Project</b>	<b>40</b>

## Seminar Week Topics and Schedule

Readings are in the course reader. The readings are a resource for the seminars, field studies, and for your final presentation. There are a lot of readings the first week, which you will refer to later on during the field section of the course. **Be strategic in your reading** so that you focus on new materials and information, and then go back and dive deeper into the readings as needed.

### Monday — October 25

#### Ecosystem and Environmental Overview

Levinton, Jeffrey, *Marine Biology: Function, Biodiversity, Ecology*, Oxford University Press, New York, 2018.

- Glossary
- Chapter 2: The Oceanic Environment, pp. 12-32.
- Chapter 3: Climate Oscillations and Climate Change, pp. 33-45.
- Chapter 4: Ecological and Evolutionary Principles of Marine Biology, pp. 46-73.

Barbier, E.B. et al., "The value of estuarine and coastal ecosystem services," *Ecological Monographs*, Vol 81(2):169-193, 2011

### Tuesday — October 26

#### Threats to Marine Ecosystems—Climate Change and Pollution

Bijma, J. Portner, H.O., Yesson, C., & Rogers, A.D., "Climate change and the oceans—What does the future hold?," *Marine Pollution Bulletin*, vol. 74, pp. 495-505, 2013.

Kelsey, Richardson, et al., "Understanding causes of gear loss provides a sound basis for fisheries management," *Marine Policy*, Vol: 96 (2018), pp 278-284, 2018.

### Wednesday — October 27

#### Threats to Marine Ecosystems— Over-harvesting and Illegal fishing

Pitcher, Tony J., & WL Cheung. "Fisheries: Hope or despair?," *Marine Pollution Bulletin*, Vol. 74.2: 506-516, 2013.

Maribus, "The cause of overfishing" in *World Ocean Reviews: Living with the Ocean 1*, Maribus, Hamburg, 2010. pp.126-135.

Maribus, "Illegal fishing" in *World Ocean Reviews: Living with the Ocean 2*. Maribus, Hamburg, 2013. pp.70-77.

### Thursday — October 28

#### Resource Management—Ecological Aspects and Governance

Maribus, "On the difficulty of governing the sea" in "*World Ocean Reviews: Living with the Ocean 4*, Maribus, Hamburg, 2015. pp.76-94.

Maribus, "Towards better fisheries management" in *World Ocean Reviews: Living with the Ocean 2*. Maribus, Hamburg, 2013. pp.108-120.

Lester, S.E., et al., "Biological effects within no-take marine reserves: a global synthesis." *Marine Ecology Progress Series*, Vol 384:33-46, 2009.

**Friday – October 29**

**Resource Management - Coastal livelihood approach, and Impacts of the Covid-19 pandemic on the fisheries and livelihood**

Allison, E.H. & F. Ellis. "The livelihoods approach and management of small-scale fisheries." *Marine Policy*, Vol 25: 377-388, 2001.

Chanrachakij C. et.al., "Severity of the Impacts of COVID-19 Pandemic on Small-scale Fisheries of Thailand: A Preliminary Assessment," *Fish for the People*. Vol.18 No.2: 2020, pp. 43-47.

Reid, Hannah, "Ecosystem-and community-based adaptation; learning from community-based natural resources management," *Climate and Development*, 8:1, 4-9, 2015.

ESSAY #1 DUE

IRP PROPOSAL DUE

## Field Schedule

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Due to the inherent unpredictability of the marine/ocean environment, the schedule for this field expedition has to be flexible. (For example, mudflat studies need to take place during low tides, etc.) Daily activities will be decided on in advance based on the tides, wind, waves, currents, and weather conditions.

The following readings are in the reader and will be helpful for your time in the field. You should also review the readings for seminar week, as it forms the basis for the overall course and your understanding of the complex inter-related ecosystems of the coast.

### Field Readings

- Levinton, Jeffrey, *Marine Biology: Function, Biodiversity, Ecology*, Oxford University Press, New York, 2018.
- Chapter 16: The Tidelands: Rocky Shores, Soft-Substratum Shores, Marshes, Mangroves, Estuaries, and Oyster Reefs, pp. 317-364
  - Chapter 17: The Shallow Coastal Subtidal: Sea Grass Beds, Rocky Reefs, Kelp Forests, and Coral Reefs, pp. 365-408.
  - Chapter 21: Fisheries and Food from the Sea, pp. 471-503.
- PEMSEA and Department of Marine and Coastal Resources (DMCR, Thailand). 2019. "National State of Oceans and Coasts 2018: Blue Economy Growth of Thailand," Partnerships in Environmental Management for the Seas of East Asia (PEMSEA), Quezon City, Philippines.
- Prasertcharoensuk, Ravadee, et al. "Time for a Sea Change: a Study of the Effectiveness of Biodiversity Conservation Measures and Marine Protected Areas Along Southern Thailand's Andaman Sea Coastline." (2010). p. 22-70
- Bennet, Nathan James, Philip Dearden, Ana Maria Peredo. "Vulnerability to multiple stressors in coastal communities: a study of the Andaman coast of Thailand." *Climate and Development*, 2014: (1-18).
- Sudtongkong, Chanyut and Webb L. Edward. "Outcomes of State vs. Community-Base Mangrove Management in Southern Thailand" *Ecology and Society*, 13(2):27.2008.
- Bennet, Nathan James, Philip Dearden. "Why local people do not support conservation: Community Perceptions of marine protected area livelihood impacts, governance and management in Thailand." *Marine Policy*, 44 (2014): (107-116).

### Field Study Topics

The following topics and studies are an important part of the course. Depending on the conditions as well as availability of local partners (communities, national park staff, etc.) we may not be able to do all of these studies, but will do as many as is possible in the time allotted.

For the field studies, you will be using both your Experiential Learning Workbook (ELW) as well as your own field notes to record what you learn, questions to follow up on, and materials for your Independent Research Project (IRP).

- Community resource management of both marine and non-marine resources
- National parks and state resource management
- Community life, including cultural practices, religion, organization, and management
- Fishing, both commercial and small scale artisanal
- Marine environment
- Sea grass ecology and conservation
- Mangrove ecology and conservation
- Reef ecology and conservation
- Coastal ecology
- Fisheries management, both state management and local conservation and management

## Field Study Methods

In addition to the primary methods of observation and recording notes in your journal, there are several specific field study methods that will be critical to the success of this course and your understanding of the coastal and island ecosystems.

- **Animal and plant identification:** Learning how to identify fish, coral, and other organisms is a critical skill to develop so that you can complete the other field studies that are a part of the course.
- **Logging and recording the ocean/marine environment state:** This means recording the currents, waves, wind, tides, and other factors in the marine and coastal environment. All of your other observations take place within this context of changing waves, tides, etc., so learning how to accurately record this information is a critical skill.
- **Biodiversity survey:** The purpose of the biodiversity survey is to learn about all of the diversity of life (vertebrates, invertebrate, etc.) in a specific area. The goal is to understand the number of different species in the designated area. The goal is to identify as many different species as possible in the area.
- **Community study:** The purpose of a community study is to look in-depth at a specific area and note the species diversity as well as map the species within a bounded area. The goal is to identify and count the number of different species as well as the numbers of individuals of that species in the area.
- **Transect survey:** A transect is a survey along a line in a designated area. The purpose of the transect is to understand diversity, abundance, and distribution along the transect line. The goal is to map out along the line, noting scale/distance in total, as well as where individuals cross or are immediately adjacent to the transect.
- **Zonation survey:** The zonation survey is a transect along a gradient (e.g. salinity or water depth) to understand how species and diversity varies along the gradient in question. The goal is to map out along the line, noting scale/distance in total, as well as where individuals cross or are immediately adjacent to the transect.
- **Mangrove channel studies:** Three studies of the mangrove channels will be conducted — one at the mouth (opening to the sea), one mid-channel, and one where the mangrove is narrow. The goal of these studies is to understand how mangrove channels and their ecosystems vary based on tides, sun, channel width, etc.

**Daily Schedule**

While day-to-day activities will be determined by specific conditions, studies and activities will be announced in advance whenever possible. The following schedule is open for you to fill in as the course progresses, as well as to note important dates when papers and presentations are due.

<b>Day</b>	<b>Month</b>	<b>Day</b>	<b>Activity / assignments</b>
Sunday	October	31	Travel to the South
Monday	November	1	_____
Tuesday		2	_____
Wednesday		3	_____
Thursday		4	_____
Friday		5	Essay #2 due _____
Saturday		6	_____
Sunday		7	_____
Monday		8	Mid course seminar / IRP Progress update
Tuesday		9	_____
Wednesday		10	_____
Thursday		11	_____
Friday		12	Essay #3 due _____
Saturday		13	_____
Sunday		14	_____
Monday		15	_____
Tuesday		16	_____
Wednesday		17	Travel back to Chiang Mai
Thursday		18	Study day
Friday		19	Essay # 4 Due / IRP Final Presentations

## Course Policies

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### Attendance Policy

Students are expected to be on time and attend all classes. If you are ill or otherwise need to miss a class, please inform your instructor or teaching assistant.

### Academic Integrity

Academic integrity is essential to a positive teaching and learning environment. All students enrolled in ISDSI courses are expected to complete coursework responsibilities with fairness and honesty. Failure to do so by seeking unfair advantage over others or misrepresenting someone else's work as your own can result in disciplinary action.

### Scholastic Dishonesty

Scholastic dishonesty means plagiarizing; cheating on assignments or examinations; engaging in unauthorized collaboration on academic work; taking, acquiring, or using test materials without faculty permission; submitting false or incomplete records of academic achievement; acting alone or in cooperation with another to falsify records or to obtain dishonestly grades, honors, awards, or professional endorsement; altering forging, or misusing an academic record; or fabricating or falsifying data, research procedures, or data analysis. Within this course, a student responsible for scholastic dishonesty can be assigned a penalty up to and including an "F" or "N" for the course. If you have any questions regarding the expectations for a specific assignment or exam, ask.

### Grading Standards

Letter grade	Score or percentage	Description
A	93–100	Achievement that is outstanding relative to the level necessary to meet course requirements.
A-	90–92	Achievement that is significantly above the level necessary to meet course requirements.
B+	87–89	Achievement that is significantly above the level necessary to meet course requirements.
B	83–86	Achievement that is significantly above the level necessary to meet course requirements.
B-	80–82	Achievement that meets the course requirements in every respect.
C+	77–79	Achievement that meets the course requirements in every respect.
C	73–76	Achievement that meets the course requirements in every respect.
C-	70-72	Achievement that is worthy of credit even though it fails to meet fully the course requirements.
D+	67-69	Achievement that is worthy of credit even though it fails to meet fully the course requirements.
D	60-66	Achievement that is worthy of credit even though it fails to meet fully the course requirements.
F	0-59	Represents failure (or no credit) and signifies that the work was either (1) completed but at a level of achievement that is not worthy of credit or (2) was not completed and there was no agreement between the instructor and the student that the student would be awarded an Incomplete.