

## **Sustainable Food Systems: Social and Biological Factors in Sustainable Agriculture**

Spring Semester, 2023

Instructor: Neil Ransom, PhD

### Course Description

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This is an advanced course examining key issues in sustainable food production, with a special emphasis on field-based studies of organic polycultures. Perhaps one of the most challenging topics in sustainability studies, sustainable food systems are critical to creating a sustainable future. This course will look at agroecology, regenerative agriculture, study both lowland and upland agriculture as practiced in Thailand, and learning in the fields and gardens of farmers and villagers. This course will focus on Southeast Asian smallholder agriculture, with a special emphasis on organic farming and agroecology. Students will be learning about both the biology of sustainable agriculture as well as the social and political issues surrounding sustainable agriculture and current commercial food systems. Students will also explore the role of cash cropping in small-scale farming including a focus on coffee, cacao, and cannabis.

### Course Objectives

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The objectives for this course are to:

- Understand the major issues in sustainable food systems.
- Understand the major ecological, biological and social challenges to sustainable agriculture.
- Have specific knowledge of agriculture and its ecological and social context in both upland and lowland Thailand and Southeast Asia.
- Understand the role cash crops play in small landholding farmers in Northern Thailand including a deeper understanding of the ecology and economics of coffee, cacao, and medicinal cannabis.

### 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. A large portion of the course is based on field research and on-site research and study. 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

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>Seminar and Observation 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>Field Research Notebook:</b> A more structured way of taking notes and learning outside the classroom, FRNs 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 two (2) essays during the course, generally one every two weeks. 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 the two weeks — 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>	
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.	
<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
<b>Final Presentation:</b> On the last day of the course each student will give a five to ten (5-10) minute 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.	20
<b>Rubric for final presentation</b>	
1. Clarity and organization — is the issue clearly explained, linked to the topic and readings of the course, and well organized?	
2. Experiential learning/field studies/observations — does the presentation link to specific examples of observations?	
3. Interviews — does the presentation reflect discussions, interviews, and talks with local people and community members?	
4. Depth — is the issue analyzed and explained well and thoroughly?	
<b>Total Independent Research Project</b>	<b>40</b>

## Seminar Week Topics and Schedule

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### Monday - February 13

#### Agroecology and People's Movements

Agroecology is an approach to food production based on the idea of a farm as an ecosystem. More than that, it also represents a global people's movement for food sovereignty. We will examine some of the problems with industrial agriculture, but primarily focus on the approach of small holder agroecological farming, as well as the communities in the Global South using agroecology as a way to re-establish control over their food systems.

- Oehen, Bernadette, and Angelika Hilbeck, eds., *Feeding the People: Agroecology for Nourishing the World and Transforming the Agri-Food System*. IFOAM EU Group, Brussels, Belgium, 2015
  - Transform? Or Conform and Adjust; Introduction; Chapter 1 & 2
- Gliessman, S. 2007. *Agroecology: The Ecology of Sustainable Food Systems*, 2nd ed. CRC Press
  - Chapter 1 & 2

### Tuesday - February 14

#### Regenerative Agriculture and Climate Change

Regenerative agriculture uses a similar approach to agroecology by looking to natural ecosystems as the model for sustainable food production. Regenerative agriculture is especially focused on restoration of natural ecosystems, building soil health, and sequestering carbon in the soil to help both mitigate climate change and in some cases help draw down more carbon than regenerative food production emits.

- Olson, Kristin, *The Soil Will Save Us: How Scientists, Farmers, and Foodies are Healing the Soil to Save the Planet*, Rodale Books, 2014.
  - Chapter 1 & 2
- Shepard, M. 2013 *Restoration Agriculture: Real World Permaculture for Farmers*. Acres USA. 59-68.
  - Chapter 6 & 9
- Thorbecke and Dettling, "Carbon Footprint Evaluation of Regenerative Grazing at White Oak Pastures," February 25, 2019, Quantis Sustainability

### Wednesday - February 15

#### Agriculture in Southeast Asia and Thailand

Agriculture in Southeast Asia is diverse, based on specific cultural and agronomic practices rooted in distinct ecosystems and bioregions. Most agriculture in mainland Southeast Asia, and Thailand in particular, can be divided into lowland paddy / "wet-rice" agriculture, and upland farming, often using long fallow shifting cultivation practices. We will be examining the specific practices of both upland and lowland agriculture, with an emphasis on both production methods and the social systems that have developed around these two practices.

- Halwart, Matthias and Modadugu V. Gupta, eds., "The Rice Field Ecosystem," in *Culture of fish in rice fields*, FAO, 2004
- Marten, Gerald G., "Small-Scale Agriculture in Southeast Asia," In M.A. Altieri and S. Hecht (eds.), *Agroecology and Small Farm Development* (CRC Press. 1990), p. 177-194.
- Plews-Ogan, Erin, et al. "Polyculture, Autonomy, and Community: the Pursuit of Sustainability in a Northern Thai Farming Village." *International Journal of Agricultural Sustainability*, vol. 15, no. 4, Nov. 2017, pp. 418-431., doi:10.1080/14735903.2017.1335044.
- Srimongkol, Katin, and Gerald Marten, "Traditional Agriculture in Northern Thailand," *Traditional Agriculture in Southeast Asia: A Human Ecology Perspective*, Westview Press, 1986.

### Thursday - February 16

#### Cacao and Cannabis Foundations

- Coe, Sophie and Coe, Michael, *The True History of Chocolate*, Third Edition, Thames and Hudson, 2019.
  - Introduction and Chapter 1
- Russo, Ethan B., History of Cannabis and Its Preparations in Saga, Science, and Sobriquet. *Chemistry & Biodiversity*, vol. 4, 2007, pp. 1614-2648.

#### Discussion about fieldwork methods

## **Friday - February 17**

### **AM: Day Trip - ECHO Demonstration Farm**

We will spend a day at ECHO Asia's demonstration farm, learning about how this international NGO supports and works with farmers in Asia, especially small holders.

- Ferguson, Rafter, "Why We Can't Separate Justice and Sustainability in the Food System," Union of Concerned Scientists, September 20, 2019
- Oehen, Bernadette, and Angelika Hilbeck, eds., *Feeding the People: Agroecology for Nourishing the World and Transforming the Agri-Food System*. IFOAM EU Group, Brussels, Belgium, 2015
  - Chapter 3 & 8
- Shepard, M. 2013 *Restoration Agriculture: Real World Permaculture for Farmers*. Acres USA. 59-68.
  - Chapter 18

### **PM: Independent Research Project Proposal Presentations**

It will be set aside for students to present their proposed focused inquiry, and discuss both challenges and opportunities in gathering data in the field.

- IRP PROPOSAL PRESENTED AT ECHO

## Field Schedule

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### **Monday - February 20**

#### **AM: Travel to Mae Ta Village**

#### **PM: Village Study and Meeting**

- Readings: TSWSU, Chapter 3

### **Tuesday - February 21**

#### **AM: Mae Ta Practicum, Sustainable Agriculture with Paw Panomkron**

#### **PM: Visit Chicken Farm**

- Readings: TSWSU, Chapter 4

### **Wednesday - February 22**

#### **Day Trip - Dairy Farm Visit**

- Conor McCabe, "Dairy Cows — The Original Upcyclers: How ruminant digestion turns byproducts into high-quality nutrition," Clarity and Leadership for Environmental Awareness and Research at UC Davis, January 07, 2022
- Mitloehner, Frank, Ermias Kebreab and Michael Boccadoro, *Methane, Cows, and Climate Change: California Dairy's Path to Climate Neutrality*, Clarity and Leadership for Environmental Awareness and Research Center University of California, Davis, September 2, 2020

### **Thursday - February 23**

#### **Mae Ta Agricultural Practicum / Compost; Bedding; Planting; Seeding**

- TSWSU, Chapter 5-6

### **Friday - February 24**

#### **Day Trip - Cannabis Farm Visit**

- Nantthasorn Zinboonyahgoon et. al. "Medicinal cannabis in Thailand: 1-year experience after legalization," PAIN, 162 (2021) S105-S109
- DUE: Essay #1

### **Saturday - February 25**

#### **Mae Ta Agricultural Practicum / Seed Bank with P'Pui**

- TSWSU, Chapter 7-8

### **Sunday - February 26**

#### **AM: Meeting with Amanda**

#### **PM: Midcourse & Coffee Foundations Lecture**

- DUE: IRP PROGRESS UPDATE
- DUE: FRN and Journal check.
- Simms, Jessica, *I Know Coffee: Harvesting, Blending, Roasting, Brewing, Gridding & Tasting Coffee*, Skinny Bottle, 2017.
  - "Introduction to Coffee" to "Environmental Conditions" (p.1-22)

## **Monday - February 27**

### **Day Trip - Cacao Farm Visit**

- Walters, Dale, *Chocolate Crisis: Climate Change and Other Threats to the Future of Cacao*, University of Florida Press, 2021.
- Chapter 13-15

## **Tuesday - February 28**

### **Explore Agroforest and Local Watershed**

- Burnette, Richard R., *Agroforestry Options for Small Upland Farms, Upland Holistic Development Project* April 2006. • Introduction, Chapter 1-4, & 6.
- Prasit W., et al. 2010. "Fallow to Forest: Applying indigenous and scientific knowledge of swidden cultivation to tropical forest restoration." *Forest Ecology and Management* 260: 1399-1406.
- Bruun, Thilde Bech, et al. "Intensification of Upland Agriculture in Thailand: Development or Degradation?" *Land Degradation & Development*, vol. 28, no. 1, 9 Sept. 2016, pp. 83–94., doi:10.1002/ldr.2596.

## **Wednesday - March 1**

### **MJU Lanna Agriculture, Rice, and Cannabis**

## **Thursday - March 2**

### **AM: Family Day**

### **PM: Free study and farewell dinner**

## **Friday - March 3**

### **AM: Travel to 91Coffee**

### **PM: Farm Survey, and Farmer Meeting**

- Pendergrast, Mark, *Uncommon Grounds: The History of Coffee and How it Transformed the World*, Basic Books, 2010.
- Chapter 17: The Speciality Revolution.

## **Saturday - March 4**

### **Coffee Agriculture, Harvesting, and Processing**

- Simms, Jessica, *I Know Coffee: Harvesting, Blending, Roasting, Brewing, Gridding & Tasting Coffee*, Skinny Bottle, 2017.
- "Farming Methods" to "Growing Regions" (p.23-39)

## **Sunday - March 5**

### **Coffee Training Post Harvest Processing**

- Simms, Jessica, *I Know Coffee: Harvesting, Blending, Roasting, Brewing, Gridding & Tasting Coffee*, Skinny Bottle, 2017.
- "Pest Control" to "No Harvest? No Problem!)" (p.40-52)

## **Monday - March 6**

### **AM: Coffee Training and Roasting / Discuss Mini Ethnography Project**

### **PM: Leave for Chiang Mai**

- Simms, Jessica, *I Know Coffee: Harvesting, Blending, Roasting, Brewing, Gridding & Tasting Coffee*, Skinny Bottle, 2017.
- "How to Roast Green Coffee Beans Like a Pro" to "Roast Levels" (p.87-107)

## **Tuesday - March 7**

### **AM: Siamaya Chocolate Factory Visit**

### **PM: Chiang Mai cafe culture Ethnography Activity**

- Edoh Adabe, K. Ngo-Samnick, E. (2014). *Cocoa Production and Processing*.
- Chapter 6-8

## **Wednesday - March 8**

### **Continue Chiang Mai cafe culture Ethnography Activity**

## **Thursday - March 9**

### **Preparation day for final presentations**

**Friday - March 10**

**AM: Final presentations & Cafe Ethnography discussion**

- DUE: Final presentation
- DUE: ESSAY #2
- DUE: Collect ELW, Field Notes

## Field Research

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Field research is an important component of this course, and mastery of the field research methods will help make the course a success. Each student will record detailed field observations and studies in their Field Research Notebook as a critical part of the learning on this course. Some of the key methodologies and techniques are described below. Specific days and assignments for the field research will be assigned.

The questions and format in the Field Research Notebook will be more extensive and detailed.

### **Northern Thailand Plant Identification**

This activity will introduce you to a variety of plants that are utilized by communities in Northern Thailand.

There are many species in Northern Thailand that are used for food, fiber, construction, medicine, or for ceremonial purposes. A number of these also have a market value. Traditionally people would grow these or gather products from the forests and fields surrounding their homes.

In this activity you will identify the species you find and understand their role in the community and ecosystem. Throughout your time you will have opportunities to ask local people about the plants in their surrounding environment. They will help you identify various species and provide information on their usage, and preferred habitat. You will combine this local knowledge with your own illustrations in the Plant ID pages to create a useful catalogue of these plants. You will need to ask a variety of people and make your own observations to complete the Plant ID pages. Cite all sources of information (informant and location). Plant identification should include the common name in English, the common name in the local language (Thai or Karen, etc.), and the scientific name as well where available from the field guides.

Information to be recorded will include:

- Use (food, medicinal, other) and specify what is used (leaves, fruit, bark, etc.)
- Ecological context / placement in the garden / forest / field
- Propagation
- Care
- Harvest
- Sketch of leaf / flower / fruit (as appropriate) including context if needed

### **Polyculture Survey**

In this activity you will examine the different ways Thai farmers and households utilize polyculture (mixed species farming) in their farms and gardens. The use of polyculture cultivation can have numerous benefits including more efficient use of space, the exploitation of beneficial relationships between organisms, and weed and pest control, to name a few. The activity will show you how polyculture farming and gardening benefits farmers and households.

Identify at least **three examples** of polyculture through observation and interviews with farmers, gardeners, or local experts. Complete an entry in your Field Notebook for each example of polyculture, and include a sketch of relationships and placement as appropriate.

- Names of the plants or animals
- Context (garden, farm, food forest, etc.)
- Relationship between organisms
- Use/benefits

### **Field Transect**

Farms and fields are very diverse. One good way to capture this diversity is to complete a transect — a study of diversity along a specific line. For this activity you will use a 20 meter transect line to do your survey.

Working in groups of 3-4 students:

- Place your transect line to capture maximum diversity
- Record all plants directly along the transect line
- Record any other organisms (insects, etc.) that you observe in and around your transect
- Sketch of placement of transect line in context
- List of plants along transect line

- List of other organisms in/around transect line

### **Agroforest Transect**

Agroforests are characterized by density and diversity. Like the Farm Transect, this will use a 20 meter transect line to do your survey. Working in groups of 3-4 students:

- Place your transect line to capture maximum diversity
- Record all plants directly along the transect line, including trees directly adjacent to the transect line
- Record any other organisms (insects, etc.) that you observe in and around your transect
- Sketch of placement of transect line in context
- List of plants/trees along transect line, noting approximate height in meters
- List of other organisms in/around transect line

### **Seed Origins and Seed Saving**

Seeds and their control is a critical part of food sovereignty. Sourcing and saving seeds is an essential part of farming and gardening. Farmers utilize a number of strategies to locate, buy, trade and save seeds. Some seeds are purchased, some traded with others, and some saved either on the farm or from locally managed seed banks. Record at least **3 types of plants** and where the seeds come from.

### **Animal Integration**

Animals have always played a critical role in agriculture including in nutrient cycles, crop waste disposal, up-cycling of inedible waste, labor, pest control, and more.

- What animals have you observed in and around the farm?
- What are their roles / how are they used?

### **Farm Survey and Map**

Farms, especially for small holders in the tropics, often have a specific layout to aid in crop production and harvest. **Draw and annotate a map of the farm**, noting each area and what it is used for.

### **Fresh Market Survey**

Fresh markets are a feature of most communities in Asia. The focus of this study is the *origin* and *price* of products in the market. **Choose 4 agricultural products** and list what they are, where they are from, their price, and what they are used for.

### **Village Survey**

The use of space and the built environment tells us a lot about a community. Use the space below to **draw and describe observations** about the village, including housing (common features), infrastructure (roads), and other observations.

### **Organic Fertilizer**

On-farm production of fertilizer and compost is a critical part of organic farming and sustainable food production. **Describe and illustrate** the process of organic fertilizer production below.

### **Comparative Soil Assessment**

Building healthy soils is one of the core practices of regenerative agriculture. This activity is a rapid assessment of soil quality and health.

You will do a rapid assessment of soil quality in three places: organic polyculture farm, agroforest, and a commercial (chemical) mono crop.

Complete in groups of 3-4.

Equipment

- Metal ruler
- Trowel
- Square plastic cardboard 50 cm / side

1. Selection: Choose a place to study that will be reasonably representative of where the soil is healthiest — under crops, plants, etc.



2. Size and depth: Mark with a central point and then dig a circle 20 cm in diameter to a depth of 20 cm (this will be pretty big!)
3. Quality assessment: As you dig note any changes in color, moisture, and texture as you dig deeper. Note depth where you see changes in color, moisture, and texture.
4. Soil organisms: As you dig, put the soil on the plastic square and separate it to observe, count, and sketch any soil organisms (insects, worms, etc.)

Soil colors: black, brown, gray, sandy, white, etc.

Soil texture: soft, hard, sandy, loamy, clumping, etc.

Soil moisture: wet, moist, dry, etc.

### **Dairy Farm Nutrient Cycle**

Ruminant animals can play a key role in nutrient recycling. The purpose of this field activity is to explore the role small-scale dairy farm plays in recycling nutrients. Using observation and interviews with the farmers, complete the following activity.

Create a list of that the dairy cows are eating. Next to each item explain what each item is and whether it is agricultural waste, a food processing byproduct, food humans can't eat (i.e. grass), or if it is food humans can eat (are the cows eating agricultural products that would otherwise be eaten by humans). Use the data to complete the next section.

Draw two piecharts using the data from above.

- (1) Draw a piechart should show the percentage of the food that comes from from (a) agricultural waste and food processing byproducts, (2) grazing, and (3) other products
- (2) Draw a piechart showing the percentage of food that the cows are eating that is (a) edible for humans vs (b) non-edible for humans.

Observe the dairy cows' grazing field compared to the surrounding land. Are there any observations about the health of the soil and grasses compared to non grazing land? What role might the cows play in the the difference between the two areas?

### **Coffee Cash Crop Practicum**

The purpose of this activity is gain a fuller understanding of coffee as a cash crop in Thailand including the biology and ecology of the coffee plant, farming and post-harvest processing, and the economic role to small and medium-scale farmers. This practicum also provides you with an excellent context to examine existing and potential sustainable and regenerative farming practices and principles used in coffee production. You will learn about coffee through farm visits, processing facility visits, and discussions with farmers and experts.

To complete this activity you will be asked to draw and identify coffee, chart out the farming and processing methods, and answer discussion questions. You will complete the activity using your first-hand observations while in the field and your discussions from farmers and experts.

#### **Coffee Harvesting and Processing**

Draw and illustrate a flowchart describing each stage from farming to a cup of coffee. Include harvesting, post-harvesting processing, and each value-added step along the way. Show each exchange and any brokers /sales that many take part in the product's journey. Try and detail the money captured at each step and by whom.

### **Cannabis Cash Crop Practicum**

The purpose of this activity is gain a fuller understanding of cannabis as a cash crop in Thailand including the biology and ecology of the cannabis plant, farming and post-harvest processing, and the economic role for small and medium-scale farmers. This practicum also provides you with an excellent context to examine existing and potential sustainable and regenerative farming practices and principles used in cannabis production. You will learn about cannabis through farm visits, processing facility visits, and discussions with farmers and experts.

To complete this activity you will be asked to draw and identify cannabis, chart out the farming and processing methods, and answer discussion questions. You will complete the activity using your first-hand observations while in the field and your discussions from farmers and experts.

### **Cannabis Harvesting and Processing**

Draw and illustrate a flowchart describing each stage of cannabis production from farming to final product(s). Include harvesting, post-harvesting processing, and each value-added step along the way. Show each exchange and any brokers / sales that many take part in the product's journey. Try and detail the money captured at each step and by whom, well as any controls on flowers/seeds and chain of custody.

### **Cacao Cash Crop Practicum**

The purpose of this activity is gain a fuller understanding of cacao and chocolate as a cash crop in Thailand including the biology and ecology of the cacao plant, farming and post-harvest processing, and the economic role to small and medium- scale farmers. This practicum also provides you with an excellent context to examine existing and potential sustainable and regenerative farming practices and principles used in cacao production. You will learn about cacao through farm visits, processing facility visits, and discussions with farmers and experts.

To complete this activity you will be asked to draw and identify cacao, chart out the farming and processing methods, and answer discussion questions. You will complete the activity using your first-hand observations while in the field and your discussions from farmers and experts.

### **Cacao Harvesting and Processing**

Draw and illustrate a flowchart describing each stage from farming to a bar of chocolate. Include harvesting, post-harvesting processing, and each value-added step along the way. Show each exchange and any brokers / sales that many take part in the product's journey. Try and detail the money captured at each step and by whom.

## 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.