

# AQUA-5: Principles of Mariculture

## Course Information

**Semester & Year:** Fall 2025

**Course ID & Section #:** AQUA-5-E9061

**Instructors Name:** Jasmine Iniguez

**Day/Time of required meetings:** T 12:30 – 2:35 PM

**Lab:** TH 12:30 – 3:40 PM

**Location:** HU125

**Course units:** 3

## Instructor Contact Information

**Office location:** SCI 216I

**Office hours:** In person by appointment or via ZOOM

**Phone number:** (707) 476-4528

**Email address:** [jasmine-iniguez@redwoods.edu](mailto:jasmine-iniguez@redwoods.edu)

## Catalog Description

This course is designed to provide students with a general overview of marine aquaculture and the cultivation of marine aquatic organisms. Students will explore aquaculture principles and practices for producing shellfish, seaweed, urchins, abalone, and various marine finfish species. Students will learn to cultivate live feeds including microalgae and artemia. This course will cover the economic implications for producing sustainable marine-sourced foods. This course will include in-class lectures, hands-on lab exercises, and field trips with local hatchery and mariculture facilities.

## Course Student Learning Outcomes

1. Apply the concepts of culturing, breeding, growing, and harvesting various mariculture species to different production systems.
2. Understand and discuss the importance of mariculture for building coastal communities, improving environmental ecosystems, and supplying healthy seafood.

## Prerequisites/corequisites/ recommended preparation

None

## Required Course Textbook

### **Aquaculture: Farming Aquatic Animals and Plants, 3<sup>rd</sup> Edition**

Author: John S. Lucas & Paul C. Southgate

Publisher: Wiley-Blackwell

ISBN: 9781119230861

### **Molluscan Shellfish Aquaculture: A Practical Guide, 2021**

Author: Sandra Shumway

Publisher: 5m Books

ISBN: 978-1789180107

### **Plankton Culture Manual, 6<sup>th</sup> Edition, 2007**

Author: Frank H. Hoff, Terry W. Snell

Publisher: Florida Aqua Farms Inc

ISBN: 978-0966296044

## Recommended Course Textbook

### **A Field Guide to Seaweeds of the Pacific Northwest**

Author: Dr. Bridgette Clarkston

Harbour Publishing

ISBN: 978-1-55017-703-9

### **Supplemental References:**

Southern Regional Aquaculture Center Fact Sheets: <https://srac.tamu.edu/>

## Evaluation & Grading Policy

### **Grading:**

<b>Course Requirements</b>	<b>Percent of Total Grade</b>	<b>Due Date</b>
Exam 1	15	Tuesday, March 4
Exam 2	15	Tuesday, April 15
Final Exam	15	Tuesday, May 13
Lab Activities & Field Trips	20	Thursdays
Quizzes	10	TBA
Mariculture Project	20	See Schedule
Participation (attendance taken into account)	5	

**CR has a set policy for how course percentages convert to grades:**

A > 92%; A- 90-92%; B+ 87-89%; B 83-86%; B- 80-82%; C+ 77-79%; C 70-76%; D 60-69%; F

**Late Assignments:**

**Each student is responsible and expected to complete all assignments and activities by the due dates specified by instructor (unless changed). Late submission will incur a 5% penalty per day past the deadline.** You will have only one week to submit past the schedule due date.

If you experience an emergency (e.g. hospitalization, death in the family, car accident) please notify me 12 hours in advance and provide verifiable documentation (e.g. a doctor's note or ER visit paperwork).

**Lab Exercises:**

Lab exercises are an essential part of this course and are designed to provide hands-on learning experiences that cannot be easily replicated outside of the classroom. Due to the unique nature of each lab, limited supplies, and time required to set up and take down, **missed labs cannot be made up under any circumstances and will resort in zeros.**

A lab *may* be excused if an emergency related experience occurs such as (e.g. hospitalization, death in the family, car accident). Students **must** notify me in advance before the lab starts (at least 12 hours) and **provide verifiable documentation** (e.g. doctor's note or ER visit paperwork).

**Exam Make-up Policy:**

This class will have a total of three exams (**100 points each**), accounting for **45% of your final grade!** The course is divided into three units, with each unit corresponding to one exam. Exams are not cumulative (including final), although certain topics may appear on multiple exams as they build foundational knowledge.

**EXAM and QUIZ MAKE-UP POLICY:**

To be eligible for a makeup exam, you **must provide a serious and verifiable excuse with documentation** for missing a scheduled exam. Acceptable reasons include:

- Medical Emergency
- Foreseeable Conflicts: (Planned medical procedures, ER Visit, family/friend's death/ car accident)

**Important Notes:** Please contact me **12 hours in advance** if something in the foreseeable future is approaching as well. If you do not notify me at all and do not provide a legitimate excuse an **automatic 10% will be taken from your makeup exam.** Students **must** notify me in advance before the lab starts and provide verifiable documentation (e.g. doctor's note or ER visit paperwork).

**No makeup will be offered for the final exam. If you miss the scheduled final exam, you will receive a zero.**

### **Quizzes:**

You will have a set of open-note quizzes. These are designed to help you prepare for the exams.

### **Mariculture Project:**

Students will be assigned a project of their choice in which they will spend the whole semester taking care of a system (husbandry task, maintenance, feeding, water quality). Students may work alone or in pairs, depending on the scale of the project. Throughout the semester you will perform husbandry tasks, system maintenance, feeding, and water quality monitoring. This assignment requires students to write a final paper synthesizing their hands-on experience and supporting scientific learning.

### **Student Learning Objectives:**

1. Develop practical skills in building mini aquaculture system maintenance, including feeding, water quality testing, and troubleshooting.
2. Gain experience in scientific observation, data collection, and record- keeping
3. Synthesize hands on experience with scientific literature in comprehensive research paper

### **PAPER FORMAT:**

- MLA or APA Format
- Submit in Word document (not pdf) so I can make track changes
- Typed, 12- point, Times New Roman, Double-spaced
- Length: 4-6 pages (excluding figures and tables)
- Include at least 5 peer-reviewed references from a research journal
- Pictures, diagrams, and tables are required to enhance your paper

### **Project Requirements:**

#### **1. System/Project Options**

- Aquaponics
- Recirculating system IMTA with Sea urchins and Seaweed System

#### **2. Ongoing Maintenance Task (Weekly responsibilities)**

- Feeding and monitoring animal health
- Cleaning and maintaining system (filter changes, syphoning waste, water exchanges)
- Testing weekly water quality (pH, ammonia, nitrite, nitrate, salinity)
- Observing and recording growth rates, behaviors, or other relevant data

#### **3. Research Paper**

- Title Page
- Introduction
- Materials and Methods
- Results
- Discussion
- Conclusion
- References

**References:** Utilize google scholar (<https://scholar.google.com/>) to search for academic journals. If there is a research manuscript you are unable to access, please let me know. I may be able to get it for you.

**DUE DATES:**

Submit all parts of the assignment via Canvas

Assignment	Due Date	Points
Project Proposal	Sunday, Sept 21	25
First Draft (Title Page, Intro, Materials and Methods)	Sunday, Oct 26	25
Presentation (Symposium)	Thursday, Dec 11	25
Final Draft (Everything)	Thursday, Dec 18	25

**Field Trips:**

Activities and field trips are **mandatory, accounting for 20%** of the grade!

**Transportation:** College of the Redwoods does not provide all transportation. Students are responsible for arranging their own travel to and from field trips. Carpooling with classmates is highly encouraged! However, for some fields trips (CR van may be checked out and I will let you know) Come dressed for the outdoors.....plan on rain, wind, cold, and wet feet!

**SCHEDULED FIELD TRIPS: (these are subject to change at any given time)**

Activity	Date
Sunken Seaweed	Oct 2
Cal Poly Fish Hatchery Tour	Oct 16
Bakers Beach, Seaweed Urchin Harvest	Oct 30
The Fishery, Galt CA?	Weekend Sept 12-13

## Tentative Course Schedule

AQUA 5: Principles of Mariculture <°))>{			
Date	Week 1	Lecture and Lab Exercise:	Textbook & Chapter
26-Aug	T	Introduction, Course Overview, Canvas Navigation, and Lab Overview and Safety	Lucas et al. Ch. 1 Tidwell, Ch. 1
<b>28-Aug</b>	<b>TH – LAB</b>	<b>Plumbing 101 &amp; Project Selection/System Building</b>	
	<b>Week 2</b>		
2-Sept	T	Introduction to Mariculture Practices and Historical State	Lucas et al. Ch 2.
<b>4-Sept</b>	<b>TH – LAB</b>	<b>Work on Projects/System Building/Set up Clash System?</b>	
	<b>Week 3</b>		
9-Sept	T	Water Quality Chemistry	Lucas et al., Ch.4
<b>11-Sept</b>	<b>TH- LAB</b>	<b>Water Quality Assessment</b>	Lucas et al., Ch.4
	<b>Week 4</b>		
16-Sept	T	Nutrition and Live Feeds: Marine Species	Lucas et al., Ch.8
<b>18-Sept</b>	<b>TH - LAB</b>	<b>Algae Culture Setup / Potential Sunken Seaweed Tour Moved up</b>	
	<b>Week 5</b>		
23-Sept	T	Mariculture Diseases and Management of Biofouling	Lucas et al. CH 10, 11, 12 Shumway, CH. 15
<b>25-Sept</b>	<b>TH - LAB</b>	<b>Disease Slides and Set up biosecurity in the lab Algae Culture Set up</b>	
	<b>Week 6</b>		
30-Sept	T	Exam 1 Review	
<b>2-Oct</b>	<b>TH - LAB</b>	<b>Algae Culture Counts</b>	
	<b>Week 7</b>		
<b>7-Oct</b>	<b>T</b>	<b>Exam 1</b>	
9-Oct	TH - LAB	Work on Projects/Data Collection	
	<b>Week 8</b>		
14-Oct	T	Marine Shrimp and Biofloc Production	Lucas et al. Ch. 24
<b>16-Oct</b>	<b>TH - LAB</b>	<b>Cal Poly Fish Hatchery Tour</b>	
	Week 9		
21-Oct	T	Seaweed & Kelp Aquaculture & Urchin Aquaculture	Lucas et al. Ch. 22
<b>23-Oct</b>	<b>TH - LAB</b>	<b>Tank Calculations, Algae Counts, Algae Transfer</b>	
	<b>Week 10</b>		
28-Oct	T	Clam and Mussel Aquaculture	Lucas et al. Ch. 15
30-Oct	<b>TH - LAB</b>	<b>Bakers Beach Seaweed Collection, ID, Urchin Harvest</b>	
	<b>Week 11</b>		
4-Nov	T	No Class – Veterans Day	Shumway, Ch. 2 & 5
6-Nov	<b>TH - LAB</b>	<b>Knots and Slip Knots</b>	
	<b>Week12</b>		

11-Nov	T	<b>Exam 2</b>	
<b>13-Nov</b>	<b>TH</b>	<b>Urchin Spawning Experiment</b>	
		<b>Week 13</b>	
18-Nov	T	Abalone Aquaculture Oyster Aquaculture	Shumway, Ch. 6 Shumway, Ch. 1
20-Nov	TH	Work on Projects	
		<b>Week 14</b>	
24-Nov		<b>Thanksgiving Break! No Class!</b>	
		<b>Week15</b>	
2-Dec	T	Yellow Tail Kingfish & Marine Fish Ornamental Fish Culture	Lucas et al. Ch. 20 Lucas et al. Ch. 26
<b>4-Dec</b>	<b>TH</b>	<b>Work on Final Projects (Final Data Collection)</b>	
		<b>Week 16</b>	
9-Dec	T	Final Exam Review	
<b>11-Dec</b>	<b>TH</b>	<b>Aquaculture Symposium – Project Presentations</b>	
		<b>Week 17</b>	
<b>16-Dec</b>	<b>T</b>	<b>Final Exam</b>	
<b>18-Dec</b>	<b>TH</b>	<b>NO CLASS – Best of luck on finals! 😊</b>	

## Educational Accessibility & Support

College of the Redwoods is committed to providing reasonable accommodations for qualified students who could benefit from additional educational support and services. You may qualify if you have a physical, mental, sensory, or intellectual condition which causes you to struggle academically, including but not limited to:

- Mental health conditions such as depression, anxiety, PTSD, or bipolar disorder
- Common ailments such as arthritis, asthma, diabetes, autoimmune disorders, and diseases
- Temporary impairments such as a broken bone, recovery from significant surgery, or a pregnancy-related disability
- Neurodevelopmental disorders such as a learning disability, intellectual disability, autism, acquired brain injury, or ADHD
- Vision, hearing, or mobility conditions

Available services include extended test time, quiet testing environments, academic assistance and tutoring through the [LIGHT Center](#), counseling and advising, alternate formats of course materials (e.g., audio books, braille, E-texts), assistive technology, learning disability assessments, approval for personal attendants, interpreters, priority registration, on-campus transportation, adaptive physical education and living skills courses, and more. If you believe you might benefit from disability- or health-related services and accommodations, please contact [Student Accessibility Support Services \(SASS\)](#). If you are unsure whether you qualify, please contact Student Accessibility Support Services (SASS) for a consultation: [sass@redwoods.edu](mailto:sass@redwoods.edu).

## SASS office locations and phone numbers

### Eureka campus

- Phone: 707-476-4280
- Location: Learning Resource Center (Library)

### Del Norte campus

- Phone: 707-465-2353
- Location: main building, near the Library

### Klamath-Trinity campus

- Phone: 707-476-4280