

AQUA-5: Principles of Mariculture

Course Information

Semester & Year: Spring 2025

Course ID & Section #: AQUA-5-E8466

Instructors Name: Jasmine Iniguez

Day/Time of required meetings: T 12:15 – 2:20 PM

Lab: TH 12:15 – 3:25 PM

Location: LEC AT 108, LAB AT108

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

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, 3rd 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, 6th 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:

Course Requirements	Percent of Total Grade	Due Date
Exam 1	15	Tuesday, March 4
Exam 2	15	Tuesday, April 8
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 pas the deadline.**

If you experience an emergency situation (e.g. hospitalization, death in the family, car accident) please notify me as soon as you can if it affects your coursework or attendance. In case of foreseeable conflicts, please contact me in advance so we can make appropriate arrangements.

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 MAKE-UP POLICY:

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

- Medical Emergency
- Foreseeable Conflicts: (Planned medical procedures, 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.**

No makeup will be offered for the final exam.

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 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**

- Saltwater Aquaponics (Exploring growth potential for different plant species)
- Crayfish Pond Cage Culture
- Rearing Crayfish in tanks and breeding them: Establish breeding protocols and monitoring development
- Integrated Multi-trophic Aquaculture System (Urchins and Seaweed)

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, Feb 9 th	25
First Draft (Title Page, Intro, Materials and Methods)	Sunday, March 30 th	25
Presentation (Symposium)	Thursday, May 8 th	25
Final Draft (Everything)	Thursday, May 15 th	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
Cal Poly Humboldt Telonicher Marine Lab	Feb 27
Bakers Beach, Seaweed Harvest	Apr 3
TBD, Field Landing Dock (Boat knots!)	Apr 10
The Fishery, Galt CA	Weekend April 25 - 27

Tentative Course Schedule

AQUA 5: Principles of Mariculture <°))>{			
Date	Week 1	Lecture and Lab Exercise:	Textbook & Chapter
21-Jan	T	Introduction, Course Overview, Canvas Navigation, and Lab Overview	Lucas et al. Ch. 1 Tidwell, Ch. 1
23-Jan	TH – LAB	Plumbing 101 & Project Selection	
	Week 2		
28-Jan	T	Introduction to Mariculture Practices and Historical State	Lucas et al. Ch 2.
30-Jan	TH – LAB	Project Needs and Build	
	Week 3		
4-Feb	T	Water Quality Chemistry	Lucas et al., Ch.4
6-Feb	TH- LAB	Water Quality Assessment using HACH	Lucas et al., Ch.4
	Week 4		
11-Feb	T	Nutrition and Feed– Marine Species Requirements	Lucas et al., Ch.8
13-Feb	TH - LAB	Live feed preparation, Fish label analysis, Algae Culture Set up	
	Week 5		

18-Feb	T	Mariculture Diseases and Management of Biofouling	
20-Feb	TH - LAB	Disease Slides and Biofouling	
	Week 6		
25-Feb	T	Exam 1 Review & IMTA Systems	
27-Feb	TH - LAB	Cal Poly Marine Lab (IMTA System Identification)	
	Week 7		
4-Mar	T	Exam 1	
6-Mar	TH - LAB	No Lab (Out for a conference)	
	Week 8		
11-Mar	T	Bivalve and Mollusk (Geoduck) Culture	Lucas et al. Ch. 24
13-Mar	TH - LAB	Boat Knots and Slip Knots	
	Week 9		
18-Mar	T	Spring Break	
20-Mar	TH - LAB		
	Week 10		
25-Mar	T	Marine Shrimp and Biofloc Production	Lucas et al. Ch. 15
27-Mar	TH - LAB	Testing Settleable Solids, Pond Water, and Secchi Disk	
	Week 11		
1-Apr	T	Seaweed and Kelp Aquaculture	
3-Apr	TH - LAB	Bakers Beach Seaweed Collection and ID Sporophyte Release Activity	
	Week 12		
8-Apr	T	Exam 2	
10-Apr	TH - LAB	Potentially Field Landing Dock (Test your Knots!)	
	Week13		
15-Apr	T	Abalone and Echinoderm Culture	Lucas et al. Ch. 25
17-Apr	TH	Urchin Spawning Experiment	
	Week 14		
22-Apr	T	RAS System and Yellow Tail Kingfish Production	Tidwell, Ch. 11
24-Apr	TH	Work on Projects	
	Week15		
29-Apr	T	Aquarium Industry & Ornamental Fish Culture	Lucas et al. Ch. 26
1-May	TH	Work on Final Projects (Final Data Collection)	
	Week 16		
6-May	T	Final Exam Review	
8-May	TH	Aquaculture Symposium – Project Presentations	
	Week 17		
13-May	T	Final Exam 10:45 AM – 12:45	
15-May	TH	NO CLASS – Best of luck on finals! 😊	

Spring 2025 Dates

Date	To Remember
January 17	Last day to register for classes (day before the first-class meeting)
January 18	Classes begin
January 20	Martin Luther King's Birthday (All Campuses Closed)
January 24	Last Day to add a class
January 31	Last Day to Drop & Receive a Refund
February 2	Last Day to Drop w/out a "W"
February 3	Census Date (20% of class)
February 14	Lincoln's Birthday (All Campuses Closed)
February 17	President's Day (All Campuses Closed)
March 6	Last Day to Petition to Graduate & Petition for Certificate
March 17 - 22	Spring Break (No Classes)
March 28	Last Day for Student/Faculty Withdrawal
March 31	Cesar Chavez Day (All Campuses Closed)
May 10 - 16	Final Examinations
May 16	Last Day to File P/NP Option
May 16	Semester Ends
May 23	Grades Due
May 26	Memorial Day (All Campuses Closed)
May 30	Grades Available for Transcript Release

Educational Accessibility & Support

College of the Redwoods is committed to providing reasonable accommodation 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, bipolar disorder, and ADHD
- 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
- A learning disability (such as dyslexia, reading comprehension), intellectual disability, autism, or acquired brain injury
- Vision, hearing, or mobility challenges

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.

SASS office locations and phone numbers

Eureka campus

- Phone: 707-476-4280
- Location: Student Services Building, first floor

Del Norte campus

- Phone: 707-465-2324
- Location: Main Building, next to the library

Klamath-Trinity campus

- Phone: 707-476-4280

Student Support Services

Good information and clear communication about your needs will help you be successful. Please let your instructor know about any specific challenges or technology limitations that might affect your participation in class. College of the Redwoods wants every student to be successful.

The following online resources are available to support your success as a student:

[CR Online Learning Support](#)

Tech support, laptop loans, guides to using Canvas, installing Office 365 for free, and more.

[Library Articles & Databases](#)

Find the best library databases for your research.

[Online Tutoring Resources](#)

Participate in tutoring over Zoom.

To learn more about the resources available to you, click on a title bar below, or click the down arrow to expand them all.

Klamath-Trinity students can contact the CR Klamath-Trinity Office for specific information about student support services at 530-625-4821.

Community College Student Health and Wellness

[National Suicide Prevention Lifeline](#)

If you are in distress or are with someone at risk right now, call or text the National Suicide Prevention Lifeline.

Call the National Suicide Prevention Lifeline
1-800-273-TALK (8255)

Text the National Suicide Prevention Lifeline
741-741

Timely Care

When you're not feeling well physically or distressed mentally, Timely Care can offer the help you're looking for in just a few quick taps. Students can schedule an appointment anytime via phone, video, and chat. [Log in or set up an account with Timely Care.](#)

Mental Health Counseling

Students should text, email, or fax Shawna Bell directly for scheduling and/or services.

- Text: 707-496-2856
- Email: shawnabmft@gmail.com
- Fax and voicemail: 707-237-2318

Wellness Central

Resources, tools, and trainings regarding health, mental health, wellness, basic needs and more designed for California community college students, faculty and staff are available on the California Community Colleges [Wellness Central](#).

Counseling

[Counseling and Advising](#) can assist students in need of academic advising and professional counseling services. Call, email or stop by one of our offices to make an appointment!

Counseling and Advising office locations and contact info

Eureka campus

- Phone: 707-476-4150
- Location: Student Services Building, first floor
- Email: counseling@redwood.edu
- Hours: Monday through Friday, 9am to 4pm. Summer hours may vary

Del Norte campus

- Phone: 707-476-2300
- Location: Main Building, next to the library
- Hours: Summer hours may vary

Klamath-Trinity campus

- Phone: 530-625-4821
- Email: KT-staff@redwoods.edu
- Hours: Summer hours may vary

Basic Needs Center

[Basic Needs Center](#) provides for the health and safety of students by providing access to healthy food, financial resources, and referrals to safe and secure housing. [Submit a request for services and information](#).

Basic Needs Center contact info

- Phone: 707-476-4153
- Email: the-grove@redwoods.edu

Learning Resource Center

The Learning Resource Center includes the following resources for students:

Library Services

[Introduction - Library Services for Students - LibGuides at College of the Redwoods](#) promotes information literacy and provides organized information resources.

Multicultural and Equity Center (MCE)

The [Multicultural and Equity Center](#) is a dynamic and inclusive place that supports all students in their academic and personal journeys at the college. We do this by creating community, home away from home, and a safe place for cultural expression, cross-cultural learning, access to college and dignity resources, and social justice work opportunities. The MEC is committed to retention and student success by offering activities related to leadership development, student connectedness and student equity. We are a student-centered program that fosters respect for all people.

Academic Support Center

The [Academic Support Center](#) offers tutoring and test proctoring for CR students.

Student Tech Help

Technical [Support](#) provides students with assistance around a variety of tech problems.

Extended Opportunity Programs and Services (EOPS)

[EOPS/CARE](#) (EOPS) provides services to eligible income disadvantaged students including: textbook awards, grants, career academic and personal counseling, transportation assistance, tutoring, laptop, calculator and textbook loans, priority registration, graduation cap and gown, workshops, and more!

TRiO Student Success Program

The TRiO Student Support Services Program provides eligible students with a variety of services including academic advising, career assessments, assistance with transfer, and peer mentoring. Students can apply for the program with the [Eureka TRiO office](#) or the [Del Norte TRiO office](#).

Veterans Resource Center

The [Veterans Resource Center](#) supports and facilitates academic success for Active Duty Military, Veterans

and Dependents attending CR through relational advising, mentorship, transitional assistance, and coordination of military and Veteran-specific resources.

CalWORKS

California Work Opportunity & Responsibility to Kids ([CalWorks](#)) provides supportive services to student parents with children under the age of 18, who are receiving cash assistance (TANF benefits), to become self-sufficient. Services include: transportation assistance, basic student supplies, tutoring, priority registration, laptop and calculator loans, career, academic, and personal counseling, and more!

Academic dishonesty

In the academic community, the high value placed on truth implies a corresponding intolerance of scholastic dishonesty. In cases involving academic dishonesty, determination of the grade and of the student's status in the course is left primarily to the discretion of the faculty member. In such cases, where the instructor determines that a student has demonstrated academic dishonesty, the student may receive a failing grade for the assignment and/or exam and may be reported to the Chief Student Services Officer or designee. The Student Code of Conduct ([AP 5500](#)) is available on the College of the Redwoods website. Additional information about the rights and responsibilities of students, Board policies, and administrative procedures is located in the [2024-2025 College Catalog](#) and [CR Board and Administrative Policies](#).

AI Use Class Policy

Recent advancements in generative artificial intelligence (AI) have made large language models such as ChatGPT and Google's Bard widely available. Sometimes, using these tools appropriately can help us overcome barriers and allow us to focus on deeper learning. However, overuse of these tools can undermine the development of our critical and creative thinking skills. In addition, AI outputs are often unreliable and frequently subject to bias. For these reasons, it is sometimes appropriate and sometimes inappropriate to use generative AI in the completion of assignments or in discussion posts. For this class, please see the specific assignment instructions for guidance on how and when generative AI tools may be used appropriately as we're working on and learning from a particular assignment. Also, please keep in mind that you are responsible for anything you submit; please carefully review all AI-generated outputs, screening them for accuracy, bias, appropriateness, and fidelity to your perspective.

Disruptive Behavior

Student behavior or speech that disrupts the instructional setting will not be tolerated. Disruptive conduct may include, but is not limited to: unwarranted interruptions; failure to adhere to instructor's directions; vulgar or obscene language; slurs or other forms of intimidation; and physically or verbally abusive behavior. In such cases where the instructor determines that a student has disrupted the educational process, a disruptive student may be temporarily removed from class. In addition, the student may be reported to the Chief Student Services Officer or designee. Additional information about the rights and responsibilities of students, Board policies, and administrative procedures is located in the [2024-2025 College Catalog](#) and [CR Board and Administrative Policies](#).

Inclusive Language in the Classroom

College of the Redwoods aspires to create a learning environment in which all people feel comfortable in contributing their perspectives to classroom discussions. It therefore encourages instructors and students to use language that is inclusive and respectful.

Canvas Information

- Log into Canvas at [My CR Portal](#)
- For help logging in to Canvas and general tech help, visit [Canvas Support Home](#)
- Once you're logged in to Canvas, you click on the Help icon on the left menu
- Canvas online orientation workshop: [Canvas Student Orientation Course](#)

Setting Your Preferred Name and Pronouns in Canvas

Students have the ability to display personal pronouns and an alternate first name in Canvas. Students may change their pronouns on their own in Canvas (Account :: Settings :: Edit Settings). To request a change to your preferred list name, contact [Admissions and Records](#). Your Preferred Name will only be listed in Canvas; this does not change your legal name in our records. See the [Student Information Update form-2022.pdf](#).

Emergency Procedures / Everbridge

College of the Redwoods has implemented an emergency alert system called Everbridge. In the event of an emergency on campus you will receive an alert through your personal email and/or phones. Registration is not necessary in order to receive emergency alerts. Check to make sure your contact information is up-to-date by logging into [WebAdvisor](#) and selecting 'Students' then 'Academic Profile' then 'Current Information Update.'

Please contact Public Safety at 707-476-4112 or campus-safety@redwoods.edu if you have any questions. For more information visit [Campus Safety](#). Please review the [EurekaEmergencyMap_S24.pdf](#) for campus evacuation sites, including the closet site to this classroom (posted by the exit of each room).

In an emergency that requires an evacuation of the building anywhere in the District:

- Be aware of all marked exits from your area and building
- Once outside, move to the nearest evacuation point outside your building
- Keep streets and walkways clear for emergency vehicles and personnel

Do not leave campus, unless it has been deemed safe by the campus authorities.

To learn more about campus-specific Emergency Procedures, click on a title bar below, or click the down arrow to expand them all.

Del Norte Campus Emergency Procedures

Please review the [Crescent City campus emergency map](#) for campus evacuation sites, including the closest site to this classroom (posted by the exit of each room). For more information, visit [Campus Safety](#).

Klamath-Trinity Campus Emergency Procedures

Please review the responsibilities of, and procedures used by, the College of the Redwoods, Klamath Trinity Instructional Site (KTIS) to communicate to faculty, staff, students and the general public during an emergency. It is the responsibility of College of the Redwoods, Klamath-Trinity Instructional Site (KTIS) to

protect life and property from the effects of emergency situations within its own jurisdiction.

In the event of an emergency, communication shall be the responsibility of the district employees on scene:

1. Dial 911, to notify local agency support such as law enforcement or fire services.
2. If safe to do so, notify key administrators, departments, and personnel.
3. If safe to do so, personnel shall relay threat information, warnings, to ensure the school community is notified.
4. Contact 530-625-4821 to notify of situation.
5. Contact Hoopa Tribal Education Administration office 530-625-4413
6. Notify Public Safety 707-476-4111.

In the event of an emergency, the responsible district employee on the scene will:

1. Follow established procedures for the specific emergency as outlined in the College of the Redwoods Emergency Procedure Booklet.
2. Lock all doors and turn off lights if in lockdown due to an active shooter or similar emergency.
3. Close all window curtains.
4. Get all inside to safe location Kitchen area is best internal location.
5. If a police officer or higher official arrives, they will assume command.
6. Wait until notice of all is clear before unlocking doors.
7. If safe to do so, move to the nearest evacuation point outside building (Pooky's Park), directly behind the Hoopa Tribal Education Building.
8. Do not leave site, unless it has been deemed safe by the person in command.