



1900 Pico Boulevard Santa Monica, CA 90405
310.434.4611

Curriculum Committee Agenda

Wednesday, October 15, 2025, 3:00 p.m.
Drescher Hall, Loft (3rd Floor, Room 300-E)

Guests and members of the public may attend via Zoom:
<https://smc-edu.zoom.us/j/88008685421>

Meeting ID: 880 0868 5421

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Find your local number: <https://smc-edu.zoom.us/j/kog4GeKXL>

Members:

Redelia Shaw, <i>Chair</i>	Evelyn Chantani	Justice Isaacs	Bobby Simmons
Dione Hodges, <i>Vice Chair</i>	Rachel Demski	Sharlene Joachim	Briana Simmons
Lourdes Arévalo	Susan Fila	Jesus Lopez	Lydia Strong
Jason Beardsley	Walker Griffy	Walt Louie	Olivia Vallejo
Fariba Bolandhemat	Catherine Haradon	Jacqueline Monge	Audra Wells
Walter Butler	Bryan Hartanto (A.S.)	Kevin Roberts	Associated Students Rep
Susan Caggiano	Aileen Huang	Scott Silverman	

Interested Parties:

Stephanie Amerian	Sheila Cordova	Matt Larcin	Patricia Ramos
Clare Battista	Nathaniel Donahue	Jamar London	Jessica Rodriguez
Maria Bonin	Kiersten Elliott	Maria Munoz	Steven Sedky
Department Chairs	Tracie Hunter	Stacy Neal	Esau Tovar
Nick Chambers	Maral Hyeler	Ailsa Ortiz (A.S.)	Tammara Whitaker

Ex-Officio Members:

Vicenta Arrizon

(Information items are listed numerically; action items are listed alphabetically)

- I. Call to Order and Approval of Agenda
- II. Public Comments *(Two minutes is allotted to any member of the public who wishes to address the Committee.)*
- III. Announcements
- IV. Approval of Minutes (October 1, 2025).....4

V. Chair's Report

VI. Information Items

1. Common Course Numbering (CCN) Updates

VII. Action Items

(Courses: Common Course Numbering)

a. ECON C2001 Principles of Microeconomics	9
b. ECON C2002 Principles of Macroeconomics	12
c. HIST C1001 United States History to 1877 (formerly HIST 11).....	15
d. HIST C1002 United States History since 1865 (formerly HIST 12)	18

Common Course Numbering requires identical language in the following fields, from the Common Course Numbering templates: prefix, course number, course title, course description, units, prerequisites/corequisites/advisories, course content, course objectives/outcomes, methods of evaluation, and textbooks. Optional additional language is indicated by an asterisk where applicable. Fields that are not included in the template (such as Methods of Presentation, Sample Assignments, etc.) do not currently have requirements and are at the discretion of the department.

(Courses: Substantial Changes)

e. AQUA 1 Introduction to Aquaculture: History, Ecology and Sustainability	21
• Changed: SLOs, course objectives	
f. AQUA 2 Applications in Aquaculture - System Design, Monitoring and Maintenance	23
• Changed: SLOs, course objectives, sample assignments	
g. AQUA 3 Microbiology and Genetics for Aquaculture	25
• Changed: SLO, objectives	
h. AQUA 4 Husbandry and Life Support in Aquaculture and Aquarium Science	27
• Changed: SLO, objectives	
i. AQUA 5 Advanced Topics in Aquaculture	29
• Changed: SLO, objectives	
j. ESL 14B Pronunciation: Rhythm and Intonation	31
• Changed: SLOs, course content, methods of evaluation, textbooks, sample assignments	
• Changed prerequisite: from: ESL 10G and ESL 10W or placement in ESL 11A to: ESL 10G or ESL 10W or placement in ESL 11A	
k. MCRBIO 1 Fundamentals of Microbiology	39
• Changed: lab content	
• Added Prerequisite: AQUA 3	

(Programs: New)

l. Physics AS-T	44
m. Sustainable Aquaculture Technology AS	49

(Programs: Change)

n. Aquaculture Technician I Certificate of Achievement	74
• Changed:	
Required Courses: Added elective options for AQUA 88B (AQUA 90A or 90B or 90C or 88B)	
Scuba Diving/First Aid Course: Added elective option of HEALTH 11 and note regarding certifications: "Note: AQUA 10 or industry equivalent. Credit for prior learning may be granted	

for students who hold recognized industry certifications. Acceptable documentation includes: NAUI Master Diver or equivalent; or NAUI Advanced Diver plus Rescue Diver certifications; or any dive certification combined with AAUS certification or equivalent; or First Aid/CPR certification equivalent to those issued by the American Heart Association, Red Cross, or comparable agencies. Please contact the life sciences department or counseling for more information.”

- o. Aquaculture Technician II Certificate of Achievement 76
 - Changed: program description, PLOs, mapped SLOs to PLOs

(Programs: Revisions)

- p. Changes to degrees, certificates, and program maps as a result of courses considered on this agenda

VIII. New Business

IX. Old Business

X. Adjournment

Please notify Redelia Shaw, Dione Hodges, and Rachel Demski by email if you are unable to attend this meeting.

The next Curriculum Committee meeting is October 29, 2025.



1900 Pico Boulevard Santa Monica, CA 90405
310.434.4611

Curriculum Committee Minutes

Wednesday, October 1, 2025, 3:00 p.m.
Drescher Hall, Loft (3rd Floor, Room 300-E)
Zoom (guests/members of the public)

Members Present:

Redelia Shaw, <i>Chair</i>	Susan Caggiano	Justice Isaacs	Steven Sedky*
Dione Hodges, <i>Vice Chair</i>	Evelyn Chantani	Sharlene Joachim	Scott Silverman
Lourdes Arévalo	Rachel Demski	Jesus Lopez	Briana Simmons
Jason Beardsley	Walker Griffy	Walt Louie	Olivia Vallejo
Fariba Bolandhemat	Catherine Haradon	Jacqueline Monge	Audra Wells
Walter Butler	Bryan Hartanto (A.S.)	Kevin Roberts	

**Steven Sedky sitting in for Susan Fila*

Members Absent:

Susan Fila	Aileen Huang**	Bobby Simmons	Lydia Strong**
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***Attended via Zoom – voting members of the committee unable to attend in-person may join as a guest on zoom but cannot move or vote on action items.*

Others Present:

Keith Graziadei	Jessica Rodriguez
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(Information items are listed numerically; action items are listed alphabetically)

I. Call to Order and Approval of Agenda

The meeting was called to order at 3:06 pm. Motion to approve the agenda with revision to remove VI. Information Items: 1. Curriculum Highlight: META, 3. Board Policy (BP) and Administrative Regulations (AR), and 4. Course Deactivations.

Motion made by: Scott Silverman; **Seconded by:** Kevin Roberts

The motion passed unanimously.

II. Public Comments

None

III. Announcements

The SMC Barrett Gallery is hosting a keynote and gallery reception for “Concrete Hope | Esperanza Concreta” Exhibition Oct. 14. More information is available at smc.edu/barrett

Today is International Older Persons Day. Please visit smc.edu/emeritus for our information on our Emeritus classes, schedule, and information.

It is Hispanic Heritage Month – please check smc.edu/calendar for a listing of events happening.

IV. Approval of Minutes

Motion to approve the minutes of September 17, 2025 with no revisions.

Motion made by: Audra Wells; **Seconded by:** Susan Caggiano

The motion passed unanimously.

V. Chair's Report

The META glitch from a couple of weeks ago that wasn't showing CORs in the public search is now fixed.

The Curriculum Highlight: Hours and Units recording and presentation from the September 17 meeting is now posted to the canvas shell.

The IDEAA Framework and Praxis module is in the Curriculum Committee canvas shell and will be a project our committee works on completing this upcoming Academic Year so that we are in compliance. I am proposing our campus lean into IDEAAS to include sustainability.

VI. Information Items

1. ~~Curriculum Highlight: META~~
2. Common Course Numbering (CCN) Updates
No updates this week.
3. ~~Board Policy (BP) and Administrative Regulations (AR)~~
4. ~~Course Deactivations~~

VII. Action Items

(Courses: New)

- a. ESL 921 Pronunciation: Rhythm and Intonation
Motion to approve ESL 921 with correction to copy SLO #3 ("Apply the guidelines for stress in multi-syllabic words to pronounce multi-syllabic words clearly and accurately.") from ESL 14B to ESL 921 (ESL 14B/ESL 921 are mirrored courses)
Motion made by: Susan Caggiano; **Seconded by:** Steven Sedky
The motion passed unanimously.

(Courses: Substantial Changes)

- b. ESL 14A Pronunciation and Spelling: Vowel and Consonant Sounds
 - Changed: course description, SLOs, methods of evaluation, textbooks, sample assignments
 - Added Prerequisite: ESL 10G and ESL 10W or placement in ESL 11A
 - Removed Advisory: ESL 10W It is highly recommended that students in ESL 14A have already completed ESL 10W or have tested into the ESL 11A level. ESL 10G It is highly recommended that students in ESL 14A have already completed ESL 10G or have tested into the ESL 11A level.Motion to approve changes to ESL 14A with no additional revisions.
Motion made by: Scott Silverman; **Seconded by:** Kevin Roberts
The motion passed unanimously.

Motion to approve prerequisites for ESL 14A as a block with no additional revisions.

Motion made by: Walker Griffy; **Seconded by:** Susan Caggiano

The motion passed unanimously.

Motion to approve removing advisories for ESL 14A with no additional revisions.

Motion made by: Scott Silverman; **Seconded by:** Jesus Lopez

The motion passed unanimously.

- c. ESL 14B Pronunciation: Rhythm and Intonation
 - Changed: SLOs, course content, methods of evaluation, textbooks, sample assignments*Tabled to return with prerequisite changes for future meeting.*

d. ESL 15 Conversation and Culture in the U.S.

- Changed: course description, SLOs, course content, methods of evaluation, textbooks, sample assignments

Motion to approve changes to ESL 15 with additional revision to SLO #1 to remove “objectively”

Motion made by: Susan Caggiano; **Seconded by:** Scott Silverman

The motion passed unanimously.

e. ESL 16A The Noun System and Articles

- Changed: course description, SLOs, course objectives, course content, lab content, methods of presentation, methods of evaluation, textbooks, sample assignments
- Changed Advisory: Concurrent enrollment in ESL 11A or ESL 19A (was “Concurrent enrollment in ESL 11A or ESL 11B”)

Motion to approve changes to ESL 16A with additional revisions to:

SLO #3:

- From “Deliver a brief presentation demonstrating correct use of count/non-count nouns, proper nouns, noun phrases, singular and plural forms, subject-verb agreement, and determiner-noun agreement.”
- To “Demonstrate correct use of count/non-count nouns, proper nouns, noun phrases, singular and plural forms, subject-verb agreement, and determiner-noun agreement in a brief presentation on a given topic.”

Motion made by: Audra Wells; **Seconded by:** Walker Griffy

The motion passed unanimously.

Motion to approve advisory changes to ESL 16A with no additional revisions.

Motion made by: Audra Wells; **Seconded by:** Scott Silverman

The motion passed unanimously.

f. ESL 16B Verb Tenses: Forms and Use

- Changed: course description, SLOs, course objectives, course content, lab content, methods of presentation, methods of evaluation, textbooks, sample assignments

Motion to approve changes to ESL 16B with additional revisions to:

SLO #3:

- From “Deliver brief speeches and produce short speaking tasks using grammatically correct sentences with correct verb tenses on assigned topics.”
- To “Produce short speaking tasks using grammatically correct sentences with correct verb tenses on assigned topics while delivering brief speeches.”

SLO #4

- From: “Respond to topics and other students' submissions with spoken questions and comments demonstrating correct use of verb forms and tenses.”
- To “Use correct verb forms and tenses with spoken questions and comments in response to spoken topics.”

Motion made by: Susan Caggiano; **Seconded by:** Dione Hodges

The motion passed unanimously.

g. ESL 16C Sentence Structure and Punctuation

- Changed: course description, SLOs, course objectives, course content, lab content, methods of presentation, methods of evaluation, textbooks, sample assignments
- Changed Advisory: ESL 11A or concurrent enrollment in ESL 19A or ESL 19B (was “Concurrent enrollment in ESL 11A or ESL 11B is advised”)

Motion to approve changes to ESL 16C with no additional revisions.

Motion made by: Susan Caggiano; **Seconded by:** Scott Silverman

The motion passed unanimously.

Motion to approve advisory changes for ESL 16C with no additional revisions.

Motion made by: Scott Silverman; **Seconded by:** Dione Hodges

The motion passed unanimously.

h. ESL 17 Intermediate Reading Skills

- Changed: course description, SLOs, course objectives, , course content, methods of presentation, methods of evaluation, textbooks, sample assignments
- Added Advisory: Concurrent enrollment in ESL 11A is advised.

Motion to approve changes to ESL 17 with no additional revisions.

Motion made by: Susan Caggiano; **Seconded by:** Kevin Roberts

The motion passed unanimously.

Motion to approve advisory addition for ESL 17 with no additional revisions.

Motion made by: Susan Caggiano; **Seconded by:** Dione Hodges

The motion passed unanimously.

i. ESL 20A Advanced Grammar Workshop

- Changed: course description, SLOs, course objectives, course content, methods of evaluation, textbooks, sample assignments

Motion to approve changes to ESL 20A and ESL 926 as a block (mirrored courses) with additional revisions to change “utilize” to “use” in: SLO #1, course objectives#1, and course objective and #3.

Motion made by: Susan Caggiano; **Seconded by:** Audra Wells

The motion passed unanimously.

j. ESL 20B Advanced Grammar and Editing

- Changed: course description, SLOs, course objectives, course content, methods of evaluation, textbooks, sample assignments

Motion to approve changes to ESL 20B with additional revision to course objective #7 to remove “and effectively” and change SLO #1 from “Compose a paragraph and revise for clarity, coherence and cohesion, and sentence-level grammar.” to “Revise sentence level grammar for clarity, cohesion while composing a paragraph.”

Motion made by: Kevin Roberts; **Seconded by:** Audra Wells

The motion passed unanimously.

k. ESL 28 Academic Vocabulary Skills

- Changed: course description, SLOs, course objectives, course content, methods of evaluation, textbooks, sample assignments

Motion to approve changes to ESL 28 and ESL 976 as a block (mirrored courses) with additional revision to the course description to remove “Students are encouraged to enroll in ESL 28 concurrently with ESL 20A, 20B, ESL 19A and/or ESL 19B.”.

Motion made by: Walker Griffy; **Seconded by:** Susan Caggiano

The motion passed unanimously.

l. ESL 922 Conversation and Culture in the U.S.

- Changed: course description, SLOs, course content, methods of evaluation, textbooks

Motion to approve changes to ESL 922 with additional revision to SLO #1 to remove “objectively”

Motion made by: Walter Butler; **Seconded by:** Jesus Lopez

The motion passed unanimously.

m. ESL 926 Advanced Grammar Workshop

- Changed: course description, SLOs, course objectives, course content, methods of evaluation, textbooks, sample assignments

ESL 926 passed as a block with ESL 20A (mirrored courses)

n. ESL 976 Academic Vocabulary Skills

- Changed: course description, SLOs, course objectives, course content, methods of presentation, methods of evaluation, textbooks, sample assignments

ESL 976 passed as a block with ESL 28 (mirrored courses)

(Courses: Distance Education)

o. ESL 976 Academic Vocabulary Skills

Motion to approve distance education for ESL 976 with no revisions to change software specific language (ex: Canvas to LMS, Zoom to videoconferencing software, PowerPoint to presentation, etc.)

Motion made by: Walker Griffy; **Seconded by:** Dione Hodges

The motion passed unanimously.

(Programs: New)

p. Affordable Property Management Certificate of Achievement

Motion to approve Affordable Property Management Certificate of Achievement with no revisions.

Motion made by: Scott Silverman; **Seconded by:** Susan Caggiano

The motion passed unanimously.

q. Property Management Certificate of Achievement

Motion to approve Property Management Certificate of Achievement with no revisions.

Motion made by: Jason Beardsley; **Seconded by:** Kevin Roberts

The motion passed unanimously.

(Programs: Revisions)

r. Changes to degrees, certificates, and program maps as a result of courses considered on this agenda
Motion to approve to changes to degrees, certificates, and program maps as a result of courses considered on this agenda

Motion made by: Susan Caggiano; **Seconded by:** Walter Butler

The motion passed unanimously.

VIII. New Business

None

IX. Old Business

None

X. Adjournment

Motion to adjourn the meeting at 4:50 pm.

Motion made by: Scott Silverman; **Seconded by:** Kevin Roberts

The motion passed unanimously.

Course Change CCN: ECONOMICS C2001, Principles of Microeconomics (formerly ECON 1)

Units:	3.00
Total Instructional Hours (usually 18 per unit):	54.00
Hours per week (full semester equivalent) in Lecture:	3.00
In-Class Lab:	0.00
Arranged:	0.00
Outside-of-Class Hours:	108.00
C-ID:	ECON 201
Transferability:	Transfers to UC, CSU
Cal-GETC Area:	4: Social and Behavioral Sciences
SMC GE Area:	4: Social and Behavioral Sciences
Degree Applicability:	Credit - Degree Applicable
Prerequisite:	Placement as determined by the college's multiple measures assessment process or completion of a course taught at or above the level of elementary algebra.
Proposed Start:	Fall 2026

I. Catalog Description

An introductory course using microeconomic models to understand individual decisions by consumers and firms, market outcomes including market failure, elasticity, market structures, labor markets, inequality, and the impact of government policies.

*Students may take ECON C2001 and ECON C2002 in any order or even at the same time.

II. Examples of Appropriate Text or Other Required Reading:

(include all publication dates; for transferable courses at least one text should have been published within the last 7 years)

1. Principles of Economics, Arnold, R., Arnold D., and Arnold, D. , McGraw-Hill © 2023
2. Economics, Colander, D. , McGraw-Hill © 2019
3. Principles of Economics, Coppock, L. and D. Mateer, Norton © 2023
4. The Economy 2.0, Core Econ, The CORE Econ Team., Core Econ © 2025
5. Modern Principles of Economics, Cowen, t. and Tabarrok, A. , Worth © 2021
6. Principles of Economics, Frank, R.H. and Bernanke, B.S., McGraw-Hill © 2023
7. Principles of Economics, 3e, Greenlaw S., Shapiro, D., and MacDonald, D. , OpenStax © 2024
8. Economics, Hubbard, R. G., & O'Brien, A. P. , Pearson © 2024
9. Economics, Krugman, P. & Wells, R. , Worth © 2024
10. Principles of Economics, Mankiw, N. G., Cengage learning © 2024
11. Economics: Principles, problems and policies, McConnell, C. R., Brue, S. L., & Flynn, S. M., McGraw-Hill Irwin © 2023
12. Economics, Parkin, M, Pearson © 2023
13. Principles of Economics, Rittenberg, L., & Tregarthen, T., Flat World Knowledge © 2021
14. Microeconomic Principles and Problems: A Pluralist Introduction, Schneider, G., Routledge © 2024
15. Principles of Economics, Stevenson, B. & Wolfers, J. , Worth © 2023
16. Economics for Today, Tucker, I. B., Cengage learning © 2023

III. Course Objectives

Upon completion of this course, the student will be able to:

1. Perform and interpret microeconomic calculations.
2. Apply microeconomic models to analyze market outcomes, including market failures and government policies.
3. Model how consumers and firms make decisions under a variety of market structures.

IV. Methods of Presentation:

Group Work, Lecture and Discussion, Distance Education, Service Learning, Online instructor-provided resources, Other Methods: While the traditional lectures and discussions are checked above, instructors are also encouraged to explore other pedagogical approaches and high-impact practices, like active learning, flipped classroom, team-based learning, An integral part of the instruction and delivery in this class requires the exchange of ideas among students in both the on-site and online environment. Instructors should include intentional student engagement activities in their course design and delivery. Distance education check acknowledges that we now offer this course in the online teaching-learning environment on a regular basis.

V. Course Content

<u>% of Course</u>	<u>Topic</u>
10.000%	1. Fundamentals of economic thinking a. Scarcity / opportunity costs b. Factors of production / production possibilities c. Specialization and gains from trade d. Marginal analysis e. Rational behavior f. Economic models and research methodology
25.000%	2. How markets operate a. Definition of a market b. Supply and demand model c. Producer / consumer surplus and efficiency d. Government intervention
10.000%	3. Elasticity
5.000%	4. Consumer theory / demand
10.000%	5. Producer theory a. Production and costs b. Accounting / economic profit c. Short- and long-run production decisions d. Industry structure
25.000%	6. Market Structures a. Perfect competition b. Monopoly c. Monopolistic competition d. Oligopoly and game theory
5.000%	7. Labor markets
10.000%	8. Market failure and public policy a. Externalities b. Public goods c. Imperfect competition d. Efficiency vs equity
100.000%	Total

VI. Methods of Evaluation

<u>% of Course</u>	<u>Topic</u>
50%	Exams and Quizzes Exams and Quizzes containing one or more: • Multiple Choice questions • Short answers • Problem Solving • True/False • Essays
20%	Written assignments Assessed written work may include any of the following (colleges are encouraged to work with local CSU and UC departments to determine writing requirements): • Current event analysis • Discussion boards • Essay questions on exams • Term papers
30%	Other Assessments Other Assessments: • Problem sets • Online or in-class discussions • Presentations • Group projects • Experiments • Current event analysis • Term papers

100%	Total
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VII. Sample Assignments:

Supply and Demand:

Using the supply and demand model, graph and explain how and why the quantity changes when the price changes. Next, pick two non-price factors (like income, price of substitutes, technology). For each, graph and explain what happens to the equilibrium price and quantity when there is a change in these factors. Elasticity: Use the information on prices, quantities demanded, and income levels for different goods to calculate the price elasticity of demand, income elasticity of demand, and cross-price elasticity of demand. Then, decide if demand is elastic, inelastic, or unit elastic, and state whether the goods are complements, substitutes, inferior, normal, necessities, or luxuries. Taxes: Using the supply and demand model, draw a graph to show how a tax creates a burden on buyers and sellers. Explain how the tax changes prices and output, and how it affects consumer surplus, producer surplus, and overall social welfare. Production Function: For different assumptions about diminishing returns, assume labor is the input and total product initially increases as labor increases. Then, draw the marginal product curve and calculate and graph the total product and average product functions, remembering that marginal product eventually decreases as labor increases.

Costs:

Using information from the table on labor, output, and fixed costs, calculate and graph total costs, variable costs, average total costs, average variable costs, average fixed costs and marginal costs. Cost, Profit, & Market Structure: From a list, separate explicit costs from implicit costs. Calculate both accounting profit and economic profit and use these results to help explain or predict economic decisions. Then, draw a graph to show the profit-maximizing price and quantity for each type of market structure. Long Run Costs: Using the information provided on short-run costs, build the long-run cost curve and describe the industry's characteristics in terms of returns to scale. Long Run Adjustments: Draw a graph to show how changes in market demand affect price and output for constant, increasing, and decreasing cost industries, and sketch the respective long-run supply curves. Oligopoly: Use different models to explain or predict prices and output levels in an oligopoly market.

VIII. Student Learning Outcomes:

1. *Demonstrate academic responsibility and integrity.
2. *Demonstrate through oral and/or written work knowledge of the course content: Supply and Demand Model, the concept of elasticity, productivity, cost structures, and the implications of alternative market structures including Perfect Competition, Monopoly, Monopolistic Competition and Oligopoly, for prices, efficiency, and the role of government.
3. *Demonstrate proficiency in the research, analytical, and communication skills necessary to present compelling and original arguments, orally and/or in writing, that advance reasonable conclusions as to how various government policies affect economic actors in a market economy.

Course Change CCN: ECONOMICS C2002, Principles of Macroeconomics (formerly ECON 2)

Units:	3.00
Total Instructional Hours (usually 18 per unit):	54.00
Hours per week (full semester equivalent) in Lecture:	3.00
In-Class Lab:	0.00
Arranged:	0.00
Outside-of-Class Hours:	108.00
C-ID:	ECON 202
Transferability:	Transfers to UC, CSU
Cal-GETC Area:	4: Social and Behavioral Sciences
SMC GE Area:	4: Social and Behavioral Sciences
Degree Applicability:	Credit - Degree Applicable
Prerequisite:	Placement as determined by the college's multiple measures assessment process or completion of a course taught at or above the level of elementary algebra.
Proposed Start:	Fall 2026

I. Catalog Description

An introductory course using models of the domestic and international economy to understand national income, unemployment, inflation, economic growth, inequality, the financial system, and monetary, fiscal, and other economic policies.

*Additionally, the course introduces students to the following models: Classical, Keynesian, Monetarist, and Supply Side with their corresponding policy implications and recommendations.

*Students may take ECON C2001 and ECON C2002 in any order or even at the same time

II. Examples of Appropriate Text or Other Required Reading:

(include all publication dates; for transferable courses at least one text should have been published within the last 7 years)

1. Economics, Colander, D., McGraw-Hill Irwin © 2019
2. Economics, Arnold, R., Arnold, D., & Arnold, D., Cengage learning © 2023
3. Principles of Economics, Coppock, L. & Mateer., Norton © 2023
4. The Economy 2.0, The CORE Econ Team, Core Econ © 2025
5. Economics, Parkin, M, Pearson © 2023
6. Modern Principles of Economics, Cowen, T., & Tabarrok, A., Worth © 2021
7. Principles of Economics, Frank, R. H., & Bernanke, B. S., McGraw-Hill Irwin © 2024
8. Principles of Economics, 3e, Greenlaw, S., Shapiro, D., & MacDonald, D., OpenStax © 2024
9. Economics, Hubbard, R. G., & O'Brien, A. P. , Pearson © 2024
10. Economics, Krugman, P. & Wells, R. , Worth © 2024
11. Principles of Economics, Mankiw, N. G., Cengage learning © 2024
12. Economics: Principles, Problems, and Policies, McConnell, C. R., Brue, S. L., & Flynn, S. M., McGraw-Hill Irwin © 2023
13. Principles of Economics, Rittenberg, L., & Tregarthen, T., Flat World Knowledge © 2021
14. Macroeconomic Principles and Problems: A Pluralist Introduction, Schneider, G., Routledge © 2023
15. Principles of Economics, Stevenson, B. & Wolfers, J. , Worth © 2023
16. Economics for Today, Tucker, I. B., Cengage learning © 2023

III. Course Objectives

Upon completion of this course, the student will be able to:

1. Interpret and analyze domestic and international macroeconomic data.
2. Apply macroeconomic models to explain economic issues and outcomes.
3. Analyze the effects of macroeconomic policies.
4. Contrast different schools of thought in terms of underlying assumptions and policy recommendations (Classical, Keynesian, Monetarist, and Supply Side).
5. Identify and explain the tools of Monetary and Fiscal Policies.
6. Assess the impact of changes in government spending and taxes on equilibrium output.
7. Compose a step-by-step diagram of the monetary policy process from changes in monetary policy tools to their ultimate impact on aggregate demand, equilibrium output, interest rates and overall prices.

IV. Methods of Presentation:

Lecture and Discussion, Group Work, Service Learning, Online instructor-provided resources, Distance Education, Other Methods: While the traditional lectures and discussions are checked above, instructors are also encouraged to explore other pedagogical approaches and high-impact practices, like active learning, flipped classroom, team-based learning, An integral part of the instruction and delivery in this class requires the exchange of ideas among students in both the on-site and online environment. Instructors should include intentional student engagement activities in their course design and delivery. Distance education check acknowledges that we now offer this course in the online teaching-learning environment on a regular basis.

V. Course Content

<u>% of Course</u>	<u>Topic</u>
8.000%	1. Fundamentals of economic thinking a. Scarcity / opportunity costs b. Factors of production c. Production possibilities d. Specialization and gains from trade e. Economic models and research methodology
8.000%	2. How markets operate a. Definition of a market b. Supply and demand model
24.000%	3. Measuring the economy a. National output and productivity b. Economic growth c. Price level (inflation) d. Business cycle e. Unemployment f. Inequality and Poverty
20.000%	4. Aggregate Demand / Aggregate Supply Model
20.000%	5. Financial system a. Saving, investment, and interest rates b. Money creation and banking c. Role and function of central banks d. Monetary policy
10.000%	6. The role of the government in the macro economy a. Government budget b. Fiscal policy c. Social policy
10.000%	7. International economics a. Balance of payments b. Exchange rates c. International trade
100.000%	Total

VI. Methods of Evaluation

<u>% of Course</u>	<u>Topic</u>
50%	Exams and Quizzes Exams and Quizzes containing one or more: • Multiple Choice questions • Short answers • Problem Solving • True/False • Essays
30%	Other Assessments

	Other Assessments: • Problem sets • Online or in-class discussions • Presentations • Group projects • Experiments • Current event analysis • Term papers
20%	Written assignments Assessed written work may include any of the following (colleges are encouraged to work with local CSU and UC departments to determine writing requirements): • Current event analysis • Discussion boards • Essay questions on exams • Term papers
100%	Total

VII. Sample Assignments:

Fiscal Policy:

Answer each of the following questions in complete sentences, using the assigned resources. Identify two main tools of fiscal policy. Explain how these tools would be used differently in an economic upturn and a recession. Trace the cause-and-effect of these policies (using both graphs and explanations) from the introduction of the policy tool through its effect on the average price level, output, and employment. To conclude, state the goals of expansionary and contractionary fiscal policy. Monetary Policy: How is the Fed's approach with monetary policy different from fiscal policy? Use two of the Fed's policy tools (interest on reserves and open market operations) used to counter a recession. Graphically illustrate and explain how these tools affect the market for reserves, the market for M1, and the market for real goods and services. Conclude by explaining the impact on prices, RGDP, and employment, and stating the Fed's targets and goals. Fed Independence: Why is the independence of the Federal Reserve important to a stable and well-functioning economy and financial system? Explain.

International Trade:

Respond to the following questions in complete sentences and with reference to your text and assigned resources. If a nation exported much of its output, but imported little, would it be better or worse off? Explain. Assume that the US raises tariffs on goods produced abroad and imported into the US: (1) Who pays the tariff? (2) How do these higher tariffs affect US consumers and businesses? (3) What impact do these higher tariffs have on prices, output, and employment in the US? Explain and graphically illustrate (where appropriate). (4) How might US trading partners respond to the higher tariffs? Explain using at least two examples from the assigned resources. (5) identify and explain two valid reasons for raising tariffs.

VIII. Student Learning Outcomes:

1. *Demonstrate academic responsibility and integrity.
2. *Demonstrate through oral and/or written work knowledge of the course content: measures of economic aggregates including GDP, the unemployment rate, the GDP Deflator and the Consumer Price Index, the tools of fiscal and monetary policy and their impact on aggregate demand, prices, income and interest rates, and the Classical, Keynesian, Monetarist and Supply Side models with their corresponding policy implications and recommendations.
3. *Demonstrate proficiency in the research, analytical, and communication skills necessary to present compelling and original arguments, orally and/or in writing, that advance reasonable conclusions concerning the different expectations of two or more economic theories and the varying consequences and opportunity costs of each on the macroeconomy in terms of level of employment, output and prices, inflation, and economic growth.

Course Change CCN: HISTORY C1001, United States History to 1877 (formerly HIST 11)

Units:	3.00
Total Instructional Hours (usually 18 per unit):	54.00
Hours per week (full semester equivalent) in Lecture:	3.00
In-Class Lab:	0.00
Arranged:	0.00
Outside-of-Class Hours:	108.00
C-ID:	HIST 130
Transferability:	Transfers to UC, CSU
Cal-GETC Area:	3B: Humanities, 4: Social and Behavioral Sciences
SMC GE Area:	3: Arts and Humanities, 4: Social and Behavioral Sciences
Degree Applicability:	Credit - Degree Applicable
Proposed Start:	Fall 2026

I. Catalog Description

This course is a historical survey of the United States, from Indigenous North America to the end of Reconstruction. The course also introduces students to historical reasoning skills.

*In addition, this course examines developments in American culture as well as ethnic, racial, gender, and class relations, politics, and the economy. It also considers U.S. interactions with other nations, focusing on foreign policy and the connections between domestic developments and the broader history of the modern world.

II. Examples of Appropriate Text or Other Required Reading:

(include all publication dates; for transferable courses at least one text should have been published within the last 7 years)

1. The American Nation, Carnes, Mark C. and John A. Garraty, Pearson © 2021
2. U.S. History OpenStax Free Textbooks Online, Corbett, P. Scott, Janssen Volker, John Lund, OpenStax (OER) © 2024
3. Out of Many: A History of the American People, Faragher, John Mack, Mari Jo Buhle, et al., Pearson © 2021
4. Give Me Liberty!, Foner, Eric, Kathleen DuVal, and Lisa McGirr, W.W. Norton Company © 2022
5. The American Journey, Goldfield, David, Carol Abbott, et al., Pearson © 2021
6. A People and a Nation: A History of the United States, Kamensky, Jane, Carol Sheriff, et al., Cengage © 2017
7. The American Pageant, Kennedy, David M. and Lizabeth Cohen, Cengage Learning © 2024
8. American Yawp (OER), Locke, John and Ben Wright, Stanford University Press © 2019
9. Liberty, Equality, Power, Murrin, John, Pekka Hämäläinen, et al., Cengage Learning © 2019
10. The American People: Creating a Nation and a Society, Nash, Gary, Julie Roy, et al., Pearson © 2023
11. The American Promise, Roark, James L., Michael P. Johnson, et al., Bedford/St. Martin's © 2022
12. America: A Narrative History, Tindall, George Brown and David E. Shi, W.W. Norton & Company © 2022
13. First Peoples: A Documentary Survey of Native American History, Calloway, Colin G., Bedford/St. Martin's © 2024
14. U.S. Women's History: Untangling the Threads of Sisterhood, Brown, Leslie, Jacqueline Castledine, et al., Rutgers University Press © 2017
15. Through Women's Eyes, Combined Volume: An American History with Documents, DuBois, Ellen and Lynn Dumenil, Macmillan Learning © 2024
16. Freedom on My Mind: A History of African Americans, with Documents, White, Deborah Gray, Mia Bay, et al., Macmillan Learning © 2020
17. Stamped from the Beginning: The Definitive History of Racist Ideas in America, Kendi, Ibram X. Christopher Dontrell Piper, et al., Bold Type Books © 2017
18. Asian American Histories of the United States, Choy, Catherine Ceniza, Cindy Kay, et al., Beacon Press © 2023
19. Asian American History, Ling, Huping, Rutgers University Press © 2023
20. Mexicanos, Third Edition: A History of Mexicans in the United States, Gonzales, Manuel G., Indiana University Press © 2019
21. * 1. Foner, Eric, et al. Voices of Freedom: A Documentary History, Volume 1. W. W. Norton & Company, 2022

III. Course Objectives

Upon completion of this course, the student will be able to:

1. Demonstrate the ability to interpret primary and secondary sources and to compose an argument which uses supportive evidence.
2. Demonstrate an understanding of U.S. History through analytical categories such as race, class, gender, sexuality, ethnicity.
3. Analyze economic, political, and cultural developments as well as social movements and assess their historical significance.
4. Analyze the relevance of Early American History to the present day.
5. *Draw connections between comparable and/or contrasting time periods and regions related to the course content, and discuss the value of historical knowledge and analysis for understanding change and continuity, up to the present time.

IV. Methods of Presentation:

Group Work, Lecture and Discussion, Service Learning, Distance Education, Other Methods: Methods of presentation will vary among instructors encompassing a combination of the following: Lecture accompanied by audio-visual material (including maps, material objects, primary photographs, documentaries, films, etc.), class discussion and activities, collaborative-learning activities, and/or service-learning projects.

V. Course Content

<u>% of Course</u>	<u>Topic</u>
6.660%	1. Introduction to basic methods of historical research and analysis
6.660%	2. Indigenous peoples, cultures, and lands
6.660%	3. European colonization
6.660%	4. Indentured servitude, chattel slavery, and the evolution of colonial labor systems
6.660%	5. Establishment and maturation of diverse colonial settlements and populations
6.660%	6. Colonial policies and imperial rivalries in North America and their implication for settlements
6.660%	7. The American Revolution
6.660%	8. The formation of the United States government from the Articles of Confederation through the ratification of the Constitution and the Bill of Rights
6.660%	9. The Early Republic including the meanings of democracy; political parties; economic and territorial expansion
6.680%	10. Sectionalism, expansion of slavery, and the Market Revolution in Antebellum America * 10a. The Old South * 10b. Life Under Slavery
6.680%	11. Manifest Destiny, the War with Mexico and its aftermath, and Indigenous policy
6.680%	12. Second Great Awakening, Abolitionist Movement, Women's Rights and other Antebellum Revival and Reforms
6.680%	13. Crisis of the 1850s and the coming of the Civil War
6.660%	14. The Civil War
6.680%	15. Reconstruction
100.000%	Total

VI. Methods of Evaluation

<u>% of Course</u>	<u>Topic</u>
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10%	Class Participation *In-Class Activities.
70%	Exams/Tests *Essay exams, out-of-class papers, and quizzes; no single assignment shall be worth more than 30% of the final grade
20%	Homework *Academic research and writing
100%	Total

Methods of formative and summative evaluation used to observe or measure students' achievement of course outcomes and objectives must include academic writing and research.

Additional methods of evaluation are encouraged and at the discretion of local faculty and may incorporate assessments and exercises such as journals, quizzes, discussions, group work, and presentations.

* Methods of grading and assignments will vary among instructors, although all will include an emphasis on written work that demonstrates content knowledge and analytical skills. Generally, frequent quizzes, one or two midterms plus a final exam will be given. These will use a combination of objective questions, short answers/identifications, and extended essays. Various assignments, including book reviews, short research papers, critical analyses of documents, chapter study questions, etc. may also be given. The relative weight of exams and assignments will vary by instructor. Generally, exams will count for 66% to 75% of the course grade, with assignments and class participation making up the remainder.

VII. Sample Assignments:

Sample Assignment #1:

Briefly summarize and analyze two primary sources, identifying their perspectives, purposes, the contexts in which they were produced, and their historical significance. Once you have analyzed each document, discuss how they relate to one another. For example, do they reveal different perspectives or change over time?

Sample Assignment #2:

Write an analytical essay that identifies and discusses relevant political, economic, social, cultural, and/or external causes of a major event and its outcome. Your essay should draw on secondary sources (the text and lectures) and a minimum of six primary sources.

VIII. Student Learning Outcomes:

1. *Describe and discuss, orally and/or in writing, the significance of major economic, political, social, cultural, and historical events of US History from pre European colonization to post-Civil War Reconstruction and their relevance to the present day.
2. *Demonstrate the ability to interpret historical information by applying analytical skills used by historians—such as synthesizing evidence from both primary and secondary sources, comparing and contrasting multiple perspectives, contextualizing information, and/or identifying causes and effects of change and continuity—to the course content.
3. *Demonstrate the value of historical knowledge for understanding more recent and/or comparable issues, events, and trends.

Course Change CCN: HISTORY C1002, United States History since 1865 (formerly HIST 12)

Units:	3.00
Total Instructional Hours (usually 18 per unit):	54.00
Hours per week (full semester equivalent) in Lecture:	3.00
In-Class Lab:	0.00
Arranged:	0.00
Outside-of-Class Hours:	108.00
C-ID:	HIST 140
Transferability:	Transfers to UC, CSU
Cal-GETC Area:	3B: Humanities, 4: Social and Behavioral Sciences
SMC GE Area:	3: Arts and Humanities, 4: Social and Behavioral Sciences
Degree Applicability:	Credit - Degree Applicable
Proposed Start:	Fall 2026

I. Catalog Description

This course is a historical survey of the United States from the end of the Civil War to the present. The course also introduces students to historical reasoning skills.

*In addition, this course examines developments in American culture as well as ethnic, racial, gender, and class relations, politics, and the economy. It also considers U.S. interactions with other nations, focusing on foreign policy and the connections between domestic developments and the broader history of the modern world.

II. Examples of Appropriate Text or Other Required Reading:

(include all publication dates; for transferable courses at least one text should have been published within the last 7 years)

1. The American Nation, Carnes, Mark C. and John A. Garraty, Pearson © 2021
2. U.S. History. OpenStax Free Textbooks Online (OER), Corbett, P. Scott, Janssen Volker, John Lund, OpenStax © 2024
3. Out of Many: A History of the American People, Faragher, John Mack, Mari Jo Buhle, et al., Pearson © 2021
4. Give Me Liberty!, Foner, Eric, Kathleen DuVal, and Lisa McGirr, W.W. Norton Company © 2022
5. The American Journey, Goldfield, David, Carol Abbott, et al., Pearson © 2021
6. A People and a Nation: A History of the United States, Kamensky, Jane, Carol Sheriff, et al., Cengage © 2017
7. The American Pageant, Kennedy, David M. and Lizabeth Cohen, Cengage Learning © 2024
8. American Yawp (OER), Locke, John and Ben Wright, Stanford University Press © 2019
9. Liberty, Equality, Power, Murrin, John, Pekka Hämäläinen, et al., Cengage Learning © 2019
10. The American People: Creating a Nation and a Society, Nash, Gary, Julie Roy, et al., Pearson © 2023
11. The American Promise, Roark, James L., Michael P. Johnson, et al., Bedford/St. Martin's © 2022
12. America: A Narrative History, Tindall, George Brown and David E. Shi, W.W. Norton & Company © 2022
13. U.S. History, OpenStax, OpenStax © 2025
14. First Peoples: A Documentary Survey of Native American History, Calloway, Colin G., Bedford/St. Martin's. © 2024
15. U.S. Women's History: Untangling the Threads of Sisterhood, Brown, Leslie, Jacqueline Castledine, et al., Rutgers University Press © 2017
16. Through Women's Eyes, Combined Volume: An American History with Documents, DuBois, Ellen and Lynn Dumenil, Macmillan Learning © 2024
17. Freedom on My Mind: A History of African Americans, with Documents, White, Deborah Gray, Mia Bay, et al., Macmillan Learning © 2020
18. Stamped from the Beginning: The Definitive History of Racist Ideas in America, Kendi, Ibram X. Christopher Dontrell Piper, et al., Bold Type Books © 2017
19. Asian American Histories of the United States, Choy, Catherine Ceniza, Cindy Kay, et al., Beacon Press © 2023
20. Asian American History, Ling, Huping, Rutgers University Press © 2023
21. Mexicanos, Third Edition: A History of Mexicans in the United States, Gonzales, Manuel G., Indiana University Press © 2019
22. * 1. Foner, Eric, et al. Voices of Freedom: A Documentary History, Volume 2. W. W. Norton & Company, 2022

III. Course Objectives

Upon completion of this course, the student will be able to:

1. Demonstrate the ability to interpret primary and secondary sources and to compose an argument which uses supportive evidence.
2. Demonstrate an understanding of U.S. History through analytical categories such as race, class, gender, sexuality, and ethnicity.
3. Analyze economic, political, and cultural developments as well as social movements and assess their historical significance.
4. Analyze the relevance of Modern American History to the present day.
5. * Draw connections between comparable and/or contrasting time periods and regions related to the course content, and discuss the value of historical knowledge and analysis for understanding change and continuity, up to the present time.

IV. **Methods of Presentation:**

Group Work, Lecture and Discussion, Service Learning, Distance Education, Other Methods: Methods of presentation will vary among instructors encompassing a combination of the following: Lecture accompanied by audio-visual material (including maps, material objects, primary photographs, documentaries, films, etc.), class discussion and activities, collaborative-learning activities, and/or service-learning projects.

V. **Course Content**

<u>% of Course</u>	<u>Topic</u>
6.250%	1. Introduction to basic methods of historical research and analysis.
6.250%	2. Reconstruction and the New South.
6.250%	3. Immigration, industrialization, and urbanization in the Gilded Age * 3a. Capitalism & It's Discontents
6.250%	4. Closing of the frontier and Resistance of Indigenous Peoples
6.250%	5. Progressive Era Reform Movements * 5a. Domestic * 5b. International
6.250%	6. Imperialist expansion and emergence of the United States as a world power
6.250%	7. World War I
6.250%	8. Post-War America and the 1920s
6.250%	9. The Great Depression and the New Deal
6.250%	10. World War II and Its Aftermath
6.250%	11. Cold War Era
6.250%	12. Civil Rights Movements
6.250%	13. Vietnam, the Great Society, and the Transformation of America
6.250%	14. From Nixon to Reagan * 14a. Movement Legacies * 14b. Deindustrialization * 14c. Conservative Countertrends
6.250%	15. Entering the New Millennium * 15a. Globalization * 15b. Culture Wars * 15c. 9/11, the War on Terror and It's Aftermath

6.250%	16. Twenty-first century and the recent past
100.000%	Total

VI. Methods of Evaluation

<u>% of Course</u>	<u>Topic</u>
10%	Class Participation *In-Class Activities.
70%	Exams/Tests *Essay Exams, Out-of-Class Papers, and Quizzes; no single assignment shall be worth more than 30% of the final grade
20%	Homework *Academic research and writing
100%	Total
Methods of formative and summative evaluation used to observe or measure students' achievement of course outcomes and objectives must include academic writing and research. Additional methods of evaluation are encouraged and at the discretion of local faculty and may incorporate assessments and exercises such as journals, quizzes, discussions, group work, and presentations. * Methods of grading and assignments will vary among instructors, although all will include an emphasis on written work that demonstrates content knowledge and analytical skills. Generally, frequent quizzes, one or two midterms plus a final exam will be given. These will use a combination of objective questions, short answers/identifications, and extended essays. Various assignments, including book reviews, short research papers, critical analyses of documents, chapter study questions, etc. may also be given. The relative weight of exams and assignments will vary by instructor. Generally, exams will count for 66% to 75% of the course grade, with assignments and class participation making up the remainder.	

VII. Sample Assignments:

Sample Assignment #1:

Briefly summarize and analyze two primary sources, identifying their perspectives, purposes, the contexts in which they were produced, and their historical significance. Once you have analyzed each document, discuss how they relate to one another. For example, do they reveal different perspectives or change over time?

Sample Assignment #2:

Write an analytical essay that identifies and discusses relevant political, economic, social, cultural, and/or external causes of a major event and its outcome. Your essay should draw on secondary sources (the text and lectures) and a minimum of six primary sources.

VIII. Student Learning Outcomes:

1. Describe and discuss, orally and/or in writing, the significance of major economic, political, social, cultural, and historical events of US History from post-Civil War Reconstruction to the early 21st century and their relevance to the present day.
2. *Demonstrate the ability to interpret historical information by applying analytical skills used by historians—such as synthesizing evidence from both primary and secondary sources, comparing and contrasting multiple perspectives, contextualizing information, and/or identifying causes and effects of change and continuity—to the course content.
3. *Demonstrate the value of historical knowledge for understanding more recent and/or comparable issues, events, and trends.

Substantial Change: AQUACULTURE 1, Introduction to Aquaculture: History, Ecology and Sustainability

Units:	3.00
Total Instructional Hours (usually 18 per unit):	54.00
Hours per week (full semester equivalent) in Lecture:	3.00
In-Class Lab:	0.00
Arranged:	0.00
Outside-of-Class Hours:	108.00
Transferability:	Transfers to UC, CSU
Degree Applicability:	Credit – Degree Applicable
SMC GE Area:	5: Natural Sciences, 7: Global Citizenship

I. Catalog Description

This is an introductory course to the field of aquaculture. Topics include the history and current trends in the field, a review of Biological and ecological concepts relevant to aquaculture with attention to the impact of climate change and other environmental concerns on the sustainability of the industry. With consideration for environmental change, additionally, this course addresses conservation and restoration practices for endangered species.

II. Examples of Appropriate Text or Other Required Reading:

(include all publication dates; for transferable courses at least one text should have been published within the last 7 years)

1. Aquaculture: Farming Aquatic Animals and Plants, 3, John S Lucas, Paul C Southgate, Craig S Tucker, Wiley-Blackwell © 2019, ISBN: 1119230861
2. A Primer of Ecological Aquaculture, 1, Kultz, Dietmar, Oxford University Press © 2022, ISBN: 9780198850236

III. Course Objectives

Upon completion of this course, the student will be able to:

1. Appraise and differentiate between historical and modern aquaculture practices, and develop best practices for a future aquaculture industry in the context of sustainability and the global climate crisis.
2. Examine the ecological principles of finfish, shellfish and algae, as they relate to sustainable aquaculture.
3. Defend sustainability needs in aquaculture, and critique various modern aquaculture approaches in this context.

IV. Methods of Presentation:

Distance Education, Lecture and Discussion, Discussion, Visiting Lecturers, Group Work, Online instructor-provided resources

V. Course Content

<u>% of Course</u>	<u>Topic</u>
4.000%	Introduction, definitions and terminology
4.000%	History of historical aquaculture
4.000%	History of commercial aquaculture
4.000%	Global markets and supply
4.000%	Current trends in aquaculture techniques
4.000%	Taxonomy and classification
12.000%	Basic biology of finfishes
12.000%	Basic biology of shellfish
12.000%	Basic biology of algae

10.000%	Food webs and biological energy transfer
10.000%	Multi-trophic systems
10.000%	Concepts in conservation and sustainability
10.000%	Global climate change and aquaculture
100.000%	Total

VI. Methods of Evaluation

% of Course	Topic
10%	Class Participation Points will be awarded for active discussion and participation in class activities.
20%	Quizzes Multiple, regularly spaced quizzes will be used to assess student progress.
30%	Exams/Tests 3-4 midterm exams
20%	Group Projects 1-3 Faculty-guided group projects culminating in written and/or oral presentation.
20%	Final exam The final examination will be in the form of exam, and/or written and/or oral presentation.
100%	Total

VII. Sample Assignments:

Presentation (written or oral):

Present a nuanced discussion on the pros and cons of aquaculture with emphasis on the requirements for a successful Blue Economy program, with consideration for sustainability and food justice.

Written or oral group project:

Compare and contrast historical and modern aquaculture techniques in the context of addressing the global climate crisis to develop best practices for the future needs of sustainable aquaculture and global food supply.

VIII. Student Learning Outcomes:

1. Describe and create best practices for a future aquaculture industry in the context of sustainability and the global climate crisis.
2. Evaluate and defend sustainability-minded best practices in aquaculture and critique various modern aquaculture approaches in this context.
3. Describe and differentiate among the ecological principles of finfish, shellfish and algae, particularly as they relate to sustainable aquaculture.
4. Define sustainability and how it can be applied to aquaculture practices in general.
5. Examine and characterize between historical and modern aquaculture practices.

Substantial Change: AQUACULTURE 2, Applications in Aquaculture - System Design, Monitoring and Maintenance

Units:	4.00
Total Instructional Hours (usually 18 per unit):	108.00
Hours per week (full semester equivalent) in Lecture:	3.00
In-Class Lab:	3.00
Arranged:	0.00
Outside-of-Class Hours:	108.00
Transferability:	Transfers to CSU
Degree Applicability:	Credit – Degree Applicable

I. Catalog Description

This lecture and lab course explores the variety of aquaculture systems, including the design and build phase, monitoring and maintenance, and rearing and husbandry of aquaculture species.

II. Examples of Appropriate Text or Other Required Reading:

(include all publication dates; for transferable courses at least one text should have been published within the last 7 years)

1. Recirculating Aquaculture, 4, Michael Timmons, Todd Guerdat & Brian Vinci, Ithaca Publishing © 2018, ISBN: 0971264678
2. Aquaculture: Farming Aquatic Animals and Plants, 3, John S. Lucas, ed., Paul C Southgate, ed., Craig S Tucker, ed., Wiley-Blackwell © 2019, ISBN: 1119230861

III. Course Objectives

Upon completion of this course, the student will be able to:

1. Design, build and evaluate original designs for effective open and closed aquaculture systems used in breeding, hatching and/or rearing aquatic taxa.
2. Evaluate the life support conditions of aquaculture systems to optimize life support of the target species.
3. Effectively analyze and make adjustments to aquaculture systems for efficiency and productivity based on data-driven analysis.
4. Appraise and apply techniques to maximize success in hatching and rearing of aquatic taxa.

IV. Methods of Presentation:

Distance Education, Lecture and Discussion, Lab, Observation and Demonstration, Critique, Discussion, Projects, Field Trips, Visiting Lecturers, Group Work, Online instructor-provided resources

V. Course Content

<u>% of Course</u>	<u>Topic</u>
15.000%	Culturing Algae & Aquatic Plants
15.000%	Spawning & Rearing Shellfishes
15.000%	Spawning & Rearing Finfishes
15.000%	Monitoring Equipment
8.000%	Wiring & Electrical Systems
8.000%	Plumbing and Pipe Fitting
8.000%	Filtration & Water Delivery
8.000%	Design & Engineering of Aquaculture Systems
8.000%	Facilities & Lab/Hatchery Safety
100.000%	Total

VI. Methods of Evaluation

% of Course	Topic
10%	Class Participation Points will be awarded for active discussion and participation in class and lab activities.
15%	Quizzes Multiple, regularly spaced quizzes will be used to assess student progress.
25%	Group Projects 1-3 faculty-guided group projects culminating in in-class demos.
25%	Projects Smaller, individual projects will be assigned for assess mastery of skills.
25%	Final Project A final, capstone project will be used to assess the overall understanding and skillsets presented in this course.
100%	Total

VII. Sample Assignments:**Design an aquaculture system:**

Design an aquaculture system to demonstrate a conceptual understanding of the circulation and water quality needs for spawning and rearing of a taxon (e.g., finfishes, shellfishes, algae).

Build an aquaculture model system (Group Project):

Build and monitor an aquaculture system capable of housing various taxa (e.g., finfishes, shellfishes, algae).

VIII. Student Learning Outcomes:

1. Design & build effective aquaculture systems for hatching and rearing of a variety of aquatic taxa.
2. Measure and interpret conditions in aquaculture systems to optimize efficiency and productivity, and make adjustments to achieve desired outcomes.
3. Apply appropriate techniques to hatch and rear a variety of aquatic taxa under controlled aquaculture conditions.

Substantial Change: AQUACULTURE 3, Microbiology and Genetics for Aquaculture

Units:	4.00
Total Instructional Hours (usually 18 per unit):	108.00
Hours per week (full semester equivalent) in Lecture:	3.00
In-Class Lab:	3.00
Arranged:	0.00
Outside-of-Class Hours:	108.00
Transferability:	Transfers to UC
Degree Applicability:	Credit – Degree Applicable
SMC GE Area:	5: Natural Sciences
Prerequisite(s):	AQUA 1 or AQUA 2

I. Catalog Description

This course addresses topics in clinical microbiology and genetics relevant to aquaculture and aquarium sciences. With consideration for environmental change, additionally, this course addresses conservation and restoration practices for endangered species.

II. Examples of Appropriate Text or Other Required Reading:

(include all publication dates; for transferable courses at least one text should have been published within the last 7 years)

1. Aquaculture and Fisheries Biotechnology: Genetic Approaches, 3, Dunham, Rex A., CABI © 2023, ISBN: 9781789243444
2. Recent Advances in Aquaculture Microbial Technology, 1, Editors: Jyothis, Matthew; Jose Midhun, EK Radhakrishnan, and Ajay Kumar, Elsevier/AP © 2022, ISBN: 9780323902618

III. Course Objectives

Upon completion of this course, the student will be able to:

1. Examine, differentiate and characterize disease-causing and essential microbes in sustainable aquaculture systems.
2. Execute best practices associated with disease remedies in sustainable aquaculture, with particular emphasis on public health.
3. Evaluate effectiveness of various treatments against disease to maximize productivity and public health.
4. Analyze and differentiate current techniques in genetic manipulation to maximize production and vitality while considering environmental safety and supporting public health.
5. Assess the effect of current aquaculture practices and techniques for disease reduction and elimination on sustainability, public health and the environment.

IV. Methods of Presentation:

Distance Education, Lecture and Discussion, Lab, Observation and Demonstration, Discussion, Critique, Projects, Field Trips, Visiting Lecturers, Group Work, Online instructor-provided resources, Experiments

V. Course Content

<u>% of Course</u>	<u>Topic</u>
12.500%	Ploidy Manipulation
12.500%	Selective Breeding
12.500%	Heredity
12.500%	Introduction to Genetics
10.000%	Histology
10.000%	Diseases and Mitigation
10.000%	Disease Identification

10.000%	Microbes in the Hatchery
10.000%	Introduction to microbes
100.000%	Total

VI. **Methods of Evaluation**

% of Course	Topic
10%	Class Participation Points will be awarded for active discussion and participation in class and lab activities.
15%	Quizzes Multiple, regularly spaced quizzes will be used to assess student progress.
25%	Exams/Tests 2-4 regularly spaced exams will assess mastery of subject material.
25%	Lab Reports Reports and assignments will be used to assess skill building in laboratory techniques and concepts.
25%	Final exam A final, capstone examination will be used to assess the overall understanding and skillsets presented in this course.
100%	Total

VII. **Sample Assignments:**

Microbe Characterization:

Design and execute an experiment to sample and characterize the microbes in the sea water tank. Report your findings in graph form. Be sure to include figure legends for each of your graphs.

Disease assessment and treatment:

Given a set of symptoms, assess for potential microbial causes and suggest potential treatments.

Selective Breeding for Climate Change:

Suggest a selective breeding regime to improve culture viability in open water in response to climate change (ie: increased temperature and lower pH).

VIII. **Student Learning Outcomes:**

1. Describe the impact of disease interventions on sustainable aquaculture to maximize the health and productivity of finfish, shellfish and algae.
2. Evaluate the intersection of treating for disease-causing microbes, maximum production, genetic modifications and best practices in aquaculture on public health and environmental sustainability.
3. Analyze a particular disease scenario common to aquaculture, and create a treatment plan for sustainable aquaculture systems that are efficient, productive, and reflect a high standard for the support of public health.

Substantial Change: AQUACULTURE 4, Husbandry and Life Support in Aquaculture and Aquarium Science

Units:	2.00
Total Instructional Hours (usually 18 per unit):	54.00
Hours per week (full semester equivalent) in Lecture:	1.50
In-Class Lab:	1.50
Arranged:	0.00
Outside-of-Class Hours:	54.00
Transferability:	Transfers to CSU
Degree Applicability:	Credit – Degree Applicable
Prerequisite(s):	AQUA 1 and AQUA 2

I. Catalog Description

This course explores production, nutrition, growing and preservation of aquaculture organisms for the food industry as well as for non-food uses of aquaculture products. Additionally, with consideration for environmental change, this course addresses conservation and restoration practices for endangered species.

II. Examples of Appropriate Text or Other Required Reading:

(include all publication dates; for transferable courses at least one text should have been published within the last 7 years)

1. Aquaculture: Farming Aquatic Animals and Plants, 3, John S Lucas, Paul C Southgate, Craig S Tucker, Wiley-Blackwell © 2019, ISBN: 1119230861

III. Course Objectives

Upon completion of this course, the student will be able to:

1. Analyze and distinguish among different techniques in conditioning, /fertilization and hatching of shellfish/finfish/algae.
2. Evaluate the effectiveness of, and execute the commonly used cryopreservation techniques in sustainable aquaculture.
3. Establish and evaluate best practices for nutrition and feeding of target finfish, shellfish and algae with consideration for sustainability.
4. Maximize the economic or species recovery viability of a target species within the context of sustainable aquaculture.
5. Classify and non-food uses of aquaculture-produced material, including attention to the application of regulations and restrictions in rearing target species.

IV. Methods of Presentation:

Distance Education, Lecture and Discussion, Lab, Observation and Demonstration, Discussion, Critique, Projects, Experiments, Visiting Lecturers, Field Trips, Group Work, Online instructor-provided resources

V. Course Content

<u>% of Course</u>	<u>Topic</u>
25.000%	Non-food uses of produced material
25.000%	Nutrition and feeding of fish, shellfish, and algae
25.000%	Cryopreservation techniques in aquaculture
25.000%	Gametes, gametogenesis and conditioning/fertilization of Fish/Finfish/Algae
100.000%	Total

VI. Methods of Evaluation

<u>% of Course</u>	<u>Topic</u>
10%	Class Participation

	Points will be awarded for active discussion and participation in class and lab activities.
15%	Quizzes Quizzes will be offered in regular intervals to assess whether students are staying current.
25%	Exams/Tests 2-4 regularly spaced exams will assess mastery of subject material.
25%	Lab Reports Reports and assignments will be used to assess skill building in laboratory techniques and concepts.
25%	Final exam A final, capstone examination will be used to assess the overall understanding and skillsets presented in this course.
100%	Total

VII. Sample Assignments:

Cost-Benefit Analysis:

Select a nutrition and feeding regimen for an aquaculture species covered in this course. Consider cost of feed, health and growth rate of the aquaculture species, human health, and environmental concerns. Determine the optimal density for maximizing profit, and the length of time to maturity and shipment.

Balancing Risk with Production:

Identify an aquaculture species within each of the three taxa. Perform a risk assessment and potential of disease outbreak as a function of species density. Describe an idealized balance between maximizing production, while minimizing risk of system collapse or disease outbreak.

VIII. Student Learning Outcomes:

1. Appraise and differentiate between different techniques in conditioning/fertilization of shellfish/finfish/algae.
2. Evaluate effectiveness of different cryopreservation techniques in aquaculture.
3. Develop and apply best practices for nutrition and feeding of fish, shellfish, and algae with consideration for both sustainability and economic viability.
4. Appraise and differentiate between food versus non-food uses of aquaculture-produced material.

Substantial Change: AQUACULTURE 5, Advanced Topics in Aquaculture

Units:	2.00
Total Instructional Hours (usually 18 per unit):	36.00
Hours per week (full semester equivalent) in Lecture:	2.00
In-Class Lab:	0.00
Arranged:	0.00
Outside-of-Class Hours:	72.00
Transferability:	Transfers to CSU
Degree Applicability:	Credit – Degree Applicable
Prerequisite(s):	AQUA 1 and AQUA 2

I. Catalog Description

This course examines the physical and logistical aspects of starting an aquaculture project, including permitting, site selection, licensing, security, and landing best practices. Additionally, the course will cover concepts of biological security, as well as food production, handling and delivery.

II. Examples of Appropriate Text or Other Required Reading:

(include all publication dates; for transferable courses at least one text should have been published within the last 7 years)

1. No textbook is appropriate for this course. However, a variety of local and government agency documents and websites will be used as needed.

III. Course Objectives

Upon completion of this course, the student will be able to:

1. Design, create and examine optimal aquaculture systems, with specific attention to identifying and defending site selection based on conditions that would optimize the aquaculture system and production success.
2. Assemble and justify applications to pertinent agencies and entities for the purposes of permitting and licensing.
3. Develop, propose and support presentations for public outreach, including for stakeholder meetings and other means of negotiation for the establishment of social license to construct an aquaculture business at a given location.
4. Assess and critique the effect of alien genetic introductions to the wild in the context of environmental health and public image (social license).
5. Describe and debate how aquaculture systems can be constructed with effective preventative mechanisms to avoid the introduction of alien genes and/or species to the wild.

IV. Methods of Presentation:

Distance Education, Lecture and Discussion, Discussion, Critique, Projects, Online instructor-provided resources

V. Course Content

<u>% of Course</u>	<u>Topic</u>
25.000%	Landings, including boat safety and knots
15.000%	Creating Food/Delivery and Handling
15.000%	Social License
15.000%	Biological Security and safeguarding against alien genetic introductions.
15.000%	Permitting & Certification
15.000%	Site selection
100.000%	Total

VI. Methods of Evaluation

% of Course	Topic
25%	Class Participation Points will be awarded for active participation in discussion boards.
20%	Quizzes regular and evenly spaced quizzes will be administered to assess progress toward mastery of skills and concepts.
20%	Projects A variety of projects, specific to different course modules will be assigned to assess real-world ability to address the needs of starting and operating an aquaculture system.
35%	Final Project A cumulative capstone project or exam will be assigned to assess course mastery.
100%	Total

VII. **Sample Assignments:**

Knot Tying Assignment:

Record a short video of yourself tying at least 10 knots covered in class, and explain the usage and possible function for each knot you present.

Permit Justification:

Write a justification of your ideal aquaculture project for the purpose of applying for a local permit to produce food.

VIII. **Student Learning Outcomes:**

1. Evaluate and analyze site conditions to optimize an aquaculture system setting.
2. Create and defend the justification for permitting and licensing applications.
3. Design a presentation and facilitate a mock meeting among community and/or industry partners to negotiate an acceptable social license for establishing an aquaculture business at a given location.
4. Assess and criticize the impact of alien genetic introductions and evaluate how aquaculture systems can be constructed with effective preventative mechanisms.

Substantial Change: ENGLISH FOR SECOND LANGUAGE SPEAKERS 14B, Pronunciation: Rhythm and Intonation

Units:	3.00
Total Instructional Hours (usually 18 per unit):	54.00
Hours per week (full semester equivalent) in Lecture:	3.00
In-Class Lab:	0.00
Arranged:	0.00
Outside-of-Class Hours:	108.00
Transferability:	None
Degree Applicability:	Credit - Not Degree Applicable
Prerequisite(s):	ESL 10G or ESL 10W or placement in ESL 11A
Proposed Start:	Fall 2026

I. Catalog Description

This course is designed to help ESL students communicate more effectively by learning the rhythm and intonation patterns of standard North American English. The course includes a brief review of all vowel sounds and specific consonants.

II. Examples of Appropriate Text or Other Required Reading:

(include all publication dates; for transferable courses at least one text should have been published within the last 7 years)

1. *Well Said*, 4, Grant, L., Heinle © 2017, ISBN: 9781305641365
2. *Mastering the American Accent*, 2, Mojsin, L, Barton's © 2016, ISBN: 9781438008109

Rationale: The information in these textbooks continues to be relevant to the pronunciation skills taught in ESL 14B. The content aligns with the contextualized approach used in ESL 14B.

III. Course Objectives

Upon completion of this course, the student will be able to:

1. Use a phonetic alphabet system to identify and produce the correct pronunciation of words.
2. Distinguish between voiced and voiceless consonants in order to apply the rules of vowel lengthening.
3. Apply the rules for correctly pronouncing -s and -ed endings.
4. Use the rules for word stress to accurately produce multi-syllabic words.
5. Identify the elements of sentence rhythm, including content and function words, in written and listening passages and then use the guidelines to produce sentences with correct rhythm.
6. Identify stressed words in written and listening passages and then orally produce sentences that demonstrate accurate placement of stress in sentences.
7. Identify examples of linking in fast speech (in listening passages) in order to understand their slow speech counterparts (and meanings).
8. Identify examples of reductions of vowels and consonants in fast speech (in listening passages) in order to understand their slow speech counterparts.
9. Use a variety of intonation patterns to convey different meanings.

IV. Methods of Presentation:

Lecture and Discussion, Other: Audio/visual listening exercises Pair and small group activities Internet-based activities

V. Course Content

<u>% of Course</u>	<u>Topic</u>
5.000%	The phonetic alphabet and how to use it to correctly pronounce words
5.000%	A review of all vowel sounds and specific consonant sounds/clusters
10.000%	Voiced and voiceless consonants and their relevance to the rules of vowel lengthening
10.000%	Word endings (-s and -ed)
15.000%	Syllable stress in multi-syllabic words

20.000%	Sentence stress, including content and function words, and the principles of rhythm, including contrastive stress patterns and breaking the rules of normal sentence stress to achieve emphasis
15.000%	Basic intonation patterns in statements and questions
10.000%	Pitch and intonation patterns
10.000%	Linking and vowel reduction in fast speech
100.000%	Total

VI. Methods of Evaluation

<u>% of Course</u>	<u>Topic</u>
45%	Class Work: In-class work, homework, and presentations (9-10 assignments in total)
15%	Final exam
40%	Quizzes: 4-5 total quizzes
100%	Total

VII. Sample Assignments:

Practicing Word Stress in Three-Syllable words ending in -y: Step 1: You will find a partner. You will be Partner 1. Your partner is Partner 2. You will receive a handout with six questions on the top half and a list of three-syllable words that end in -y on the bottom half. Partner 2 receives a different handout but which also contains six questions on the top half and a list of three-syllable words that end in -y on the bottom half. Step 2: You will ask Partner 2 the questions on the top portion of their handout. Partner 2 will choose words from the bottom half of their handout to answer the questions. The answers are all words that are three-syllables long and that end in -y. You will listen to make sure that Partner 2 applies the correct stress pattern to each answer. (Stress should be on the first syllable.) Step 3: Now you and your partner will reverse roles. Partner 2 now asks you their six questions and listens to your responses and provides feedback on your syllable stress.

Movie Clip Presentation: Step 1: Listen as the teacher introduces the context of a short, 3-minute movie clip. Step 2: With the sound off, you will view a short 3-minute movie clip that features two actors. The teacher will ask you to notice facial expressions and mouth movements and make predictions about the content of dialogue. Step 3: You will receive the script of the movie clip. Step 4: You and your class will read through the script and highlight stressed words in sentences and stressed syllables in multi-syllabic words. You should also mark rising and falling intonation within statements and questions. Step 5: You will view the movie clip a few times. Step 6: You will form pairs and practice reproducing the dialogue. Step 7: For homework, you will view the clip on the class Canvas page and practice the role you want to play. Step 8: In the next class session, you will present the dialogue in front of the class and the teacher will video record it. Step 9: The teacher will post the presentations on Canvas and you will view your presentation. You will mark on your script where you think you may have made any errors in pronunciation and comment on your performance. Step 10: You will turn in your script in to the teacher who will then view your presentation and evaluate your presentation.

VIII. Student Learning Outcomes:

1. Apply the rules for question and statement intonation patterns to accurately produce sentences with various intonation patterns.
2. Identify the elements of sentence rhythm, including content and function words, in written and listening passages and then use the guidelines to produce sentences with correct rhythm.
3. Apply the guidelines for stress in multi-syllabic words to pronounce multi-syllabic words clearly and accurately.

Prerequisite Checklist and Worksheet: ESL 14B

Prerequisite: ESL 10G or

Other prerequisites: ESL 10W or Placement in ESL 11A

SECTION 1 - CONTENT REVIEW: If any criterion is not met, the prerequisite will be disallowed.

Criterion	Met	Not Met
1. Faculty with appropriate expertise have been involved in the determination of the prerequisite, corequisite or advisory.	X	
2. The department in which the course is (will be) taught has considered course objectives in accordance with accreditation standards.	X	
3. Selection of this prerequisite, corequisite or advisory is based on tests, the type and number of examinations, and grading criteria.	X	
4. Selection of this prerequisite, corequisite or advisory is based on a detailed course syllabus and outline of record, related instructional materials and course format.	X	
5. The body of knowledge and/or skills which are necessary for success before and/or concurrent with enrollment have been specified in writing.	X	
6. The course materials presented in this prerequisite or corequisite have been reviewed and determined to teach knowledge or skills needed for success in the course requiring this prerequisite.	X	
7. The body of knowledge and/or skills necessary for success in the course have been matched with the knowledge and skills developed by the prerequisite, corequisite or advisory.	X	
8. The body of knowledge and/or skills taught in the prerequisite are not an instructional unit of the course requiring the prerequisite.	X	
9. Written documentation that steps 1 to 8 above have been taken is readily available in departmental files.	X	

SECTION II - ADDITIONAL LEVEL OF SCRUTINY:

X Type 2: Sequential within and across disciplines (e.g., Physics 7, 8, 9, ...) **Complete the Prerequisite Worksheet**

ENTRANCE SKILLS FOR (ESL 14B)

(What the student needs to be able to do or understand BEFORE entering the course in order to be successful)

A)	Answer questions and paraphrase main ideas and details in short listening passages
B)	Use contextual clues to identify meaning of new vocabulary
C)	Identify main ideas, supporting details, facts, and opinions in short listening passages
D)	Listen for examples, definitions, and reasons in short listening passages
E)	Identify and use the following in speaking and writing: statement and question formation; count/noncount nouns; pronouns; singulars and plurals; subject-verb agreement (including there is/are); prepositional phrases of location, direction, and time; simple modals; present, past and future time
F)	Identify parts of speech
G)	Use contextual clues and cohesive markers to determine meaning in short listening passages
H)	Ask and answer questions about everyday routines and past and future events orally and in writing
I)	Take notes on a short listening passage (using graphic organizers)
J)	Identify a speaker's purpose

EXIT SKILLS (objectives) FOR (ESL 10G)

(What the student has the demonstrated ability to do or understand AFTER successful completion of this course)

1.	Answer questions and paraphrase main ideas and details in short listening passages
2.	Use contextual clues to identify meaning of new vocabulary
3.	Identify main ideas, supporting details, facts, and opinions in short listening passages
4.	Listen for examples, definitions, and reasons in short listening passages
5.	Identify and use the following in speaking and writing: statement and question formation; count/noncount nouns; pronouns; singulars and plurals; subject-verb agreement (including there is/are); prepositional phrases of location, direction, and time; simple modals; present, past and future time
6.	Identify parts of speech
7.	Use contextual clues and cohesive markers to determine meaning in short listening passages
8.	Ask and answer questions about everyday routines and past and future events orally and in writing
9.	Take notes on a short listening passage (using graphic organizers)
10.	Identify a speaker's purpose

		ENTRANCE SKILLS FOR (ESL 14B)									
EXIT SKILLS FOR (ESL 10G)		A	B	C	D	E	F	G	H	I	J
	1	X									
	2		X								
	3			X							
	4				X						
	5					X					
	6						X				
	7							X			
	8								X		
	9									X	
	10										X

Prerequisite Checklist and Worksheet: ESL 14B

Prerequisite: ESL 10W or

Other prerequisites: ESL 10G or Placement in ESL 11A

SECTION 1 - CONTENT REVIEW: If any criterion is not met, the prerequisite will be disallowed.

Criterion	Met	Not Met
1. Faculty with appropriate expertise have been involved in the determination of the prerequisite, corequisite or advisory.	X	
2. The department in which the course is (will be) taught has considered course objectives in accordance with accreditation standards.	X	
3. Selection of this prerequisite, corequisite or advisory is based on tests, the type and number of examinations, and grading criteria.	X	
4. Selection of this prerequisite, corequisite or advisory is based on a detailed course syllabus and outline of record, related instructional materials and course format.	X	
5. The body of knowledge and/or skills which are necessary for success before and/or concurrent with enrollment have been specified in writing.	X	
6. The course materials presented in this prerequisite or corequisite have been reviewed and determined to teach knowledge or skills needed for success in the course requiring this prerequisite.	X	
7. The body of knowledge and/or skills necessary for success in the course have been matched with the knowledge and skills developed by the prerequisite, corequisite or advisory.	X	
8. The body of knowledge and/or skills taught in the prerequisite are not an instructional unit of the course requiring the prerequisite.	X	
9. Written documentation that steps 1 to 8 above have been taken is readily available in departmental files.	X	

SECTION II - ADDITIONAL LEVEL OF SCRUTINY:

X Type 2: Sequential within and across disciplines (e.g., Physics 7, 8, 9, ...) **Complete the Prerequisite Worksheet**

ENTRANCE SKILLS FOR (ESL 14B)

(What the student needs to be able to do or understand BEFORE entering the course in order to be successful)

A)	Distinguish and use correct word order in various sentence types
B)	Construct simple, compound (and, but, so), and complex sentences using time clauses (after, before, when), reason clauses (because), and real conditionals (if)
C)	Paraphrase sentences and short reading passages to demonstrate understanding
D)	Identify sentence parts and parts of speech
E)	Apply strategies to learn and practice vocabulary

EXIT SKILLS (objectives) FOR (ESL 10W)

(What the student has the demonstrated ability to do or understand AFTER successful completion of this course)

1.	Distinguish and use correct word order in various sentence types
2.	Construct simple, compound (and, but, so), and complex sentences using time clauses (after, before, when), reason clauses (because), and real conditionals (if)
3.	Demonstrate reading comprehension by answering questions and paraphrasing
4.	Paraphrase sentences and short reading passages to demonstrate understanding
5.	Identify main ideas, supporting details, facts, opinions and inferences in reading passages
6.	Identify contextual clues e.g. embedded definitions, transition words, pronoun reference, and word forms in reading passages and use them to determine meaning
7.	Compose, revise, and edit for: statement and question formation; count/non-count nouns; pronouns; singulars and plurals; subject-verb agreement (including there is/are); prepositional phrases of location, direction, and time; simple modals; present, past, and future time
8.	Identify sentence parts and parts of speech
9.	Produce, within time constraints, a minimum of 10 thematically-related sentences based on a reading or personal experience
10.	Format writing assignments
11.	Apply strategies to learn and practice vocabulary

		ENTRANCE SKILLS FOR (ESL 14B)										
EXIT SKILLS FOR (ESL 10W)		A	B	C	D	E	F	G	H	I	J	K
	1	X										
	2		X									
	3											
	4			X								
	5											
	6											
	7											
	8				X							
	9											
	10											
	11					X						

Prerequisite Checklist and Worksheet: ESL 14B

**Prerequisite: Placement in ESL 11A or
Other prerequisites: ESL 10G or ESL 10W**

SECTION 1 - CONTENT REVIEW: If any criterion is not met, the prerequisite will be disallowed.

Criterion	Met	Not Met
1. Faculty with appropriate expertise have been involved in the determination of the prerequisite, corequisite or advisory.	X	
2. The department in which the course is (will be) taught has considered course objectives in accordance with accreditation standards.	X	
3. Selection of this prerequisite, corequisite or advisory is based on tests, the type and number of examinations, and grading criteria.	X	
4. Selection of this prerequisite, corequisite or advisory is based on a detailed course syllabus and outline of record, related instructional materials and course format.	X	
5. The body of knowledge and/or skills which are necessary for success before and/or concurrent with enrollment have been specified in writing.	X	
6. The course materials presented in this prerequisite or corequisite have been reviewed and determined to teach knowledge or skills needed for success in the course requiring this prerequisite.	X	
7. The body of knowledge and/or skills necessary for success in the course have been matched with the knowledge and skills developed by the prerequisite, corequisite or advisory.	X	
8. The body of knowledge and/or skills taught in the prerequisite are not an instructional unit of the course requiring the prerequisite.	X	
9. Written documentation that steps 1 to 8 above have been taken is readily available in departmental files.	X	

SECTION II - ADDITIONAL LEVEL OF SCRUTINY:

X Type 2: Sequential within and across disciplines (e.g., Physics 7, 8, 9, ...) **Complete the Prerequisite Worksheet**

ENTRANCE SKILLS FOR (ESL 14B)

(What the student needs to be able to do or understand BEFORE entering the course in order to be successful)

A)	Answer listening and reading comprehension questions with complete and coherent sentences.
B)	Identify main ideas and supporting details in reading and listening passages.
C)	Examine context to determine word meanings and to categorize word forms and their function in a sentence.
D)	Use the following in speaking/writing: noun system (count/noncount); verb tenses (present, past, future, perfect and progressive); comparatives and superlatives; parallel structure; social modals; subject/verb agreement; gerunds as subjects; sentence boundaries; and mechanics (commas and capitalization).
E)	Identify and use academic vocabulary (including common collocations) and select and employ appropriate word forms in sentences and paragraphs.
F)	Use a variety of contextual clues to determine meaning in listening and reading passages

EXIT SKILLS (objectives) FOR (ESL 11A)

(What the student has the demonstrated ability to do or understand AFTER successful completion of this course)

1.	Write effective sentences using a variety of sentence types with correct punctuation.
2.	Demonstrate use of topic sentences and supporting details.
3.	Compose paragraphs, which may include a variety of types, e.g., opinion, cause/effect, and comparison/contrast, under time constraints.
4.	Answer listening and reading comprehension questions with complete and coherent sentences.
5.	Revise sentences in paragraphs.
6.	Identify main ideas and supporting details in reading and listening passages.
7.	Examine context to determine word meanings and to categorize word forms and their function in a sentence.
8.	Identify cohesive markers and explain their purpose in readings.
9.	Use the following in speaking/writing: noun system (count/noncount); verb tenses (present, past, future, perfect and progressive); comparatives and superlatives; parallel structure; social modals; subject/verb agreement; gerunds as subjects; sentence boundaries; and mechanics (commas and capitalization).
10.	Identify and use academic vocabulary (including common collocations) and select and employ appropriate word forms in sentences and paragraphs.
11.	Participate in classroom activities by discussing readings and assignments in small groups and pairs, by asking questions for clarification, and by organizing in-class presentations.

12.	Use a variety of contextual clues to determine meaning in listening and reading passages.
13.	Use cohesive markers correctly when writing various sentence types.
14.	Identify and understand inferences when reading.

		ENTRANCE SKILLS FOR (ESL 14B)													
EXIT SKILLS FOR (ESL 11A)		A	B	C	D	E	F	G	H	I	J	K	L	M	N
	1														
	2														
	3														
	4	X													
	5														
	6		X												
	7			X											
	8														
	9				X										
	10					X									
	11														
	12						X								
	13														
	14														

Substantial Change: MICROBIOLOGY 1, Fundamentals of Microbiology

Units:	5.00
Total Instructional Hours (usually 18 per unit):	162.00
Hours per week (full semester equivalent) in Lecture:	3.00
In-Class Lab:	6.00
Arranged:	0.00
Outside-of-Class Hours:	108.00
Transferability:	Transfers to UC, CSU
Cal-GETC Area:	5B: Biological Science, 5C: Laboratory
SMC GE Area:	5: Natural Sciences
Degree Applicability:	Credit - Degree Applicable
Prerequisite(s):	CHEM 10 or CHEM 19 (preferred) or eligibility for Chemistry 11 and PHYS 3 or BIOL 3 or BIOL 21 or BIOL 30 or AQUA 3

I. Catalog Description

This course involves study of several types of microorganisms with emphasis on bacteria. Principles of microbiology, metabolism, genetics, immunology, and medical and nonmedical applications are considered. The laboratory includes aseptic transfer techniques, cultural characteristics, methods of microscopy, and analytical techniques for identifying microbial organisms. The course content is related to both general and clinical applications including recent molecular biological and serological techniques.

II. Examples of Appropriate Text or Other Required Reading:

(include all publication dates; for transferable courses at least one text should have been published within the last 7 years)

1. Fundamentals of Microbiology, 12th, Pommerville, J, Jones and Bartlett © 2021, ISBN: 978-1284211757
2. Exercises for the Microbiology Laboratory, 5th, Pierce, Burton E. and Michael J. Leboffe, Morton Publishing © 2021, ISBN: 978-1617319044

III. Course Objectives

Upon completion of this course, the student will be able to:

1. Apply techniques of cultivating, staining, and safely manipulating cultures of bacteria.
2. Identify bacterial cultures using morphological and physiological tests and literature, including Bergey's Manuals.
3. Demonstrate aseptic transfer techniques, pure culture techniques, and describe physical and chemical methods of control as related to clinical and environmental applications.
4. Describe microbial genetics in terms of both history and current applications to general and clinical microbiology.
5. Demonstrate and explain procedures in biotechnology such as PCR methodology and DNA sequencing.
6. Describe the role of microbial metabolism to the understanding of microbial biology, physiology, immunology, and pathogenesis, as well as treatment and control of microbes.
7. Apply the basic principles of immunology and the basis for serological tests and their applications.
8. Describe infectious diseases and their impact on mankind in relation to history, environmental sources, mode of transmission, etiology, diagnosis, and organ systems involved.
9. Outline the applications of microbiology to agriculture, industry, public health, and the environment.
10. Apply basic microbiological concepts to patient care and management.

IV. Methods of Presentation:

Lecture and Discussion, Observation and Demonstration, Other (Specify), Group Work, Lab
Other Methods: Material is presented in three hours of lecture per week (or online), based on reading assignments and current applications. Six hours weekly are devoted to laboratory work, including review, classroom discussions, quiz and practical exam sections, audiovisual presentations, and experimental work. Some sections involve group work as well as individual work.

V. Course Content

<u>% of Course</u>	<u>Topic</u>
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25.000%	History of Microbiology, overview of the field, principles of microscopy and differential stains. Microbial structure of prokaryotes and eukaryotes. Cultivation of bacteria using media, growth curve, and generation time. Control of microbes by physical/chemical agents.
15.000%	Microbial metabolism and identification of organisms. Taxonomy: classification and diversity of microbes: bacteria, algae, fungi, protozoa, and multicellular parasites such as helminths and nematodes.
15.000%	Bacteria, viruses, microbial genetics, recombinant DNA and biotechnology.
20.000%	Microbiology of soil and aquatic environments. Food, dairy, and industrial microbiology. Epidemiology; normal flora, endogenous infections. Host and parasite interactions. Mechanisms of pathogenicity of microbial organisms. Nonspecific host defenses.
25.000%	Immune response: specific host defenses. Practical applications: vaccines and diagnosis. Immunology and hypersensitivity. Antimicrobial drugs. Topics and diseases of the body systems.
100.000%	Total

Vb. Lab Content

<u>% of Course</u>	<u>Topic</u>
40%	Complete the laboratory manual including drawings, clinical comments of microbial organisms examined as live specimens, and/or prepared slides. clinical comments entail establishing diseases caused, as well as signs and symptoms. Clinical presentation, diagnosis and treatment to be included. Definitive identification of an unknown bacterium conducted where such identification is based on morphological characteristics and biochemical profile. As part of the laboratory practicum, survey organisms examined in the course and review biochemical tests performed. Slide show of organisms to be identified will be presented. Interpretation of biochemical tests to be performed.
40%	Conduct microscopic examination of microbial organisms and calibration of objectives to allow measurements. Perform biochemical tests used to identify bacteria; identify protozoa, fungi, and helminth worms based on microscopic examination of appropriate preserved/stained specimens. Conduct standard plate counts to estimate bacterial content. Use the most probable number to examine water bacteria. Determine the mile quality completed by the methylene blue reduction.
20%	General principles from lecture will be demonstrated, observed, and tested in the lab setting.
100%	Total

VI. Methods of Evaluation

<u>% of Course</u>	<u>Topic</u>
40%	Exams/Tests (2-4 exams)
25%	Final exam
10%	Lab Reports
5%	Oral Presentation
20%	Research Projects
100%	Total

VII. Sample Assignments:

Sample Assignment-1:

Bugs in a Booklet is an assignment that will exercise your ability to put both microbes and written language under a microscope. You will complete two tasks: 1. You will research your chosen microbe, and 2. You will practice bibliographic precision. In the lab you will look at tiny bacteria, such as *Staphylococcus aureus* and *Escherichia coli*; for the paper, you will look at tiny punctuation marks, such as commas and periods. At the end of the semester, abstracts of your papers will be collected in a booklet that is distributed to each student. You will be a published author! Bugs in a Booklet is a research paper project consisting of four interrelated assignments: 1. Choose a microbe before you start the taxonomy assignment. Submit your choice online. Be sure that your choice is unique. The Taxonomy assignment gives you the opportunity to see where your microbe fits in the overall scheme of things. Are you studying a bacterium? A virus? Perhaps a protozoan or even a microscopic animal? Do the experts agree on the classification of your microbe (probably not!)? Microbes don't much care about classification--but people do because classification helps a physician determine what drug to use against a pathogenic microbe. The taxonomy is a brief assignment; it may fit on one page, including references. If you change your mind about your microbe, you will have to repeat your taxonomy. 2. In the format bibliography, you will practice your ability to examine details. Again, the purpose is twofold: in addition to examining details, the Format Bibliography assignment is designed to create a common style--or format--for the final booklet. You are expected to use this format for references in subsequent assignments. 3. The report itself answers questions about the microbe. History: Who first found your microbe? Where? When? What is the taxonomy of your microbe? Natural History: What does the microbe need for survival? What makes it grow and reproduce? How do you identify your microbe in laboratory tests? Importance: Why is your microbe important enough to study in a microbiology class? Why did you choose your microbe? References follow the format used in the Format Bibliography. 4. The abstract is the final assignment in this series. The abstract is a brief summary of the main points of your research paper--it answers the questions of history, natural history, and importance. References for the abstract follow the format you used in the first assignment. Your abstract and references will be published in the booklet.

Sample Assignment-2:

Microbiology 1 Sample Assignment 2: Lunch on the Run Below you can click to see photographs of a family who has traveled to a coastal location south of the US border. The seven persons pictured include: •Grandfather, age 84. Retired biology professor in excellent health. Suffers from osteo-arthritis and takes low dose steroids and other non-steroidal anti-inflammatory drugs. Home is in North Carolina. Has been hiking and camping all his adult life. •Little Sister, age 45. Undergraduate degree in marine biology. Many years' experience as a computer programmer. Addicted to the out-of-doors. Actively involved with the Sierra Club in Southern California. Likes to discover uncharted waterfalls in wilderness areas. ("Guide" for this trip.) •Nurse, age 50. Little sister's boyfriend. Works with abused children in group home. Raised in Montana. Loves to fish. Part Native American. •EMT, age 28. Daughter of Little Sister's boyfriend. Raised in southern California. Trained as a firefighter. Active duty military. 15 weeks pregnant. •College student, age 20. Interested in computers. Son of Little Sister. (Speaks Spanish) Goes to college in North Carolina: recently drove all the way home to California. •Big Sister, age 50. (Not pictured, taking pictures.) Many years experience in clinical microbiology. Currently teaching microbiology at a university in Utah. Slightly overweight. Family history of diabetes. Recently facilitated microbiology workshop in Bucharest, Romania. •Big Brother, age 52. Undergraduate degree in physics. Also trained as a Physicians' Assistant. Currently owns and operates a concrete cutting business in Seattle for which he designs and manufactures blades. (Lots of heavy lifting.) The family has spent time watching the activity in this harbor town ... watching people feed birds and sea animals ... wandering through the fish market (You must appreciate the artful towers of shrimp!). The nurse was the only one who accepted the free sample of smoked tuna. Hot and thirsty, they all sat down at an open air café for fish tacos. The Diners-The Lunch-The Market[Photos of the diners, what they had for lunch, and the open air fish market]The Assignment: 1. Evaluate possible risk factors for (at least) 3 persons. 2. Identify at least 3 sources of infection or foodborne disease. 3. Name 5 possible microbial pathogens lurking in (or near) this lunch, including the pictured item or risk factor with which they might be associated. Include at least one protozoan and one virus. Be sure to connect the pathogen, source, and risk factor for each of your three patients. 4. What advice do you have for this family to avoid or prevent disease? 5. How would these pictures look different in your community? Why? Compare and contrast. 6. Add references for all the information you provide. Use your textbook as well as other resources. Follow the Bugs Booklet format. Submit your completed assignment to the LunchBasket Dropbox.

VIII. Student Learning Outcomes:

1. Compare and contrast infectious diseases of microbial origin, both prokaryotic and eukaryotic, as related to health care, the environment, and other applications.
2. Determine the identity of unknown microbes, with emphasis on bacteria.

Prerequisite Checklist and Worksheet: MCRBIO 1

Prerequisite: AQUA 3 Microbiology and Genetics for Aquaculture

Other prerequisites: CHEM 10 or CHEM 19 (preferred) or eligibility for Chemistry 11 and PHYS 3 or BIOL 3 or BIOL 21 or BIOL 30

SECTION 1 - CONTENT REVIEW: If any criterion is not met, the prerequisite will be disallowed.

Criterion	Met	Not Met
1. Faculty with appropriate expertise have been involved in the determination of the prerequisite, corequisite or advisory.	X	
2. The department in which the course is (will be) taught has considered course objectives in accordance with accreditation standards.	X	
3. Selection of this prerequisite, corequisite or advisory is based on tests, the type and number of examinations, and grading criteria.	X	
4. Selection of this prerequisite, corequisite or advisory is based on a detailed course syllabus and outline of record, related instructional materials and course format.	X	
5. The body of knowledge and/or skills which are necessary for success before and/or concurrent with enrollment have been specified in writing.	X	
6. The course materials presented in this prerequisite or corequisite have been reviewed and determined to teach knowledge or skills needed for success in the course requiring this prerequisite.	X	
7. The body of knowledge and/or skills necessary for success in the course have been matched with the knowledge and skills developed by the prerequisite, corequisite or advisory.	X	
8. The body of knowledge and/or skills taught in the prerequisite are not an instructional unit of the course requiring the prerequisite.	X	
9. Written documentation that steps 1 to 8 above have been taken is readily available in departmental files.	X	

SECTION II - ADDITIONAL LEVEL OF SCRUTINY:

Type 1: Standard Prerequisite (required prerequisite at UC or CSU)

Identify three UC or CSU campuses that offer the equivalent course with the equivalent prerequisite.

X List schools here:

UCSD – BIMM 120 & BIMM 121: Microbiology & Lab

UCI – BIO SCI M122 & BIO SCI M118L: General Microbiology & Lab

UCLA – MIMG 101 Introductory Microbiology

Complete the Prerequisite Worksheet

ENTRANCE SKILLS FOR (MCRBIO 1)

(What the student needs to be able to do or understand BEFORE entering the course in order to be successful)

A)	Recall and define vocabulary words used to explain foundational biological processes, themes, and the scientific method
B)	Describe key differences between inorganic and organic biological molecules
C)	Understand the major difference between prokaryotic and eukaryotic cells and recall the foundational principles of metabolic events
D)	Describe the connection between DNA structure and function, heredity, and the broader principles of evolution
E)	Experience using compound light microscope and laboratory equipment used in cell biology
F)	Knowledge of the scientific method, recombinant DNA technology, and their applications to different sectors in the life science and biotechnology industries
G)	Execute laboratory protocols and safety instructions
H)	Select, create, and interpret appropriate data tables and figures to represent scientific data and communicate and critique scientific data and information

EXIT SKILLS (objectives) FOR (AQUA 3)

(What the student has the demonstrated ability to do or understand AFTER successful completion of this course)

1.	Describe and recognize aspects of the scientific method
2.	Recognize and operate equipment found in a cell biology laboratory
3.	Discuss foundation concepts in cellular biology and microbiology, and connect these concepts to the cell cycle and metabolism.

4.	Read and interpret protocol and safety instructions
5.	Explain how small-scale scientific experiments are designed
6.	Think critically about scientific data and ethical practices
7.	Apply metacognitive and executive function strategies to acquire knowledge
8.	Document scientific data and keep an industry standard notebook

		ENTRANCE SKILLS FOR (MCRBIO 1)							
EXIT SKILLS FOR (AQUA 3)		A	B	C	D	E	F	G	H
	1	X					x		
	2					X		X	
	3	X	X	X	X		x		
	4					X			
	5	X					x	X	X
	6	X							X
	7	X	X	X	X	X	x	X	X
	8							X	X

Santa Monica College Program of Study Physics AS-T

The Associate in Science in Physics for Transfer Degree focuses on a scientific understanding of mechanics, electromagnetism, optics, thermodynamics, and fluid dynamics. Students majoring in physics will study Newton's Laws of Motion, Conservation Principles, Maxwell's Equations, image formation, diffraction, heat transport, and the arrow of time. The program will focus on the application of scientific methods to perform precise experiments and construct complete models of natural phenomena.

Upon completion of the Associate in Science in Physics for Transfer (AS-T), students will have a strong academic foundation in the field and be prepared for upper division baccalaureate study. Completion of the degree indicates that the student will have satisfied the lower division requirements for transfer into physics or similar major for many campuses in the California State University system.

Associate Degree for Transfer Requirements:

- Completion of 60 semester units or 90 quarter units of degree-applicable courses,
- Minimum overall grade point average of 2.0,
- Minimum grade of "C" (or "P") for each course in the major, and
- Completion of Cal-GETC

Program Learning Outcomes:

- Outline a logical process based on well-established physics principles and demonstrate the ability to use basic mathematical techniques when presented with a physical situation to solve a particular physics problem.
 - CS 55: Apply various programming concepts, including control flow, looping, conditional statements, and elementary data structures provided by standard Java system libraries.
 - CS 55: Identify data structures and employ the most suitable for implementing various abstract data types.
 - MATH 11: Given vector-valued or real-valued functions involving two or more independent variables, identify and use appropriate techniques to analyze the fundamental properties of those functions. Included would be partial and directional derivatives, gradients, differentials, and integrals over lines, surfaces and solid regions.
 - MATH 11: Setup and solve physical applications problems related to all aspects of motion along a curve. Included would be the arclength parametrization of a curve and the use of tangent, velocity, normal and binormal vectors, curvature, and the tangential and normal components of acceleration and their relationship to the osculating plane containing the circle of best fit at a point on the curve.
 - MATH 11: Apply Green's Theorem, Stokes' Theorem, and Gauss' Divergence Theorem with the concepts of divergence, curl and flux and solve problems related to vector fields including magnetic fields, flow fields, and conservative vector fields.
 - MATH 13: Apply definitions and theorems of linear algebra, with topics including linear independence, spanning, dimension, subspaces and linear transformations, to establish consequences of new definitions, prove additional results, and illustrate arguments with specific examples.
 - MATH 15: Given a first/second order or nonhomogeneous linear differential equation, students will determine and apply appropriate strategies to solve the differential equation
 - MATH 15: Given applied differential equation problems such as physical motion, orthogonal trajectories, mixtures, springs or electrical circuits, students will determine and apply appropriate strategies to set up and solve the problems
 - MATH 7: Given an algebraic or trigonometric function, evaluate and apply limits and prove basic limit statements.
 - MATH 7: Given an algebraic or trigonometric function, differentiate the function and solve application problems involving differentiation.
 - MATH 7: Given an algebraic or trigonometric function, integrate the function and solve application problems involving integration.
 - MATH 8: Set up and solve applications problems involving limits, areas, volumes, arc length, indeterminate forms, center of mass and improper integrals using differentiation and integration techniques with transcendental functions.
 - MATH 8: Determine the divergence or type of convergence of various infinite series, find the domain (interval of convergence) of power series and derive and apply Taylor series.
 - MATH 8: Graph and analyze curves using parametric equations and/or polar coordinates and solve applications involving functions in either polar or parametric form.

- PHYSICS 21: When presented with a physical situation and asked to solve a particular problem in mechanics (i.e. two masses connected via a string passing over a pulley), the student will follow a logical process based on well-established physics principles (i.e. Newton's laws) and demonstrate ability to use basic mathematical techniques including calculus.
- PHYSICS 22: When presented with a physical situation and asked to solve a particular problem in, for example, electricity and magnetism (e.g., the creation of an electric current by a changing magnetic field), the student will follow a logical process based on well-established physics principles (e.g., Maxwell's equations) and demonstrate ability to use basic mathematical techniques, including calculus.
- PHYSICS 23: When presented with a physical situation and asked to solve a particular problem in fluids, thermodynamics, wave phenomena, or optics, the student will follow a logical process based on well-established physics principles (i.e. laws of thermodynamics) and demonstrate ability to use basic mathematical techniques, including calculus.
- Apply the scientific method to construct a clear and testable hypothesis, collect and record accurate measurements, calculate and evaluate uncertainties, and interpret experimental data to draw evidence-based conclusions consistent with scientific principles in both laboratory experiments and written lab reports.
 - CS 55: Apply various programming concepts, including control flow, looping, conditional statements, and elementary data structures provided by standard Java system libraries.
 - CS 55: Identify data structures and employ the most suitable for implementing various abstract data types.
 - PHYSICS 21: When conducting a laboratory experiment and writing a lab report, the student will demonstrate understanding of the basics of the scientific method by being able to state a clear and testable hypothesis, taking careful measurements, estimating uncertainties, and drawing appropriate conclusions based on gathered data and on sound scientific principles.
 - PHYSICS 22: When conducting a laboratory experiment and writing a lab report, the student will demonstrate understanding of the basics of the scientific method by being able to state a clear and testable hypothesis, taking careful measurements, estimating uncertainties, and drawing appropriate conclusions based on gathered data and on sound scientific principles.
 - PHYSICS 23: When conducting a laboratory experiment and writing a lab report, the student will demonstrate understanding of the basics of the scientific method by being able to state a clear and testable hypothesis, taking careful measurements, estimating uncertainties, and drawing appropriate conclusions based on gathered data and on sound scientific principles.

Required Core	Units: 15.0
PHYSICS 21 Mechanics with Lab	5.0
PHYSICS 22 Electricity and Magnetism with Lab	5.0
PHYSICS 23 Fluids, Waves, Thermodynamics, Optics with Lab	5.0
Math Requirements	Units: 21.0
MATH 7 ^{DE} Calculus 1	5.0
MATH 8 ^{DE} Calculus 2	5.0
MATH 11 ^{DE} Multivariable Calculus	5.0
MATH 13 ^{DE} Linear Algebra	3.0
MATH 15 ^{DE} Ordinary Differential Equations	3.0
Programming Concepts and Methodologies	Units: 3.0
CS 55 ^{DE} Java Programming	3.0
	Total: 39.0

In the four columns to the right under the **College Program Requirements**, enter the college's course identifier, title and the number of units comparable to the course indicated for the form. If the course may be double-counted with Cal-GETC, enter the GE Area to which the course is articulated. To review the GE Areas and associated unit requirements, please go to Chancellor's Office Academic Affairs page, RESOURCE section located at: <https://www.cccco.edu/About-Us/Chancellors-Office/Divisions/Educational-Services-and-Support/What-we-do/Curriculum-and-Instruction/Unit/Templates-For-Approved-Transfer-Model-Curriculum>

or the ASSIST website: <https://www.assist.org/>.

The units indicated in the template are the **minimum** semester units required for the prescribed course or list. All courses must be CSU and UC transferable. **All courses with an identified C-ID Descriptor must be submitted to C-ID prior to submission of the Associate Degree for Transfer (ADT) proposal to the Chancellor's Office.**

Where no **C-ID Descriptor** is indicated, discipline faculty should compare their existing course to the example course(s) provided in the form at:

<http://www.c-id.net/degreereview.html>

Attach the appropriate ASSIST documentation as follows:

- *Articulation Agreement by Major (AAM)* demonstrating lower division preparation in the major at a CSU or UC;
- *UC Transfer Course Agreement (UCTCA)* for the transfer courses; and/or,
- *Cal-GETC Certification Course List by Area (GECC)*.

The acronyms **AAM**, **UCTCA**, and **GECC** will appear in **C-ID Descriptor** column directly next to the course to indicate which report is needed to be attached to the proposal to support the course's inclusion in the transfer degree. To access ASSIST, please go to <http://www.assist.org>.

Associate in Science in Physics 2.0 for Transfer Degree					
College Name:					
TRANSFER MODEL CURRICULUM (TMC)		COLLEGE PROGRAM REQUIREMENTS			
Course Title (units)	C-ID Descriptor	Course ID	Course Title	Units	Cal-GETC
REQUIRED CORE: (32-33 units)					
Calculus-based Physics for Scientists and Engineers: ABC (12)	PHYS 200S				
OR	OR				
Calculus-based Physics for Scientists and Engineers: A (4)	PHYS 205	PHYS S 21	Mechanics with Lab	5	5A/5C
AND	AND				
Calculus-based Physics for Scientists and Engineers: B (4)	PHYS 210	PHYS S 22	Electricity and Magnetism with Lab	5	5A/5C
AND	AND				
Calculus-based Physics for Scientists and Engineers: C (4)	PHYS 215	PHYS S 23	Fluids, Waves, Thermodynamics, Optics with Lab	5	5A/5C

TRANSFER MODEL CURRICULUM (TMC)		COLLEGE PROGRAM REQUIREMENTS			
Course Title (units)	C-ID Descriptor	Course ID	Course Title	Units	Cal-GETC
Single Variable Calculus Sequence (8) OR Single Variable Calculus I – Early Transcendentals (4) AND Single Variable Calculus II – Early Transcendentals (4) OR Single Variable Calculus I – Late Transcendentals (4) AND Single Variable Calculus II – Late Transcendentals (4)	MATH 900S OR MATH 210 AND MATH 220 OR MATH 211 AND MATH 221				
		MATH 7	Calculus 1	5	2
		MATH 8	Calculus 2	5	2
Multivariable Calculus (4)	MATH 230	MATH 11	Multivariable Calculus	5	2
Ordinary Differential Equations (3) AND Introduction to Linear Algebra (3) OR Differential Equations and Linear Algebra (5)	MATH 240 AND MATH 250 OR MATH 910S	MATH 13	Linear Algebra	3	2
		MATH 15	Ordinary Differential Equations	3	2
Programming Concepts and Methodologies I (3) OR Any Introductory Programming Course such as C++, Python, and such that is articulated for transfer for the major	COMP 122 OR AAM	CS 55	Java Programming	3	N/A

Total Units for the Major:	32-33	Total Units for the Major:	39	
		Total Units that may be double-counted (The transfer GE Area limits must <u>not</u> be exceeded)	7	
		General Education (Cal-GETC) Units	34	
		Elective (CSU Transferable) Units	0	
		Total Degree Units (maximum)	66	

This is proposed as a high-unit STEM major that prepares students for transfer to both the CSU and UC. Exception to 60-unit requirement by AB 928: 6 additional units for the ADT. Supporting evidence and rationale is required.

*Please note that colleges are permitted to use up to six additional units, but no additional local requirements can be added to this degree. Students are only to be required to complete the full Cal-GETC pattern and the core courses listed in the TMC.

*Please note that colleges are permitted to use up to six additional units, but no additional local requirements can be added to this degree. Students are only to be required to complete the full Cal-GETC pattern and the core courses listed in the TMC.

NOTES: Recommendations and Considerations

1. Require both Differential Equations and Linear Algebra. All UC campuses and most CSU campuses require both. In addition, CSU faculty shared that this would better prepare students for transfer.
2. Removal of one semester of General Chemistry. The one semester of general chemistry was removed because it was not required by all CSU campuses and many community colleges indicated that they would need a modification of Cal-GETC Area 5 (allow two physical science courses instead of one physical science and one biological science) and the six additional units from AB928 to implement the degree locally.
3. Require one introductory programming course. All UC campuses and most CSU campuses require programming. There were concerns that if students waited to take a programming course after transfer that it may create an equity issue between students that start at the four-year institution as freshmen and those that transfer. However, if units are really an issue, then this would be the course that could be taken after transfer.
4. Recommend an exception to the 60-unit maximum to permit a 66-unit maximum for the Physics ADT and/or completion of Cal-GETC after transfer. The units required for the major (with the removal of the first semester of General Chemistry) has been reduced to 32-33. With 7 units of double counting, the required units, based on the minimum units listed in the C-ID descriptors, would be 59-60. More than 30% of the colleges completing the survey for this TMC (that currently have ADTs in Physics) indicated that they would be unable to implement this new TMC locally because of 5 unit physics/math courses. For colleges with 5 unit physics courses, the major becomes 35-36 units. This would move the local degrees to 62-63 units and those degrees would not be possible if the TIMC is approved at 60 units.

To ensure the number of Physics ADT options at community college campuses does not decrease, it is requested that the 6 additional units outlined in AB928 are allowed for colleges implementing this degree program.

Santa Monica College
Program of Study
Sustainable Aquaculture Technology AS

The Associate of Science in Sustainable Aquaculture Technology program at Santa Monica College provides students with the knowledge and hands-on experience needed to pursue careers in the growing field of aquaculture. This program covers key areas such as ecology and sustainability, systems design, sustainable fish farming, shellfish and seaweed cultivation, marine ecosystem management, microbial ecology in aquaculture, genetics in aquaculture, and special topics on sustainable aquaculture technology. Students will learn about water quality management, invertebrate and vertebrate health, rare species cultivation, hatchery and propagation operations, biosecurity, and food safety practices while gaining practical skills through laboratory work and practical work experiences. Graduates will be prepared to work in various sectors, including fish farms, hatcheries, environmental agencies, and marine/aquaculture-focused research institutions.

Program Highlights

- Comprehensive curriculum that is industry-aligned, emphasizing aquaculture techniques and design for algae, shellfish, and finfish in open water off-shore applications and onshore recirculating aquaculture systems (RAS)
- Experiential learning through practical laboratory work, internships, and fieldwork
- Engage students with local aquaculture operations and industry experts to provide networking opportunities

Program Learning Outcomes:

- Engage students with the historical and current practices of aquaculture to develop best practices in sustainability within the global climate context.
 - AQUA 1: Appraise and differentiate between historical and modern aquaculture practices, and develop best practices for a future aquaculture industry in the context of sustainability and the global climate crisis.
 - AQUA 1: Examine the ecological principles of finfish, shellfish and algae, as they relate to sustainable aquaculture.
 - AQUA 1: Defend sustainability needs in aquaculture, and critique various modern aquaculture approaches in this context.
 - AQUA 3: Evaluate the intersection of maximum production, genetic modifications & best practices in aquaculture on public health and sustainability.
 - AQUA 88B: Demonstrate a level of engagement in the subject matter that reveals their understanding of the value of the course content beyond the task itself, specifically as it relates to linking the relevance of course content to the professional practice of independent studies discipline.
 - BIOL 10: Demonstrate an understanding of the relationship between evolution, ecology and conservation biology.
 - BIOL 15: Based on their experience in this course, students will judge the impact of human activity on different global ecosystems, and will evaluate and assess the interconnectedness of sustainability, social justice, and economic prosperity in the 21st century.
 - BIOL 9: Given a current environmental controversy, paraphrase opposing views and evaluate them on the basis of scientific criteria.
- Prepare students for the aquaculture workforce through a comprehensive curriculum in techniques and methodologies in breeding, cultivation, and harvesting of aquatic taxa.
 - AQUA 2: Students will design & build effective aquaculture systems for hatching and rearing of a variety of aquatic taxa
 - AQUA 2: Students will effectively monitor aquaculture systems for efficiency and productivity, and make adjustments to maximize desired outcomes.
 - AQUA 2: Students will demonstrate their ability to hatch and rear a variety of aquatic taxa.
 - AQUA 3: Create sustainable aquacultures that are both efficient and productive and support public health.
 - AQUA 3: Describe the effectiveness of disease interventions on aquaculture sustainability.
 - AQUA 3: Evaluate the intersection of maximum production, genetic modifications & best practices in aquaculture on public health and sustainability.
 - AQUA 4: Appraise and differentiate between different techniques in conditioning/fertilization of shellfish/finfish/algae.
 - AQUA 4: Evaluate effectiveness of different cryopreservation techniques in aquaculture.
 - AQUA 4: Establish best practices for nutrition and feeding of fish, shellfish and algae with consideration for both sustainability and economic viability.
 - AQUA 5: Evaluate and analyze site conditions to optimize an aquaculture system setting.
 - AQUA 5: Assess and criticize the impact of alien genetic introductions, and evaluate how aquaculture systems can be constructed with effective preventative mechanisms.

- AQUA 88B: Demonstrate a level of engagement in the subject matter that reveals their understanding of the value of the course content beyond the task itself, specifically as it relates to linking the relevance of course content to the professional practice of independent studies discipline.
- Develop problem-solving skills to address challenges in aquaculture operations, such as disease management, resource optimization, and sustainable farming practices, by applying research principles and innovative approaches.
 - AQUA 2: Students will design & build effective aquaculture systems for hatching and rearing of a variety of aquatic taxa
 - AQUA 2: Students will effectively monitor aquaculture systems for efficiency and productivity, and make adjustments to maximize desired outcomes.
 - AQUA 2: Students will demonstrate their ability to hatch and rear a variety of aquatic taxa.
 - AQUA 3: Create sustainable aquacultures that are both efficient and productive and support public health.
 - AQUA 3: Describe the effectiveness of disease interventions on aquaculture sustainability.
 - AQUA 3: Evaluate the intersection of maximum production, genetic modifications & best practices in aquaculture on public health and sustainability.
 - AQUA 4: Appraise and differentiate between different techniques in conditioning/fertilization of shellfish/finfish/algae.
 - AQUA 4: Evaluate effectiveness of different cryopreservation techniques in aquaculture.
 - AQUA 4: Establish best practices for nutrition and feeding of fish, shellfish and algae with consideration for both sustainability and economic viability.
 - AQUA 4: Appraise and differentiate between food versus non-food uses of aquaculture-produced material.
 - AQUA 5: Evaluate and analyze site conditions to optimize an aquaculture system setting.
 - AQUA 5: Assess and criticize the impact of alien genetic introductions, and evaluate how aquaculture systems can be constructed with effective preventative mechanisms.
 - AQUA 88B: Conduct independent research or study of well-defined topic in the discipline of the independent study.
 - AQUA 88B: Describe project and discuss any conclusions drawn or other project outcomes.
 - AQUA 88B: Demonstrate a level of engagement in the subject matter that reveals their understanding of the value of the course content beyond the task itself, specifically as it relates to linking the relevance of course content to the professional practice of independent studies discipline.
 - AQUA 90A: Demonstrate knowledge of the operation of the organization hosting the internship
 - AQUA 90A: Participate effectively in professional activities assigned by the internship supervisor
 - AQUA 90B: Demonstrate knowledge of the operation of the organization hosting the internship
 - AQUA 90B: Participate effectively in professional activities assigned by the internship supervisor
 - AQUA 90C: Demonstrate knowledge of the operation of the organization hosting the internship
 - AQUA 90C: Participate effectively in professional activities assigned by the internship supervisor
 - BIOL 10: Demonstrate successful skills in applying the scientific method to gather and critically evaluate data.
 - BIOL 10: Demonstrate ability to apply and interpret basic quantitative skills (such as statistical and graphical data) to environmental biology.
- Introduce business principles to support the effective management and growth of aquaculture operations.
 - AQUA 1: Appraise and differentiate between historical and modern aquaculture practices, and develop best practices for a future aquaculture industry in the context of sustainability and the global climate crisis.
 - AQUA 1: Defend sustainability needs in aquaculture, and critique various modern aquaculture approaches in this context.
 - AQUA 5: Create and defend the justification for Permitting and licensing applications.
 - AQUA 5: Facilitate a mock stakeholders meeting to negotiate acceptable social license for establishing an aquaculture business at a given location.
 - AQUA 88B: Demonstrate a level of engagement in the subject matter that reveals their understanding of the value of the course content beyond the task itself, specifically as it relates to linking the relevance of course content to the professional practice of independent studies discipline.
 - BUS 55: Demonstrate a level of engagement in the subject matter that reveals their understanding of the value of the course content beyond the task itself, specifically as it relates to linking the relevance of course content to careers in business and accounting and their personal lives.
 - BUS 55: Explain the growth of Southern California Companies and it's future endeavors
 - BUS 55: Demonstrate the dynamics of the sundry of career paths in Southern California and explore the array of opportunities in the Ocean economy.
- Provide practical workplace experience that fosters professional work habits in a safe and productive environment.

- AQUA 10A: Solve emergent underwater crises and facilitate rescue diving solutions.
- AQUA 10A: Assess and respond to potential diving related injuries.
- AQUA 88B: Conduct independent research or study of well-defined topic in the discipline of the independent study.
- AQUA 88B: Describe project and discuss any conclusions drawn or other project outcomes.
- AQUA 88B: Demonstrate a level of engagement in the subject matter that reveals their understanding of the value of the course content beyond the task itself, specifically as it relates to linking the relevance of course content to the professional practice of independent studies discipline.
- AQUA 90A: Demonstrate knowledge of the operation of the organization hosting the internship
- AQUA 90A: Participate effectively in professional activities assigned by the internship supervisor
- AQUA 90B: Demonstrate knowledge of the operation of the organization hosting the internship
- AQUA 90B: Participate effectively in professional activities assigned by the internship supervisor
- AQUA 90C: Demonstrate knowledge of the operation of the organization hosting the internship
- AQUA 90C: Participate effectively in professional activities assigned by the internship supervisor
- HEALTH 11: Identify life-threatening conditions that require immediate action and EMS response.
- HEALTH 11: Take appropriate action when faced with a cardiovascular emergency.
- HEALTH 11: Create an emergency action plan that coincides with local emergency response systems.

Core Aquaculture Requirements

Units: 15.0

AQUA 1 ^{DE} Introduction to Aquaculture: History, Ecology and Sustainability	3.0
AQUA 2 Applications in Aquaculture - System Design, Monitoring and Maintenance	4.0
AQUA 3 Microbiology and Genetics for Aquaculture	4.0
AQUA 4 Husbandry and Life Support in Aquaculture and Aquarium Science	2.0
AQUA 5 ^{DE} Advanced Topics in Aquaculture	2.0

Elective 1

Units: 4.0-6.0

It is highly recommended that students complete BIOL 15.

BIOL 15 ^{DE} Marine Biology with Laboratory	4.0
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OR

Two classes, one from each group

Group 1

BUS 55 ^{DE} Southern California's International Connections and Blue/Ocean Economy	3.0
BIOL 9 ^{DE} Environmental Biology	3.0
BIOL 10 Applied Ecology and Conservation Biology	4.0
ENGR 11 Engineering Graphics and Design	3.0

AND

Group 2

BIOL 15 ^{NDE} Marine Biology (Non-Laboratory)	3.0
GEOL 31 ^{DE} Introduction to Physical Oceanography	3.0

Elective 2: Select one course

Units: 2.0-3.0

Note: AQUA 10A or industry equivalent. Credit for prior learning may be granted for students who hold recognized industry certifications. Acceptable documentation includes: NAUI Master Diver or equivalent; or NAUI Advanced Diver plus Rescue Diver certifications; or any dive certification combined with AAUS certification or equivalent; or First Aid/CPR certification equivalent to those issued by the American Heart Association, Red Cross, or comparable agencies. Please contact the life sciences department or counseling for more information.

AQUA 10A SCUBA (same as: KIN PE 49D)	2.0
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OR

HEALTH 11 ^{DE} First Aid and Cardio-Pulmonary Resuscitation	3.0
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Elective 3: Select one course

Units: 1.0-3.0

AQUA 88B Independent Studies in Aquaculture	2.0
AQUA 90A Aquaculture Internship	1.0
AQUA 90B Aquaculture Internship	2.0
AQUA 90C Aquaculture Internship	3.0

Total Units: 22.0-27.0

Santa Monica College

Program Narrative

Sustainable Aquaculture Technology AS

Program Goals and Objectives:

The Associate of Science in Sustainable Aquaculture Technology program at Santa Monica College provides students with the knowledge and hands-on experience needed to pursue careers in the growing field of aquaculture. This program covers key areas such as ecology and sustainability, systems design, sustainable fish farming, shellfish and seaweed cultivation, marine ecosystem management, microbial ecology in aquaculture, genetics in aquaculture, and special topics on sustainable aquaculture technology. Students will learn about water quality management, invertebrate and vertebrate health, rare species cultivation, hatchery and propagation operations, biosecurity, and food safety practices while gaining practical skills through laboratory work and practical work experiences. Graduates will be prepared to work in various sectors, including fish farms, hatcheries, environmental agencies, and marine/aquaculture-focused research institutions.

Program Highlights

- Comprehensive curriculum that is industry-aligned, emphasizing aquaculture techniques and design for algae, shellfish, and finfish in open water off-shore applications and onshore recirculating aquaculture systems (RAS)
- Experiential learning through practical laboratory work, internships, and fieldwork
- Engage students with local aquaculture operations and industry experts to provide networking opportunities

Program Learning Outcomes:

Engage students with the historical and current practices of aquaculture to develop best practices in sustainability within the global climate context.

Prepare students for the aquaculture workforce through a comprehensive curriculum in techniques and methodologies in breeding, cultivation, and harvesting of aquatic taxa.

Develop problem-solving skills to address challenges in aquaculture operations, such as disease management, resource optimization, and sustainable farming practices, by applying research principles and innovative approaches.

Introduce business principles to support the effective management and growth of aquaculture operations.

Provide practical workplace experience that fosters professional work habits in a safe and productive environment.

Catalog Description:

The Associate of Science in Sustainable Aquaculture Technology program at Santa Monica College provides students with the knowledge and hands-on experience needed to pursue careers in the growing field of aquaculture. This program covers key areas such as ecology and sustainability, systems design, sustainable fish farming, shellfish and seaweed cultivation, marine ecosystem management, microbial ecology in aquaculture, genetics in aquaculture, and special topics on sustainable aquaculture technology. Students will learn about water quality management, invertebrate and vertebrate health, rare species cultivation, hatchery and propagation operations, biosecurity, and food safety practices while gaining practical skills through laboratory work and practical work experiences. Graduates will be prepared to work in various sectors, including fish farms, hatcheries, environmental agencies, and marine/aquaculture-focused research institutions.

Program Highlights

- Comprehensive curriculum that is industry-aligned, emphasizing aquaculture techniques and design for algae, shellfish, and finfish in open water off-shore applications and onshore recirculating aquaculture systems (RAS)
- Experiential learning through practical laboratory work, internships, and fieldwork
- Engage students with local aquaculture operations and industry experts to provide networking opportunities

Program Learning Outcomes:

Engage students with the historical and current practices of aquaculture to develop best practices in sustainability within the global climate context.

Prepare students for the aquaculture workforce through a comprehensive curriculum in techniques and methodologies in breeding, cultivation, and harvesting of aquatic taxa.

Develop problem-solving skills to address challenges in aquaculture operations, such as disease management, resource optimization, and sustainable farming practices, by applying research principles and innovative approaches.

Introduce business principles to support the effective management and growth of aquaculture operations.

Provide practical workplace experience that fosters professional work habits in a safe and productive environment.

Program Requirements:

Core Aquaculture Requirements

AQUA 1 ^{DE} Introduction to Aquaculture: History, Ecology and Sustainability	Units: 15.0 3.0
AQUA 2 Applications in Aquaculture - System Design, Monitoring and Maintenance	4.0
AQUA 3 Microbiology and Genetics for Aquaculture	4.0

AQUA 4 Husbandry and Life Support in Aquaculture and Aquarium Science	2.0
AQUA 5 ^{DE} Advanced Topics in Aquaculture	2.0

Elective 1

Units: 4.0-6.0

It is highly recommended that students complete BIOL 15.

BIOL 15 ^{DE} Marine Biology with Laboratory	4.0
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OR

Two classes, one from each group

Group 1

BUS 55 ^{DE} Southern California's International Connections and Blue/Ocean Economy	3.0
BIOL 9 ^{DE} Environmental Biology	3.0
BIOL 10 Applied Ecology and Conservation Biology	4.0
ENGR 11 Engineering Graphics and Design	3.0

AND

Group 2

BIOL 15N ^{DE} Marine Biology (Non-Laboratory)	3.0
GEOL 31 ^{DE} Introduction to Physical Oceanography	3.0

Elective 2: Select one course

Units: 2.0-3.0

Note: AQUA 10A or industry equivalent. Credit for prior learning may be granted for students who hold recognized industry certifications. Acceptable documentation includes: NAUI Master Diver or equivalent; or NAUI Advanced Diver plus Rescue Diver certifications; or any dive certification combined with AAUS certification or equivalent; or First Aid/CPR certification equivalent to those issued by the American Heart Association, Red Cross, or comparable agencies. Please contact the life sciences department or counseling for more information.

AQUA 10A SCUBA (same as: KIN PE 49D)	2.0
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OR

HEALTH 11 ^{DE} First Aid and Cardio-Pulmonary Resuscitation	3.0
--	-----

Elective 3: Select one course

Units: 1.0-3.0

AQUA 88B Independent Studies in Aquaculture	2.0
AQUA 90A Aquaculture Internship	1.0
AQUA 90B Aquaculture Internship	2.0
AQUA 90C Aquaculture Internship	3.0

Total Units: 22.0-27.0

Master Planning:

Students will be able to pursue their personal, intellectual, and educational goals with this program while learning the theory and skills needed to contribute to the global community in aquaculture as a form of sustainable food production. The Associate of Science in Sustainable Aquaculture Technology supports Santa Monica College's mission and strategic goals by preparing students for careers in sustainable aquaculture and environmental stewardship. The program's applied curriculum in fish farming, seaweed and shellfish cultivation, and aquaculture systems design aligns with the College's Master Plan for Education by promoting workforce preparation, sustainability, and community engagement. It also supports the California Community Colleges Vision for Success by increasing completion, expanding equitable access, and developing skilled workers for California's emerging blue economy.

Enrollment and Completer Projections:

The projection of the number of students to earn the degree annually is 10.

Place of Program in Curriculum/Similar Programs:

This degree does not replace or alter any existing programs. Instead, it builds upon the above stacked certificates for Certificate of Achievement — Aquaculture Technician I and Certificate of Achievement — Aquaculture Technician II.

Similar Programs at Other Colleges in Service Area:

While there are two other community colleges in Southern California that offer agriculture programs with the same top code (0115.20) one college in Northern California with an existing aquaculture program with a different top code (1920.00), there is **not** an existing aquaculture program in Los Angeles County with top code 0115.20.

Labor Market Analysis: 0115.20 – Wildlife and Fisheries

Aquaculture Science – Associate of Science (A.S.) degree;

Certificate requiring 6 to <18 semester units

Los Angeles Center of Excellence, August 2024

Program Endorsement:	Endorsed: All Criteria Met ☐	Endorsed: Some Criteria Met ☒	Not Endorsed ☐
Program Endorsement Criteria			
Supply Gap:	Yes ☒	No ☐	
Living Wage: (Entry-Level, 25 th)	Yes ☐	No ☒	
Education:	Yes ☒	No ☐	
Emerging Occupation(s)			
	Yes ☐	No ☒	

SUMMARY

This report analyzes whether local labor market demand is being met by community college programs aligned with the identified middle-skill occupations¹ or whether a shortage of workers exists. Labor market demand is measured by annual job openings while education supply is measured by the number of awards (degrees and certificates) conferred on average each year.

Based on the available data, there appears to be a supply gap for the three identified occupations in the region. While the majority of annual openings for the occupations in this report have entry-level wages that are lower than the self-sufficiency standard wage in both Los Angeles and Orange counties, the majority of annual openings for the occupations in this report typically require an associate degree.

Recommendation: Due to two of the three program endorsement criteria being met, the Los Angeles Center of Excellence for Labor Market Research (LA COE) endorses this proposed program.

Key Findings

Supply Gap

- 358 annual job openings are projected in the region through 2027. This number is greater than the three-year average of 11 awards conferred by educational institutions in the region.

¹ Middle-skill occupations typically require some postsecondary education, but less than a bachelor's degree. The COE classifies middle-skill jobs as the following:

- All occupations that require an educational requirement of some college, associate degree or apprenticeship;
- All occupations that require a bachelor's degree, but also have more than one-third of their existing labor force with an educational attainment of some college or associate degree; or
- All occupations that require a high school diploma or equivalent or no formal education, but also require short- to long-term on-the-job training where multiple community colleges have existing programs.

- However, the SOC codes in this report include various agriculture occupations and not solely aquaculture-related jobs. Therefore, the number of annual job openings for aquacultural-related jobs is likely overstated.
- Over the past 12 months, there were 28 online job postings that listed “aquaculture” as a specialized skill. The highest number of job postings were for aquaculture managers, husbandry interns, aquaculture technicians, and animal care technicians.

Living Wage

- 65% of annual job openings for these aquaculture-related occupations have entry-level wages **below** Los Angeles County’s self-sufficiency standard hourly wage (\$18.10/hour).²

Educational Attainment

- 56% of the annual job openings typically require an associate degree for middle-skill occupations related to aquaculture in the LA/OC region.
- 52% of agricultural and food science technicians in the field have completed some college or an associate degree, according to national educational attainment data.
 - While only 15% of farmworkers, farm, ranch, and aquacultural animals have completed some college or an associate degree, 77% have completed a high school diploma or less educational attainment.

Community college supply

- 2 community colleges issued awards related to natural resources in the greater LA/OC region.
- 11 awards (degrees and certificates) were conferred on average each year between 2021 and 2023.

Other postsecondary supply

- No other educational institutions in the LA/OC region have conferred awards in aquaculture-related programs in the past three years.

TARGET OCCUPATIONS

LA COE prepared this report to provide regional labor market and postsecondary supply data related to three middle-skill occupations. [For full occupation descriptions, please see Appendix.](#)

- **Agricultural Technicians (19-4012)**³
- **Food Science Technicians (19-4013)**⁴
- **Farmworkers, Farm, Ranch, and Aquacultural Animals (45-2093)**⁵

OCCUPATIONAL DEMAND

Exhibit 1 shows the five-year occupational demand projections for these occupations related to aquaculture. In the greater Los Angeles/Orange County region, the number of jobs related to

² Self-Sufficiency Standard wage data was pulled from The Self-Sufficiency Standard Tool for California. For more information, visit: <http://selfsufficiencystandard.org/california>.

³ [Agricultural Technicians \(bls.gov\)](https://www.bls.gov/occupations/agricultural-technicians)

⁴ [Food Science Technicians \(bls.gov\)](https://www.bls.gov/occupations/food-science-technicians)

⁵ [Farmworkers, Farm, Ranch, and Aquacultural Animals \(bls.gov\)](https://www.bls.gov/occupations/farmworkers-farm-ranch-and-aquacultural-animals)

these occupations is projected to decrease by 17% through 2027. However, there will be more than 350 job openings per year through 2027 due to retirements and workers leaving the field. It is important to note that the SOC codes in this report include various agricultural occupations and not solely occupations related to aquaculture. Therefore, the data in Exhibit 1 is likely overstated for entry-level aquaculture occupations. The majority of jobs in 2022 for these middle-skill occupations (76%) were located in Los Angeles County.

Exhibit 1: Current employment and occupational demand, Los Angeles and Orange counties⁶

Geography	2022 Jobs	2027 Jobs	2022-2027 Change	2022-2027 % Change	Annual Openings
Los Angeles	2,087	1,712	(375)	(18%)	263
Orange	668	580	(88)	(13%)	95
Total	2,756	2,292	(464)	(17%)	358

Detailed Occupation Data

Exhibit 2 displays the current employment and projected occupational demand for each of the target occupations in Los Angeles County. The percentage of workers aged 55+ and automation index is included in order visualize upcoming replacement demand for these occupations.

Exhibit 2: Current employment, projected occupational demand, percentage of workers aged 55+, Los Angeles County⁷

Occupation	2022 Jobs	2027 Jobs	5-Yr % Change	Annual Openings	% Aged 55 and older*	Auto-mation Index**
Agricultural Technicians	318	357	12%	54	25%	94.8
Food Science Technicians	611	643	5%	91	27%	94.8
Farmworkers, Farm, Ranch, and Aquacultural Animals	1,158	712	(39%)	118	21%	107.3
Total	2,087	1,712	(18%)	263	-	-

*The average percentage of workers aged 55 and older across all occupations in the greater LA/OC region is 27%. These occupations have a smaller or similar share of older workers, which typically indicates fewer replacements needs to offset the amount of impending retirements.

**The automation index captures an occupation's risk of being affected by automation with a base of 100. An automation index greater than 100 indicates a higher-than average risk of automation; less than 100 indicates a lower-than-average risk.

WAGES

The labor market endorsement in this report considers the entry-level hourly wages for these occupations related to aquaculture in Los Angeles County as they relate to the county's self-

⁶ Five-year change represents new job additions to the workforce. Annual openings include new jobs and replacement jobs that result from retirements and separations.

⁷ Ibid.

sufficiency standard wage. Orange County wages are included below in order to provide a complete analysis of the greater Los Angeles/Orange County region.

Los Angeles County

The majority, 65%, of annual openings for these aquaculture-related occupations have entry-level wages below the self-sufficiency standard wage for one adult (\$18.10 in Los Angeles County). Typical entry-level hourly wages are in a range between \$15.58 and \$20.88. (Exhibit 3).

One occupation has entry-level wages above the self-sufficiency standard wage:

- Food science technicians, \$20.88

Experienced workers can expect to earn wages between \$22.38 and \$30.28, which are higher than the self-sufficiency standard.

Exhibit 3: Earnings for occupations in Los Angeles County

Occupation	Entry-Level Hourly Earnings (25 th Percentile)	Median Hourly Earnings	Experienced Hourly Earnings (75 th Percentile)	Median Annual Earnings*
Agricultural Technicians	\$16.76	\$19.64	\$26.93	\$40,900
Food Science Technicians	\$20.88	\$24.01	\$30.28	\$49,900
Farmworkers, Farm, Ranch, and Aquacultural Animals	\$15.58	\$17.38	\$22.38	\$36,200

*Rounded to the nearest \$100

Orange County

The majority, 63%, of annual openings for these aquaculture-related occupations have entry-level wages below the self-sufficiency standard wage for one adult (\$20.63 in Orange County). Typical entry-level hourly wages are in a range between \$15.54 and \$20.53 (Exhibit 4).

One occupation has entry-level wages above the self-sufficiency standard wage:

- Food science technicians, \$20.53

Experienced workers can expect to earn wages between \$21.66 and \$29.78, which are higher than the self-sufficiency standard.

Exhibit 4: Earnings for occupations in Orange County

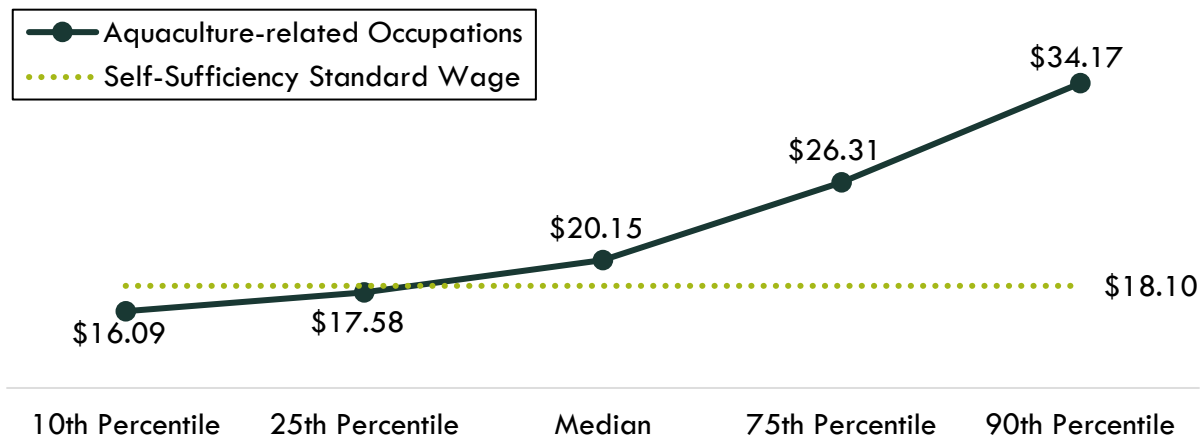
Occupation	Entry-Level Hourly Earnings (25 th Percentile)	Median Hourly Earnings	Experienced Hourly Earnings (75 th Percentile)	Median Annual Earnings*
Agricultural Technicians	\$16.08	\$18.86	\$25.79	\$39,200
Food Science Technicians	\$20.53	\$23.61	\$29.78	\$49,100
Farmworkers, Farm, Ranch, and Aquacultural Animals	\$15.54	\$16.79	\$21.66	\$34,900

*Rounded to the nearest \$100

Across the greater Los Angeles and Orange County region, the average entry-level hourly earnings for the occupations in this report are \$17.58; this is below the living wage for one single

adult in Los Angeles County (\$18.10). Exhibit 5 shows the average hourly wage for the occupations in this report, for entry-level to experienced workers.

Exhibit 5: Average hourly earnings for aquaculture-related occupations, Los Angeles and Orange counties



JOB POSTINGS

In the past 12 months, 28 online job postings in Los Angeles and Orange counties listed “aquaculture” as a specialized skill. The postings were analyzed for the most common job titles, skills, and employers associated with the target occupations in this report (Exhibit 6).

Exhibit 6: Most commonly requested job titles, skills and employers in job postings, Los Angeles and Orange counties

Top Job Titles	Top Skills	Top Employers
• Aquaculture managers • Husbandry interns • Aquaculture technicians • Animal care technicians	• Aquaculture • Biology • Animal husbandry • Marine science	• Santa Monica College • CIS International Holdings • Quality Marine • Aerotek

In the greater Los Angeles/Orange County region, 82% of the aquaculture-related job postings listed a minimum educational requirement. The number and percentage of job postings by educational level appear in exhibit 7. In addition to the education levels in exhibit 7, 7% of the job postings requested a master’s degree (2 postings), while 18% requested a Ph.D. or professional degree (5 postings).

Exhibit 7: Education levels requested in job postings for occupations related to aquaculture, Los Angeles and Orange counties

Education Level	Job Postings	% of Job Postings
Bachelor's degree	7	25%
Associate degree	7	25%
High school diploma or vocational training	2	7%

EDUCATIONAL ATTAINMENT

In the greater Los Angeles/Orange County region, the majority of annual job openings (56%) typically require an associate degree (Exhibit 8). Furthermore, the national-level data indicates 52% of agricultural and food science technicians in the field have completed some college or an associate degree as their highest level of educational attainment. While only 15% of farmworkers, farm, ranch, and aquacultural animals have completed some college or an associate degree, 77% have completed a high school diploma or less educational attainment. The Bureau of Labor Statistics (BLS) lists the following typical entry-level education levels for the occupations in this report:

Exhibit 8: Entry-level education preferred by employers nationally, Bureau of Labor Statistics

Occupation	Education Level
Agricultural Technicians	Associate degree
Food Science Technicians	Associate degree
Farmworkers, Farm, Ranch, and Aquacultural Animals	No formal educational credential

EDUCATIONAL SUPPLY

Community College Supply

Exhibit 9 shows the annual and three-year average number of awards conferred by community colleges in the related TOP code: Natural Resources (0115.00). The two colleges with completions in the region are Saddleback and West LA. There are three other related TOP codes that train students for the occupations in this report, but have no current programs in the region or have not conferred awards in the past three years:

- Food Processing and Related Technologies (0113.00)
- Wildlife and Fisheries (0115.20)
- Ocean Technology (1920.00)

Exhibit 9: Regional community college awards (certificates and degrees), 2021-2023

TOP Code	Program	College	2020-21 Awards	2021-22 Awards	2022-23 Awards	3-Year Average
0115.00	Natural Resources	West LA	-	12	1	4
		LA Subtotal	6	7	6	6
		Saddleback	6	7	6	6
		OC Subtotal	6	19	7	11
Supply Total/Average			6	19	7	11

Other Postsecondary Supply

For a comprehensive regional supply analysis, it is important to consider the supply from other institutions in the region that provide training programs for aquaculture. There are two CIP codes that are specifically related to aquaculture; however, there were no program awards conferred in the region under these CIP codes in the past three years:

- Aquaculture (01.0303)
- Agricultural/Biological Engineering and Bioengineering (14.0301)

Sustainable aquaculture research and programs continue to evolve in the Los Angeles/Orange County region. AltaSea at the Port of Los Angeles is a public-private ocean institute that has partnered with K-12 and higher education institutions in Los Angeles County to provide encourage ocean STEM opportunities, including aquaculture curriculum.⁸ The USC Sea Grant continues to fund research and outreach programs, including the development of safe, environmentally sustainable, and socially responsible aquaculture products.⁹

APPENDIX: OCCUPATION DESCRIPTIONS

LA COE prepared this report to provide regional labor market supply and demand data related to these target occupations:

- **Agricultural Technicians (19-4012)** Work with agricultural scientists in plant, fiber, and animal research, or assist with animal breeding and nutrition. Set up or maintain laboratory equipment and collect samples from crops or animals. Prepare specimens or record data to assist scientists in biology or related life science experiments. Conduct tests and experiments to improve yield and quality of crops or to increase the resistance of plants and animals to disease or insects.¹⁰
- **Food Science Technicians (19-4013)** Work with food scientists or technologists to perform standardized qualitative and quantitative tests to determine physical or chemical properties of food or beverage products. Includes technicians who assist in research and

⁸ <https://altasea.org/education/>

⁹ [Aquaculture - USC Sea Grant](#)

¹⁰ [Agricultural Technicians \(bls.gov\)](#)

development of production technology, quality control, packaging, processing, and use of foods.¹¹

- **Farmworkers, Farm, Ranch, and Aquacultural Animals (45-2093)** Attend to live farm, ranch, open range or aquacultural animals that may include cattle, sheep, swine, goats, horses and other equines, poultry, rabbits, finfish, shellfish, and bees. Attend to animals produced for animal products, such as meat, fur, skins, feathers, eggs, milk, and honey. Duties may include feeding, watering, herding, grazing, milking, castrating, branding, de-beaking, weighing, catching, and loading animals. May maintain records on animals; examine animals to detect diseases and injuries; assist in birth deliveries; and administer medications, vaccinations, or insecticides as appropriate. May clean and maintain animal housing areas. Includes workers who shear wool from sheep and collect eggs in hatcheries.¹²

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DATA SOURCES

- O*NET Online
- Lightcast (formerly Emsi)
- Bureau of Labor Statistics (BLS)
- California Employment Development Department, Labor Market Information Division, OES
- California Community Colleges Chancellor's Office Management Information Systems (MIS)
- Self-Sufficiency Standard at the Center for Women's Welfare, University of Washington
- Chancellor's Office Curriculum Inventory (COCI 2.0)

Important Disclaimer: All representations included in this report have been produced from primary research and/or secondary review of publicly and/or privately available data and/or research reports. Efforts have been made to qualify and validate the accuracy of the data and the reported findings; however, neither the Centers of Excellence, COE host District, nor California Community Colleges Chancellor's Office are responsible for applications or decisions made by recipient community colleges or their representatives based upon components or recommendations contained in this study.

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Centers of Excellence for Labor Market Research, Economic and Workforce Development Program

¹¹ [Food Science Technicians \(bls.gov\)](https://www.bls.gov)

¹² [Farmworkers, Farm, Ranch, and Aquacultural Animals \(bls.gov\)](https://www.bls.gov)

Aquaculture Program at Santa Monica College (SMC)

Minutes – Industry Advisory Board Meeting
Wednesday, July 24, 2024, 1:00PM - 2:16PM

I. **Call to Order** – 1:00pm

The Aquaculture Program Industry Advisory Board (IAB) meeting was held via Zoom. Karol Lu, Ed.D., Project Manager, called the meeting to order at 1:00pm on Wednesday, July 24, 2024.

II. **Welcome & Introductions** – 1:01pm

Ferris Kavar, Director of Sustainability from Santa Monica College (SMC) welcomed *nine members* from industry and *six program faculty and staff* from SMC in attendance. All advisory committee members as well as faculty and staff members from SMC introduced themselves:

In attendance – Name, Title, and Association

Garen Baghdasarian, Ph.D., Chair, Life Sciences Department, Santa Monica College

Ferris Kavar, Director, Sustainability Center, Santa Monica College

Karol Lu, Ed.D., Project Manager, Santa Monica College

Laura Rink, Adjunct Faculty, Santa Monica College

Emily Aguirre, Adjunct Faculty, Santa Monica College

Stuart Ryan, Adjunct Faculty, Santa Monica College

Janet Kübler, Ph.D., Lecturer, California State University, Northridge

David Telling, Founding Partner, Pacific6

Donald Kent, M.S., President, Hubbs Seaworld Research Institute

Peter Struffenegger, Manager, Sterling Caviar

Marslaidh Ryan, Director, Heal the Bay

Randy Lovell, State Aquaculture Coordinator, CA Dept. Of Fish and Wildlife

Linda Chilton, Educator

Devin Spencer, MBA, General Manager, Cultured Abalone Farm

Meredith Brooks, Senior Program and Grants Manager, AltaSea

III. **Approval of Minutes** – 1:08pm

The Aquaculture Program IAB meeting minutes from April 27, 2023, were reviewed. Marslaidh Ryan moved to approve the minutes as written; Meredith Brooks seconded the motion. Meeting minutes were approved by unanimous consent.

IV. **Program Updates and Report** – 1:09pm

a. **Funding**

Ferris Kavar provided the committee members with a program update on current program funding, including subaward NOAA – Padilla grant, Builder's Initiative private grant, and recently approved Perkins grant for 2024-25 year. With NOAA – Padilla expiring in August 2024, Ferris Kavar mentioned that the program will be looking for additional funding opportunities to support the growth of the program.

b. **Aquaculture Internships**

Laura Rink provided the committee members with a program update on the first cohort of 6 interns at Heal the Bay during Summer 2024 intersession. Laura Rink emphasized the importance of internship experiences for students in the program to provide a pathway to gain work experience and a pipeline to the workforce.

c. **Certificates of Achievement (CoAs)**

Dr. Garen Baghdasarian provided an update on the approval of the two Aquaculture CoAs – Level 1 and Level 2; both certificates have been approved by the curriculum committee at SMC and pending approval at the California Community College Chancellor's Office (CCCCO):

CoA – Level I (15-17 units)

AQUA 1 - Introduction to Aquaculture: History, Ecology and Sustainability (3 units)

AQUA 2 - Applications in Aquaculture - System Design, Monitoring and Maintenance (4 units)

BIOL 15 – Marine Biology w/ Lab (4 units) OR one course from each group:

Group 1 (3 units): BUS 55, BIOL 9, BIOL 10, ENGR 11

Group 2 (3 units): BIOL 15N, GEOL 31

AQUA 10A – Scuba (2 units)
AQUA 88B – Independent Studies (2 units)

CoA – Level II (8 units)

AQUA 3 - Microbiology and Genetics for Aquaculture (4 units)
AQUA 4 - Husbandry and Life Support in Aquaculture and Aquarium Science (2 units)
AQUA 5 - Advanced Topics in Aquaculture (2 units)

V. **New Business – 1:17pm**

a. **Program Modification**

Dr. Garen Baghdasarian discussed the need for a program modification to the existing Certificate of Achievement – Level I with the addition of elective options – 1) HEALTH 11 or equivalent first aid training, and 2) AQUA 90A, 90B, 90C; if the addition of the courses to the program are approved, the CoA – Level I total will be 14-19 units. The following information was presented to the advisory board members:

Addition of elective courses to the CoA – Level I (15-17 units >> **14-19 units**) - program modifications in **red** text:

AQUA 1 - Introduction to Aquaculture: History, Ecology and Sustainability (3 units)
AQUA 2 - Applications in Aquaculture - System Design, Monitoring and Maintenance (4 units)
BIOL 15 – Marine Biology w/ Lab (4 units) OR one course from each group:
Group 1 (3 units): BUS 55, BIOL 9, BIOL 10, ENGR 11
Group 2 (3 units): BIOL 15N, GEOL 31

Select one course from each elective group:

Elective 1 (2-3 units): AQUA 10A – Scuba (2 units), **HEALTH 11 - First Aid and Cardio-Pulmonary Resuscitation (3 units) OR equivalent first aid training**

Elective 2 (1-3 units): AQUA 88B – Independent Studies (2 units), **AQUA 90A (1 unit) - Internship, AQUA 90B (2 units) - Internship, AQUA 90C (3 units) - Internship**

The addition of HEALTH 11 as an elective option to the AQUA 10A – Scuba course allows students the option to continue to receive first aid training even if they are unable to commit to the scuba course for personal/medical reasons and/or does not meet the current basic swim prerequisite for AQUA 10A. Since first aid and safety is incorporated into the AQUA 10A course, a student who is unable to complete AQUA 10A would lose the skills taught in that course if a stand-alone first aid course is not offered as an alternative to AQUA 10A.

The addition of the internship course series, AQUA 90A, 90B, and 90C, as an elective option to the AQUA 88B – Independent Study course allows students two different pathways of interest. The current AQUA 88B is an independent study course suitable for students interested in aquaculture research as a future career. The AQUA 90A, 90B, and 90C courses are internship courses that allow students to work at an internship site to gain practical, hands-on work experience; examples cited as an internship is working on an aquaculture farm.

b. **Update CoA – Level I and CoA – Level II Titles**

Dr. Garen Baghdasarian spoke about the need to update the titles to the existing certificates – CoA – Level I and CoA – Level II to reflect the training within each certificate. He presented several options for certificates' titles: Aquaculture Technician, Aquaculture Techniques & Systems, Applied Aquaculture Practices, Sustainable Aquaculture Systems.

c. **Open Discussion – Industry Advisory Board Members - 1:24pm**

i. **Funding**

Ms. Marslaidh Ryan asked clarifying questions regarding types of funding that support the program and Dr. Karol Lu and Ferris Kawar mentioned that the program receives funding support from both the District and grants.

ii. **Internships**

Mr. Peter Struffenegger suggests increasing the number of internship sites so that students gain more experience across the industry; Mr. Donald Kent asks whether aquaculture internships for students at SMC will extend outside of LA county. Ms. Laura Rink and Dr. Garen Baghdasarian clarified that limiting students to one internship site this year was not ideal, and the program will be expanded to other sites next year. Ms. Linda Chilton advised about the internship opportunities nationally.

iii. **Update CoA – Level I and CoA – Level II Titles**

Both Laura Rink and Randy Lovell agreed with Ferris Kavar's suggestion to use the word "advance" to CoA – Level II title, "Advanced Aquaculture Technician," that follows the title "Aquaculture Technician" for the CoA – Level I. Ms. Emily Aguirre and Ms. Marslaith Ryan suggest the use of the word "technology" in the certificate titles. Considerations for titles suggested by the IAB members include:

CoA – Level I

Aquaculture Technician
Technology
Aquaculture Technician I
Marine Technology

CoA – Level II

Advanced Aquaculture Technician Aquaculture
Advanced Aquaculture Technology
Aquaculture Technician II

VI. **Action Items – 1:56pm**

a. **Program Modification – Addition of HEALTH 11 or equivalent first aid training**

Mr. Donald Kent made a motion to recommend a *modification to the Certificate of Achievement – Level I* with the addition of HEALTH 11 - First Aid and Cardio-Pulmonary Resuscitation (3 units) OR equivalent first aid training. This motion was seconded by Ms. Meredith Brooks. There were no objections. **The motion passed by unanimous consent.** Vote count: (9) In Favor, (0) Opposed, (0) Abstained

b. **Open Discussion – 1:57pm**

Mr. Randy Lovell requests additional course information for AQUA 88B – Independent Study and for the internship course, AQUA 90A, 90B, and 90C so that IAB can make a more informed decision. Additional information could include the difference between the independent study versus an internship course. Dr. Karol Lu explained that students who were enrolled in the internship course could earn course credit while working at an internship site, however, additional information can be provided to the IAB to review and that the program modification to add the internship course can be done via electronic polling.

c. Mr. Donald Kent made a motion to table the addition of AQUA 90A, 90B, and 90C as a program modification to CoA – Level I, updates to the current titles of the CoAs, and the addition of the associate degree until additional information has been reviewed by the IAB. This motion was seconded by Ms. Linda Chilton. There were no objections. **The motion passed by unanimous consent.**

VII. **Committee Recommendations**

a. Recommends a program modification to add an elective course so that students can select between AQUA 10A – Scuba or the new addition:

- HEALTH 11 - First Aid and Cardio-Pulmonary Resuscitation (3 units) OR equivalent first aid training

b. Additional course catalog description for AQUA 88B – Independent Study and AQUA 90A, 90B, and 90C will be provided to the IAB. An addendum to the meeting minutes will be added at a later date to include the committee's recommendation re: addition of AQUA 90A, 90B, 90C as an elective course, the modification to the titles of the CoA - Level I & II, and the addition of the associate degree. Committee members will cast their votes via electronic polling.

VIII. **Adjournment – 2:16pm**

Minutes recorded and submitted by Karol Lu, Ed.D., Project Manager, pending approval.

Addendum

Aquaculture Program Industry Advisory Meeting Minutes
Date of Original Meeting: Wednesday, July 24, 2024, 1:00PM - 2:16PM

Date of Addendum: September 5, 2024

Purpose of the Addendum: This addendum serves to update the minutes of the Aquaculture Program advisory board meeting held on Wednesday, July 24, 2024, to include the rationale for program modification and the committee's recommendation by way of electronic polling.

Section V – New Business - updates

- As requested during the advisory meeting on July 24, 2024, in Section VI, item B and C, additional information was sent to the committee members for review. The document titled, "Proposal for Program Modifications and the addition of A.S. Degree" was sent via email on August 13, 2024, along with a link for committee members to cast their votes via electronic polling. E-polling was available to committee members between August 13-30, 2024.
- **New item - Section V, item D.** The addition of an associate degree (A.S. in Sustainable Aquaculture Technology) was proposed to the committee members.
 - **Course Requirements.** The course requirements for the proposed associate degree will include the following:
 - Major Requirements (22-27 units)
 - AQUA 1 - Introduction to Aquaculture: History, Ecology and Sustainability (3 units)
 - AQUA 2 - Applications in Aquaculture - System Design, Monitoring and Maintenance (4 units)
 - Elective 1 (4-6 units)
 - BIOL 15 – Marine Biology w/ Lab (4 units) OR one course from each group:
 - Group 1 (3 units): BUS 55, BIOL 9, BIOL 10, ENGR 11
 - Group 2 (3 units): BIOL 15N, GEOL 31 AQUA 10A – Scuba (2 units)
 - Elective 2 (2-3 units)
 - AQUA 10A – Scuba (2 units) or
 - HEALTH 11 - First Aid and Cardio-Pulmonary Resuscitation (3 units) OR equivalent first aid training
 - Elective 3 (1-3 units)
 - AQUA 88B – Independent Studies (2 units) or
 - AQUA 90A (1 unit) or AQUA 90B (2 units) or
 - AQUA 90C (3 units)
 - AQUA 3 - Microbiology and Genetics for Aquaculture (4 units)
 - AQUA 4 - Husbandry and Life Support in Aquaculture and Aquarium Science (2 units)
 - AQUA 5 - Advanced Topics in Aquaculture (2 units)
 - General Education requirements (33-38 units)

Section VI – Action Items – updates

- **Item D (new). Program Modification – Addition of AQUA 90A, 90B, 90C.** Committee members voted *in favor of the addition of AQUA 90A, 90C, 90C* as an elective option to AQUA 88B – Independent Study to the Certificate of Achievement (CoA) – Level I. Vote count: (10) In Favor, (1) Oppose, (0) Abstained
- **Item E (new). Program Modification – CoA – Level I title.** Committee members voted *in favor of modifying the title* of CoA – Level I to Certificate of Achievement – Aquaculture Technician I by unanimous consent. (11) In Favor, (0) Oppose, (0) Abstained

- **Item F (new). Program Modification – CoA – Level II title.** Committee members voted *in favor of modifying the title* CoA – Level II to Certificate of Achievement – Aquaculture Technician II by unanimous consent. Vote count: (11) In Favor, (1) Oppose, (0) Abstained
- **Item G (new). Addition of A.S. Degree.** Committee members voted *in favor of the addition of an associate degree* (A.S. in Sustainable Aquaculture Technology). Vote count: (10) In Favor, (1) Oppose, (0) Abstained.

Section VII – Committee Recommendations – updates

- **Item C (new).** Recommends a program modification to add an elective course so that students can select between AQUA 88B (2 units) – Independent Study or one of the following courses:
 - AQUA 90A (1 unit) – Internship or
 - AQUA 90B (2 units) – Internship or
 - AQUA 90C (3 units) – Internship
- **Item D (new).** Recommends a program modification to update the title to Certificate of Achievement – Level I to Certificate of Achievement – Aquaculture Technician I
- **Item E (new).** Recommends a program modification to update the title to Certificate of Achievement – Level II to Certificate of Achievement – Aquaculture Technician II
- **Item F (new).** Recommends the addition of an associate degree (A.S. in Sustainable Aquaculture Technology).

**Los Angeles Regional Consortium
Program Recommendation Minutes**

December 12, 2024
8:30 a.m. – 12:30 p.m.

Virtual

- | | |
|---|--|
| <ul style="list-style-type: none">• Dr. Nick Real, Cerritos College• Kimberly Mathews, Citrus College• Dr. Paul Flor, Compton College• Dr. Christina Tafoya, East LA College• David Gonzales, El Camino College• Dr. Federico Saucedo, Glendale Community College• Vivian Alonzo (alternate), LA City College• Dr. Alexandra Duran, LA Harbor College• Marla Uliana, LA Mission College• Mon Khat, LA Pierce College | <ul style="list-style-type: none">• Dr. Marcia Wilson, LA Trade-Tech College• Eric Brach, LA Southwest College• Dr. Laurie Nalepa, LA Valley College• Starla Thomas (alternate), Long Beach City College• Dejah Swingle, Mt. San Antonio College• Dr. Micah Young (alternate), Pasadena City College• Bridgette Hernandez, Rio Hondo College• Dr. Patricia Ramos, Santa Monica College• Tiffany Miller, West Los Angeles College |
|---|--|

I. Welcome and Call to Order

The Los Angeles Regional Consortium (LARC) Workforce Council Business Meeting was called to order at 8:35 a.m. by Dr. Narineh Makijan, Los Angeles Regional Consortium (LARC) Chair & AVP, Pasadena City College.

II. LA Workforce Council Voting Member Roll Call

The roll call was completed by Noushig Simonian, Administrative Assistant, Pasadena City College. They confirmed that a quorum of participating members was present.

III. Approval of Previous Month's Minutes.....Dr. Narineh Makijan

a. Minutes from the November 21, 2024 Business Meeting

Motion: Dr. Patricia Ramos, Santa Monica College

Second: Eric Brach, LA Southwest College

Approved: ☒ Yes ☐ No

IV. General Updatesa. Chancellor's Office Update *Chancellor's Office*b. Fiscal & Procurement Update *PCC Fiscal & Procurement Teams
Pasadena City College***V. Informational Items**

a. Program Data Requests

Program Title	TOP Code	College	Contact
<i>New Program (Regional Program Recommendation)</i>			
1. Entrepreneurship/Small Business I (Certificate)	0506.40 Small Business and Entrepreneurship	Glendale Community College	Sophia Possidon spossidon@glendale.edu
2. Financial Planning & Investment I (Certificate)	0504.00 Banking and Finance	Glendale Community College	Sophia Possidon spossidon@glendale.edu
3. Human Resources Assistant I (Certificate)	0506.00 Business Management	Glendale Community College	Sophia Possidon spossidon@glendale.edu
4. Insurance Professional I (Certificate)	0512.00 Insurance	Glendale Community College	Sophia Possidon spossidon@glendale.edu
5. International Business I (Certificate)	0508.00 International Business and Trade	Glendale Community College	Sophia Possidon spossidon@glendale.edu
6. Management I (Certificate)	0506.00 Business Management	Glendale Community College	Sophia Possidon spossidon@glendale.edu
7. Marketing I (Certificate)	0509.00 Marketing and Distribution	Glendale Community College	Sophia Possidon spossidon@glendale.edu
8. Introduction to Fixed and Removable Prosthodontics (Certificate)	1240.30 Dental Laboratory Technician	LA City College	Jeff Hicks hicksjl@laccd.edu
9. Biotechnology: Brewing and Fermentation Tech (Certificate)	0113.00 Food Processing and Technologies	LA Harbor College	Israel Santana santani3@lahc.edu
10. Health & Wellness Coaching (Certificate)	0835.60 Coaching	LA Pierce College	Mon Khat khatm@piercecollege.edu

Program Title	TOP Code	College	Contact
11. Hospitality Management (Certificate)	1307.00 Hospitality	LA Pierce College	Eleanor Viz Vize@piercecollege.edu
12. Advanced Graphic Design (A.S. Degree, Certificate)	1030.00 Graphic Art and Design	LA Trade-Tech College	Joseph Guerrieri guerrij@lattc.edu
13. Graphic Design Fundamentals (Certificate)	1030.00 Graphic Art and Design	LA Trade-Tech College	Joseph Guerrieri guerrij@lattc.edu
14. Construction Management (A.S. Degree)	0957.00 Civil and Construction Management Technology	Long Beach City College	Andrew Fuenmayor afuenmayor@lbcc.edu
15. Aquaculture Technician II (Certificate)	0115.20 Wildlife and Fisheries	Santa Monica College	Karol Lu lu_karol@smc.edu
16. Biotechnology Laboratory Skills (Certificate)	0430.00 Biotechnology and Biomedical Technology	Santa Monica College	Karol Lu lu_karol@smc.edu
17. Commercial Dance (A.S. Degree)	1008.10 Commercial Dance	Santa Monica College	Marissa Osato Moreno moreno_marissa@smc.edu
18. Film/TV Production Management (Certificate)	0506.00 Business Management	West LA College	Jason Librande libranjr@laccd.edu
<i>College/District Program Review</i>			
19. Child and Adolescent Development (A.A.-T Degree)	1305.00 Child Development/Early Care and Education	LA Harbor College	Marco Marano maranom@lahc.edu
20. Child Development (A.S. Degree)	1305.00 Child Development/Early Care and Education	LA Harbor College	Marco Marano maranom@lahc.edu
21. Early Childhood Education (A.S.-T Degree)	1305.00 Child Development/Early Care and Education	LA Harbor College	Marco Marano maranom@lahc.edu
22. Elementary Teacher Education (A.A.-T Degree)	1305.00 Child Development/Early Care and Education	LA Harbor College	Marco Marano maranom@lahc.edu
<i>Program Modification (substantial change)</i>			
23. Music Entrepreneurship (A.S. Degree)	1005.00 Commercial Music	Pasadena City College	Zac Matthews zpmatthews@pasadena.edu

VI. Action ItemsDr. Narineh Makijan

a. [New Program Recommendation](#)

Motion: Dr. Patricia Ramos, Santa Monica College

Second: Dejah Swingle, Mt. San Antonio College

Recommended: ☒ Yes ☐ No

Dr. Laurie Nalepa inquired whether Program #11, [Certificate of Achievement: Journalism](#), submitted by LA Mission College primarily focuses on social media. Marla Uliana confirmed that this is correct.

Program Title	TOP Code	College	Contact	Type of LMI Endorsement	LMI Criteria			Emerging*
					Supply Gap	Living Wage	Ed Atmnt	
1. Certificate of Achievement: Automobile Diagnostic Technician	0948.00	Citrus College	Kimberly Mathews kmathews@citruscollege.edu	ES	Y	N	Y	N
2. Certificate of Achievement: Automobile Fundamentals	0948.00	Citrus College	Kimberly Mathews kmathews@citruscollege.edu	ES	Y	N	Y	N
3. Certificate of Achievement: Automobile Service	0948.00	Citrus College	Kimberly Mathews kmathews@citruscollege.edu	ES	Y	N	Y	N
4. Certificate of Achievement: Automotive Basic Service & Repair	0948.00	Citrus College	Kimberly Mathews kmathews@citruscollege.edu	ES	Y	N	Y	N
5. Certificate of Achievement: Automotive General Service & Repair	0948.00	Citrus College	Kimberly Mathews kmathews@citruscollege.edu	ES	Y	N	Y	N
6. Certificate of Achievement: Automotive Undercar Service & Repair	0948.00	Citrus College	Kimberly Mathews kmathews@citruscollege.edu	ES	Y	N	Y	N
7. Certificate of Achievement: Automotive Underhood Service & Repair	0948.00	Citrus College	Kimberly Mathews kmathews@citruscollege.edu	ES	Y	N	Y	N
8. Certificate of Achievement: Toyota / Lexus Technician	0948.00	Citrus College	Kimberly Mathews kmathews@citruscollege.edu	ES	Y	N	Y	N
9. Certificate of Achievement: Entertainment Technology and VFX	0614.40	East LA College	Dr. Christina Tafoya tafoyac@elac.edu	EA	Y	Y	Y	Y
10. Certificate of Achievement: Recreation Specialist	0836.10	East LA College	Dr. Christina Tafoya tafoyac@elac.edu	ES	Y	N	Y	N

Program Title	TOP Code	College	Contact	Type of LMI Endorsement	LMI Criteria			Emerging*
					Supply Gap	Living Wage	Ed Atmnt	
11. Certificate of Achievement: Journalism	0602.00	LA Mission College	Marla Uliana ulianamr@lamission.edu	ES	Y	Y	N	N
12. Certificate of Achievement: Screen Printing Fundamentals	0936.00	LA Trade-Tech College	Dr. Marcia Wilson wilsonmr@lattc.edu	ES	Y	N	Y	N
13. Certificate of Achievement: Audio Arts Certificate Level I	0699.00	Mt. San Antonio College	Dejah Swingle dswingle@mtsac.edu	EA	Y	Y	Y	N
14. Certificate of Achievement: Audio Arts Certificate Level II	0699.00	Mt. San Antonio College	Dejah Swingle dswingle@mtsac.edu	EA	Y	Y	Y	N
15. A.S. Degree: Sustainable Aquaculture Technology	0115.20	Santa Monica College	Dr. Patricia Ramos ramos_patricia@smc.edu	ES	Y	N	Y	N

Key	
EA = Endorsed: All Criteria Met ES = Endorsed: Some Criteria Met NE = Not endorsed PA = Pre-approved	Y = Yes N = No * Emerging denotes there are gaps in the traditional labor market information.

b. [Program Modification](#)

Motion: Dejah Swingle, Mt. San Antonio College

Second: Marla Uliana, LA Mission College

Recommended: ☒ Yes ☐ No

1. [A.S. Degree: Emphasis in Animation](#), East LA College

Contact: Dr. Christina Tafoya, tafoyac@elac.edu

- By adding a total of 4 additional courses onto our existing catalog, we have been able to develop the following level II industry-based tracks in the animation discipline:
 - Visual Development
 - Character animation
 - 3D Production
 - Entertainment technology

- The previous AA degree had a mix of courses that belong onto all those industry tracks, providing a very generic based knowledge that unfortunately doesn't necessarily give the students the required skills to seek employment.
- By grouping the existing courses onto these track type of certificates, we will make sure that the students will gain a broad knowledge of the industry while ensuring a deeper level of proficiency in the specific areas that are most relevant to their careers.
- Now students can complete the Animation Level I certificate plus one of these Level II certificates to obtain their AA degree.

2. [Certificate of Achievement: Aquaculture Technician I](#), Santa Monica College

Contact: Dr. Patricia Ramos, ramos_patricia@smc.edu

- Program Title: Modification to the current program title from "Certificate of Achievement - Level I" to "Certificate of Achievement – Aquaculture Technician I"
- Courses:
 - Addition of one elective course to the currently approved certificate course (AQUA 10A - Scuba): HEALTH 11 - First Aid and Cardio Pulmonary Resuscitation (3 units) OR equivalent first aid training
 - Addition of three elective courses to the currently approved certificate course (AQUA 88B - Independent Studies): Aqua 90A - Internship (1 unit), Aqua 90B - Internship (2 units), and Aqua 90C- Internship (3 units)

c. [New Baccalaureate Degrees](#)

Motion: Marla Uliana, LA Mission College

Second: Dr. Patricia Ramos, Santa Monica College

Recommended: ☒ Yes ☐ No

Dr. Marcia Wilson inquired whether she should proceed with submitting a B.A. in Paralegal Studies application despite finding other four-year colleges, including UCs and CSUs, offering similar programs during her search. Luke advised Dr. Wilson to submit an LMI request.

Luke Meyer encouraged anyone submitting a Baccalaureate application without a cover letter to contact him for assistance in obtaining one. Additionally, Luke explained that the COE is transitioning from five-year projections to ten-year projections for reports and offered to update any existing baccalaureate reports with five-year projections accordingly. Dr. Patricia Ramos inquired if January 15 is the deadline for baccalaureate applications, to which Luke confirmed. Luke reminded the council that baccalaureate LMI reports have a 90-day processing time, and assured the group that any outstanding Labor Market Information (LMI) reports would be completed prior to the holiday break.

- [B.A. Degree: Paralegal Studies](#), East LA College
Contact: Dr. Christina Tafoya, tafoyac@elac.edu

- [B.S. Degree: Restorative Justice and Rehabilitation for Law Enforcement](#), Glendale Community College
Contact: Dr. Freddy Saucedo, fsaucedo@glendale.edu

VII. Additional Action Items

- a. Approval of Minutes Reflecting Today's Program Recommendation Vote.....*Dr. Narineh Makijan*
Motion: Dr. Marcia Wilson, LA Trade-Tech College Second: Mon Khat, LA Pierce College Recommended: ☒ Yes ☐ No

Santa Monica College
Program of Study
Aquaculture Technician I Certificate of Achievement

This certificate prepares students for entry- and middle-skill work for the burgeoning Blue Economy in Southern California, including the aquaculture industry. The program emphasizes workforce preparation at the interface of global climate change and sustainability. With consideration for environmental change, additionally, this program addresses conservation and restoration practices for endangered species.

Program Learning Outcomes:

- Analyze and evaluate the history, ecology, and sustainability of local and global aquaculture systems. Special attention will be paid to indigenous and modern practices, environmental and human health impacts, as well as endangered species.
 - AQUA 1: Appraise and differentiate between historical and modern aquaculture practices, and develop best practices for a future aquaculture industry in the context of sustainability and the global climate crisis.
 - AQUA 1: Examine the ecological principles of finfish, shellfish and algae, as they relate to sustainable aquaculture.
 - AQUA 1: Defend sustainability needs in aquaculture, and critique various modern aquaculture approaches in this context.
 - AQUA 88B: Demonstrate a level of engagement in the subject matter that reveals their understanding of the value of the course content beyond the task itself, specifically as it relates to linking the relevance of course content to the professional practice of independent studies discipline.
 - BIOL 10: Demonstrate an understanding of the relationship between evolution, ecology and conservation biology.
 - BIOL 9: Given a current environmental controversy, paraphrase opposing views and evaluate them on the basis of scientific criteria.
- Create, design, construct, monitor, and maintain aquaculture systems for a variety of aquatic species.
 - AQUA 2: Students will design & build effective aquaculture systems for hatching and rearing of a variety of aquatic taxa
 - AQUA 2: Students will effectively monitor aquaculture systems for efficiency and productivity, and make adjustments to maximize desired outcomes.
 - AQUA 2: Students will demonstrate their ability to hatch and rear a variety of aquatic taxa.
 - AQUA 88B: Describe project and discuss any conclusions drawn or other project outcomes.
 - AQUA 88B: Demonstrate a level of engagement in the subject matter that reveals their understanding of the value of the course content beyond the task itself, specifically as it relates to linking the relevance of course content to the professional practice of independent studies discipline.
 - BIOL 10: Apply basic concepts of ecology, ranging from a population-level to an ecosystem-level approach, to case study scenarios and laboratory investigations.
 - BIOL 15: Students will use their knowledge of marine organisms and ecological concepts to analyze a given ecosystem, then hypothesize and defend their proposed potential mechanisms for the observed organismic distributions, as well as the interactions between the organisms and their physical environment.
 - BIOL 15N: Based on their knowledge of oceanographic concepts, evaluate physical oceanographic data, formulate interpretations of the phenomenon observed, and then conclude how these phenomena may affect the biology of marine organisms.
 - BIOL 15N: Use their knowledge of marine organisms and ecological concepts to analyze a given ecosystem, then hypothesize and defend their proposed potential mechanisms for the observed organismic distributions, as well as the interactions between the organisms and their physical environment.
 - ENGR 11: Demonstrate the ability to generate two- and three-dimensional and pictorial drawings of solid models using Computer Aided Drafting (CAD) for an engineering product using standard drawing conventions recognized in the engineering field.
- Apply their understanding of SCUBA and/or First Aid / CPR knowledge to establish safe practices in their future career in aquaculture or a related field.
 - AQUA 10A: Demonstrate mastery of SCUBA diving skills.
 - AQUA 10A: Solve emergent underwater crises and facilitate rescue diving solutions.
 - AQUA 10A: Assess and respond to potential diving related injuries.
 - AQUA 10A: Execute work related tasks including scientific experimentation and arduous physical activities while on SCUBA.

- AQUA 88B: Demonstrate a level of engagement in the subject matter that reveals their understanding of the value of the course content beyond the task itself, specifically as it relates to linking the relevance of course content to the professional practice of independent studies discipline.
- HEALTH 11: Identify life-threatening conditions that require immediate action and EMS response.
- HEALTH 11: Take appropriate action when faced with a cardiovascular emergency.
- HEALTH 11: Create an emergency action plan that coincides with local emergency response systems.

Required Courses	Units: 8.0-10.0
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AQUA 1 ^{DE} Introduction to Aquaculture: History, Ecology and Sustainability	3.0
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AQUA 2 Applications in Aquaculture - System Design, Monitoring and Maintenance	4.0
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AQUA 88B Independent Studies in Aquaculture	2.0
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OR

AQUA 90A Aquaculture Internship	1.0
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OR

AQUA 90B Aquaculture Internship	2.0
---------------------------------	-----

OR

AQUA 90C Aquaculture Internship	3.0
---------------------------------	-----

Aquaculture Focused Electives	Units: 4.0-6.0
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It is highly recommended that students complete BIOL 15.

BIOL 15 ^{DE} Marine Biology with Laboratory	4.0
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OR

Two classes, one from each group

Group 1

BUS 55 ^{DE} Southern California's International Connections and Blue/Ocean Economy	3.0
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BIOL 9 ^{DE} Environmental Biology	3.0
--	-----

BIOL 10 Applied Ecology and Conservation Biology	4.0
--	-----

ENGR 11 Engineering Graphics and Design	3.0
---	-----

AND

Group 2

BIOL 15N ^{DE} Marine Biology (Non-Laboratory)	3.0
--	-----

GEOL 31 ^{DE} Introduction to Physical Oceanography	3.0
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Scuba Diving/First Aid Course:	Units: 2.0-3.0
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Note: AQUA 10A or industry equivalent. Credit for prior learning may be granted for students who hold recognized industry certifications. Acceptable documentation includes: NAUI Master Diver or equivalent; or NAUI Advanced Diver plus Rescue Diver certifications; or any dive certification combined with AAUS certification or equivalent; or First Aid/CPR certification equivalent to those issued by the American Heart Association, Red Cross, or comparable agencies. Please contact the life sciences department or counseling for more information.

AQUA 10A SCUBA (same as: KIN PE 49D)	2.0
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OR

HEALTH 11 ^{DE} First Aid and Cardio-Pulmonary Resuscitation	3.0
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Total: 14.0-19.0

**Santa Monica College
Program of Study
Aquaculture Technician II Certificate of Achievement**

This Certificate of Achievement - Aquaculture Technician II prepares students for higher-skill work for the burgeoning Blue Economy in Southern California, including the aquaculture industry. The program emphasizes workforce preparation at the interface of global climate change and sustainability. With consideration for environmental change, this program addresses conservation and restoration practices for endangered species.

Program Learning Outcomes:

- Analyze, evaluate, and apply microbiological and genetic concepts, data, and laboratory techniques to manage the health and sustainability of aquaculture systems.
 - AQUA 3: Create sustainable aquacultures that are both efficient and productive and support public health.
 - AQUA 3: Appraise and differentiate between disease-causing microbes and those that are necessary for healthy, sustainable aquaculture systems.
 - AQUA 3: Evaluate the effectiveness of disease remedies in aquaculture with consideration for best practices in sustainability and public health.
 - AQUA 3: Describe the effectiveness of disease interventions on aquaculture sustainability.
 - AQUA 3: Evaluate the intersection of maximum production, genetic modifications & best practices in aquaculture on public health and sustainability.
 - AQUA 3: Appraise and differentiate among genetic manipulation techniques for increased production with consideration for environmental and public health factors.
- Analyze conditions for culturing aquatic species, and develop optimal strategies to maximize production, while minimizing environmental impact.
 - AQUA 3: Create sustainable aquacultures that are both efficient and productive and support public health.
 - AQUA 3: Evaluate the intersection of maximum production, genetic modifications & best practices in aquaculture on public health and sustainability.
 - AQUA 3: Appraise and differentiate among genetic manipulation techniques for increased production with consideration for environmental and public health factors.
 - AQUA 4: Appraise and differentiate between different techniques in conditioning/fertilization of shellfish/finfish/algae.
 - AQUA 4: Establish best practices for nutrition and feeding of fish, shellfish and algae with consideration for both sustainability and economic viability.
 - AQUA 4: Appraise and differentiate between food versus non-food uses of aquaculture-produced material.
 - AQUA 5: Evaluate and analyze site conditions to optimize an aquaculture system setting.
 - AQUA 5: Assess and criticize the impact of alien genetic introductions, and evaluate how aquaculture systems can be constructed with effective preventative mechanisms.
- Design, justify, and communicate a business model for an aquaculture facility that integrates site selection, permitting, biosecurity, social license, production logistics (food creation/delivery/handling), and sustainable market delivery.
 - AQUA 3: Create sustainable aquacultures that are both efficient and productive and support public health.
 - AQUA 4: Establish best practices for nutrition and feeding of fish, shellfish and algae with consideration for both sustainability and economic viability.
 - AQUA 4: Appraise and differentiate between food versus non-food uses of aquaculture-produced material.
 - AQUA 5: Evaluate and analyze site conditions to optimize an aquaculture system setting.
 - AQUA 5: Create and defend the justification for Permitting and licensing applications.
 - AQUA 5: Facilitate a mock stakeholders meeting to negotiate acceptable social license for establishing an aquaculture business at a given location.
 - AQUA 5: Assess and criticize the impact of alien genetic introductions, and evaluate how aquaculture systems can be constructed with effective preventative mechanisms.

Required Courses

	Units: 8.0
AQUA 3 Microbiology and Genetics for Aquaculture	4.0
AQUA 4 Husbandry and Life Support in Aquaculture and Aquarium Science	2.0
AQUA 5 ^{DE} Advanced Topics in Aquaculture	2.0

Total: 8.0