University of Hawaii Community Colleges
Proposal to Initiate, Modify or Delete a Course

1. Type of Action
   A. Addition □ Regular or Experimental or X Other Split original AQUA 106 into separate lecture and lab courses
   B. Deletion
   C. Modification: □ in credits □ in number or alpha □ in prerequisites or co-requisites

2. New Alpha, Number and Title
   AQUA 106 Small Scale Aquaculture

3. Credits 3 credits

4. Old Alpha, Number and Title
   AQUA 106 Small Scale Aquaculture

5. Credits 4 credits

6. New Catalog Description
   Survey of possibilities of small scale aquaculture. Application of basic biological and ecological concepts and theories to the selection, planning and design of small scale aquaculture systems. (3 hrs lecture) WCC DB

7. Select box and type specific information in text box.
   □ Prerequisites □ Corequisites or
   □ Recommended Preparation
   Concurrent registration in AQUA 106L

8. Student Contact Hours Per Week
   Lecture 3
   Lecture/Lab
   Lab
   Other (click to specify)

9. Proposed Date of First Offering
   Semester Fall
   Year 2008

10. This course X is proposed for the Liberal Arts Program Program. X can fulfill DB
    If Other, specify ASC in Bio-Resources and Technology, BRDM Track Elective Set 1

11. This course Makes No Difference in the number of credits required for the program/core.

12. Equivalent or similar courses offered in the UH System:

<table>
<thead>
<tr>
<th>Campus</th>
<th>Alpha, Number, Title</th>
<th>Campus</th>
<th>Alpha, Number, Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>UH Hilo</td>
<td>AQUA 262 Intro Aquaculture</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HonoluluCC</td>
<td>OCN 180 Intro Aquaculture Aquarium Mngmnt</td>
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<tr>
<td></td>
<td>X</td>
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</tbody>
</table>

13. This course is (check one and click in appropriate textbox and provide details):
   X Already articulated with
   Provide details of existing or desired articulation (date, college(s), purposes, pre-major, etc.) in this space:

   □ Appropriate for Articulation with
   Provide details of existing or desired articulation (date, colleges(s), purposes, pre-major or major, etc.) in this space:
   - Not yet appropriate for Articulation.

14. Reason for Initiating, Modifying or Deleting Courses or Other Pertinent Comment:
   Provide students with more flexibility when registering for classes by splitting the lecture and laboratory components for this class.

Requested by: [Signature] 1/28/07
Approved by: [Signature] 2/19/08
[Department Chairperson]
[Curriculum Committee Chairperson]
[Faculty Senate Chairperson]
[Dean of Instruction]

CCCM #6100 (Amended for WCC use October 2002)
Levels of Review of Course Proposal at Windward Community College

Course Alpha, Number, and Title: AQUA 106 Small Scale Aquaculture

1. Department Area (more than one departmental instructor's signature required)
   
   [Signature]
   
   [Date: 11/29/07]

2. Department Chairperson
   
   [Signature]
   
   [Date: 11/29/07]

   Was this course discussed in a department meeting? □ Yes □ No

3. Division
   
   [Signature]
   
   [Date: 12/04/2007]

4. Curriculum Committee Review
   
   Approved □
   
   Disapproved □

   Reason:
   
   [Signature]
   
   [Date: 2/12/08]

   Curriculum Committee Chairperson

CCCM #6100 (Amended for WCC use October 2002)
WCC Form for Course Modifications

Course AQUA 106 Small Scale Aquaculture
Submitted by David Krupp
Date November 12, 2007

1. What change is proposed in the course? Provide specific information comparing both the “new” and “old” course.

The purpose of this modification is to split the lecture component of the original AQUA 106, a 4-credit lecture/laboratory/field trip course, from its laboratory/field component. Consequently, there will be a 3-credit lecture class (AQUA 106) and a separate laboratory/field trip class (AQUA 106L). Bureaucratically, this change requires removal of the laboratory/field trip component of the former AQUA 106, reducing it by 1 credit. It also requires the establishment of a new course, AQUA 106L.

2. What is the rationale for the change?

The Natural Sciences Department has been separating its lecture/laboratory classes into corresponding separate lecture and laboratory courses. Making this split will offer flexibility for the student when registering for these classes. Making this change will not compromise the pedagogy.

3. Is the change substantive enough to require a change in course identification? If so, explain thoroughly.

Requires the establishment of a separate AQUA 106L laboratory/field trip class.

4. Is the course articulated with any 4-year program? Yes

If yes, give details of the agreement(s) and explain any impact the proposed modifications may have on articulation.

5. Provide details of any additional staff, equipment, facilities, library/media material, faculty preparation and other financial considerations that would be required to implement this course modification. What has been done to provide for these additional costs? Who will teach the course? Is additional preparation needed?

None. Regular WCC biological science faculty, or a lecturer will teach this class.

6. Will this course modification result in any alterations in the number of hours required to attain a certificate or degree? No

If yes, provide details and justification for these alterations.

7. If the course is renumbered to 100 or above, does it meet the criteria for transfer level courses? (Go to next page for transfer course criteria.) No
 University of Hawaii Community Colleges  
Proposal to Initiate, Modify or Delete a Course  
Course Modification Form – Go to next page for Articulation Form  
COURSE ARTICULATION FORM (GENERAL EDUCATION CORE)  

ORIGINATING CAMPUS: Windward Community College  
DATE SUBMITTED: November 12, 2007  

COURSE ALPHA & NUMBER: AQUA 106  
SEMESTER CREDITS: 3  

COURSE TITLE: Small Scale Aquaculture  
DATE OF OUTLINE: November 12, 2007  

(* Representative outline, no multiple syllabi, please.)  

1. Articulation committee to review this course:  

Standing Committees:  
- Written Communication  
- Mathematical & Logical Thinking  
- World Civilizations  
- Languages  
- Arts & Humanities  
- Natural Science  
- Social Science  

2. The information in this item is required by the reviewing committee so that it has a starting point for reviewing the course. It is the responsibility of the submitting campus to do the necessary research to provide this information.

In the opinion of the originating campus, this course is equivalent to the following and/or meets the criteria for the indicated core categories. Every core category space, except your own campus, must be filled in (can include ‘none’). An equivalent course, if known, may be helpful to committee members but is not required.

<table>
<thead>
<tr>
<th>Receiving Campus</th>
<th>Equivalent Course (Alpha and Number)</th>
<th>Core Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>UH Hilo</td>
<td>Nat Sci (Biology)</td>
<td></td>
</tr>
<tr>
<td>UH Manoa</td>
<td>DB</td>
<td></td>
</tr>
<tr>
<td>UH West Oahu</td>
<td>Nat Sci (Biology)</td>
<td></td>
</tr>
<tr>
<td>Hawaii CC</td>
<td>NS1</td>
<td></td>
</tr>
<tr>
<td>Honolulu CC</td>
<td>DB</td>
<td></td>
</tr>
<tr>
<td>Kapiolani CC</td>
<td>DB</td>
<td></td>
</tr>
<tr>
<td>Kauai CC</td>
<td>NS1</td>
<td></td>
</tr>
<tr>
<td>Leeward CC</td>
<td>DB</td>
<td></td>
</tr>
<tr>
<td>Maui CC</td>
<td>Nat Sci</td>
<td></td>
</tr>
<tr>
<td>Windward CC</td>
<td>DB</td>
<td></td>
</tr>
</tbody>
</table>

3. If submitted electronically, I understand that this outline will be posted to a publicly accessible web site to enable open access for reviewing committees and campuses. The outline will be taken off the site upon completion of the review.

Typed Name or Signature  

SUBMIT TO: UCA Clearinghouse, Attn: John Muth  
Chancellor’s Office for CC, 2327 Dole Street  
Revised 1/19/01
AQUA 106 Small Scale Aquaculture
03 Credits

INSTRUCTOR:
OFFICE:
OFFICE HOURS:
TELEPHONE:
EMAIL:
EFFECTIVE DATE: Fall 2008

WINDWARD COMMUNITY COLLEGE MISSION STATEMENT

Windward Community College is committed to excellence in the liberal arts and career development; we support and challenge individuals to develop skills, fulfill their potential, enrich their lives, and become contributing, culturally aware members of our community.

CATALOG DESCRIPTION

Survey of possibilities of small scale aquaculture. Application of basic biological and ecological concepts and theories to the selection, planning and design of small scale aquaculture systems. (3 hrs lecture) WCC DB

PREREQUISITES

No prerequisites. Although it would be useful if the student has taken a class in biology before enrolling in AQUA 106. The student is also recommended to take the companion laboratory course AQUA 106L concurrently with AQUA 106.

STUDENT LEARNING OUTCOMES

The student learning outcomes are

- Describe past and present aquaculture technologies.
- Plan and design a small scale aquaculture system.
- Select appropriate small scale aquaculture organisms.
- Determine the optimal conditions for cultivating small scale aquaculture organisms.
- Develop a small scale aquaculture husbandry and management plan.
- Evaluate the economic feasibility of developing a small scale aquaculture system.

REQUIREMENTS SATISFIED BY THIS CLASS

- This class may satisfy the Windward Community College Associate in Arts Degree diversification requirement for a Natural Sciences biological science class (DB).
- This class may partially satisfy requirements for the Windward Community College Academic Subject Certificate in Bio-Resources and Technology, Bio-Resources Development and Management Track (Elective Set I Technology, Utilization, and Management).
- This class may partially satisfy requirements for the University of Hawai‘i Marine Option Program Certificate as a Marine-Related course.
COURSE CONTENT

Course Content and Topics

- History of Aquaculture
- Basic Biological Principles
- Types of Culturing Facilities (e.g., ponds, tank, raceways, pens, cages, etc.)
- Pond Construction
- Environmental Factors Affecting Aquaculture Facilities and their Control (e.g., oxygen, temperature, photoperiod, pH, salinity, nutrients, water motion, toxic materials, etc.)
- Non-Desirable Species and their Control
- Nutrition and Feeding
- Reproduction, Metabolism & Growth
- Diseases of Cultured Organisms and their Control
- Species-Specific Culture Methods
- Polyculture
- Hawaiian Fishponds
- Best Environmental Management Practices
- Harvesting and Processing
- Economic Aspects of Aquaculture
- Laws and Regulations Governing Aquaculture in Hawai‘i

Skills or Competencies

- Describe the history of aquaculture.
- Describe basic biological principles, including, but not limited to, characteristics of life, chemical basis for life, basic plant and animal metabolism and nutrition, basic genetics, evolution, the classification and nomenclature of living thing, and reproduction and development.
- Describe basic ecological principles as they apply to aquaculture, including, but not limited to, environmental factors affecting living things, population growth, intra- and interspecific competition, predator-prey relationships, food chains and webs, biogeochemical cycles, and energy flow through ecosystems.
- Describe the design, construction, and operation details for various kinds of aquaculture facilities and methods.
- Describe the basic biology and specific culture requirements of common species used in small scale aquaculture.
- Compare and contrast the different types of Hawaiian fishponds, describing their respective operations and the species that were cultivated.
- Describe the laws and regulations governing aquaculture in Hawai‘i.
- Design a small scale aquaculture system, addressing all aspects of system design, including construction, species, operation, husbandry, maintenance, monitoring, harvesting and costs.

ASSESSMENT AND GRADING

SMALL SCALE AQUACULTURE SYSTEM DESIGN AND PLAN. The student will utilize the concepts learned to design and plan a small scale aquaculture system (100 points). This written plan will include the following information: (1) detailed description including diagrams that illustrate construction design; (2) species to be cultivated; (3) detailed description for how the system would work; (4) a plan for the husbandry and maintenance of the organisms to be cultivated including the methods for monitoring the operation; (5) harvesting protocols (when
and how), including how the harvested products should be processed; (6) description of the permits that may be needed; and (7) an itemized budget detailing the anticipated costs for the construction and operation of the system.

**QUIZZES.** The student will take a minimum of ten quizzes (15 points each; 150 points total). These quizzes will address the detailed content and major concepts presented in the lectures, lecture outlines, text readings, and study guide activities.

**EXAMINATIONS.** The student will take one midterm examination (100 points) and a cumulative final examination (150 points) to demonstrate understanding of information presented primarily during lectures.

The assignment of points will be according to the following protocol:

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aquaculture Design Plan</td>
<td>100</td>
</tr>
<tr>
<td>Quizzes</td>
<td>150</td>
</tr>
<tr>
<td>Midterm Examination</td>
<td>100</td>
</tr>
<tr>
<td>Final Examination</td>
<td>150</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>500</td>
</tr>
</tbody>
</table>

**Letter grades will be assigned as follows:**

<table>
<thead>
<tr>
<th>Grade</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>90% or above in total points.</td>
</tr>
<tr>
<td>B</td>
<td>80-89.9% of total points.</td>
</tr>
<tr>
<td>C</td>
<td>65-79.9% of total points.</td>
</tr>
<tr>
<td>D</td>
<td>55-64.9% of total points.</td>
</tr>
<tr>
<td>F</td>
<td>Below 55% of total points or informal or incomplete official withdrawal from course.</td>
</tr>
<tr>
<td>I</td>
<td>Incomplete; given at the INSTRUCTOR’S OPTION when student is unable to complete a small part of the course because of circumstances beyond his or her control. It is the STUDENT’S responsibility to make up incomplete work. Failure to satisfactorily make up incomplete work within the appropriate time period will result in a grade change for &quot;I&quot; to the contingency grade identified by the instructor (see catalog).</td>
</tr>
<tr>
<td>CR</td>
<td>65% or above in total points; the student must indicate the intent to take the course as CR/NC in writing by the end of the 10th week of classes (see catalog).</td>
</tr>
<tr>
<td>NC</td>
<td>Below 65% of total points; this grade only available under the CR/NC option (see above and see catalog).</td>
</tr>
<tr>
<td>N</td>
<td>NOT GIVEN EXCEPT UNDER EXTREMELY RARE CIRCUMSTANCES (e.g., documented serious illness or emergency that prevents the student from officially withdrawing from the course); never used as an alternative for an &quot;F&quot; grade.</td>
</tr>
<tr>
<td>W</td>
<td>Official withdrawal from the course after the third week and prior to the end of the 10th week of classes (see catalog).</td>
</tr>
</tbody>
</table>

Waiver of minimum requirements for specific grades may be given only in unique situations at the instructor's discretion.

Students involved in academic dishonesty will receive an "F" grade for the course. Academic dishonesty is defined in WCC's college catalog.
LEARNING RESOURCES

Required Textbook

Szyper, J., 1989. Backyard Aquaculture in Hawaii. Windward Community College and Aquaculture Development Program, Hawaii State Dept. of Land and Natural Resources. 87 pp. *This text is available for free through the Internet in pdf format.*

Handouts and selected readings from various texts will also be distributed in class.

Supplemental Texts:


STUDENT RESPONSIBILITIES

The student is expected to attend and actively participate in all course lectures and activities, and complete all assignments, quizzes and examinations on time.

The student is expected to be prepared in advance before the class sessions. Being prepared includes the following: having read text materials (e.g., textbook readings and other resources) assigned for that day's activities and bringing required work materials (e.g., textbook, handouts, writing supplies, etc.) to the session.

Any changes in the course schedule, such as examination dates, deadlines, etc., will be announced ahead of time in class. It is the student's responsibility to be informed of these changes.

It is the student's responsibility to be informed about deadlines critical to making registration changes (e.g., last day of erase period and last day for making an official withdrawal).

Students should expect a level of difficulty comparable to other 100-level science classes intended for non-science majors. When difficult concepts and detailed information are presented, it is the student's responsibility to take the appropriate steps to learn and understand these concepts and information.

Science courses at W.C.C. generally require two to three hours of independent private study time for each hour in class. However, because of the nature of the material presented in AQUA 106, more study time may be required (depends upon the student's science/biology background). It is the student's responsibility to allocate the appropriate time needed for study in an environment conducive to quality study. The student must budget time efficiently and be realistic about all personal and professional commitments that consume time.
**HOW TO SUCCEED IN THIS CLASS**

Understanding biological science involves understanding many difficult concepts and vocabulary, not just knowing facts. The student should know that the details to these concepts are important. In addition, the student will be introduced to hundreds of new words. In some cases, words that are familiar in a context other than biology will be introduced in the context of biology. The student will need to understand and use these terms in a biological science context.

Students are expected to participate in all lecture activities and complete all course assignments on time.

The student will not succeed in this class without taking careful lecture notes and reading the corresponding material in the textbook. As soon as possible (best if done on the same day), the student should copy over these lecture notes filling in gaps and missing information by referring to the textbook and other resources provided. The student should carefully review these rewritten lecture notes as often as possible.

In addition to copying over lecture notes, study activities should include drawing labeled diagrams or graphs that illustrate important biological phenomena (e.g., the internal structure of the cell, the stages of cell division, or the anatomy of the heart). These diagrams need not be works of art, but should clearly illustrate significant information. Before an exam, it would be useful to redraw these labeled diagrams and graphs from memory.

The student should make flashcards for each new vocabulary word presented (refer to lecture outlines for a lists of required terms). The student should use these card for self-testing as often as possible. The student should also practice using the words to explain biological concepts.

The student should do all of the recommended study guide activities and review all of the Internet resource materials provided.

The textbook and other resources may include useful study questions. The student should write out answers to all of these questions as though they were required assignments. Students could exchange these answers and provide constructive feedback to each other.

The student should read the textbook materials corresponding to a particular lecture before and after that lecture.

Students are recommended to establish study groups and study together. The students in these groups may test each other's knowledge and understanding of the information. They may also take turns teaching each other.

The student should ask the instructor to explain the things that the student does not understand.

**DISABILITIES ACCOMMODATION STATEMENT**

If you have a physical, sensory, health, cognitive, or mental health disability that could limit your ability to fully participate in this class, you are encouraged to contact the Disability Specialist Counselor to discuss reasonable accommodations that will help you succeed in this class. Ann Lemke can be reached at 235-7448, lemke@hawaii.edu, or you may stop by Hale 'Akoakoa 213 for more information.