AG 170 Introduction to Aquaponics (CRN 64324)  
4 Credits (3 Hours Lecture, 1 hour Laboratory)

INSTRUCTOR: Leonard Young/RuthEllen Klinger-Bowen  
OFFICE: Hale Imiloa 119  
OFFICE HOURS: TUE 11:00 - 12:00  
TELEPHONE: 236-9257  
EMAIL: lyoung@hawaii.edu  
RuthEllen Klinger-Bowen  rckb@hawaii.edu 
EFFECTIVE DATE: 1/17

WINDWARD COMMUNITY COLLEGE MISSION STATEMENT
Windward Community College offers innovative programs in the arts and sciences and opportunities to gain knowledge and understanding of Hawai‘i and its unique heritage. With a special commitment to support the access and educational needs of Native Hawaiians, we provide O‘ahu’s Ko‘olau region and beyond with liberal arts, career and lifelong learning in a supportive and challenging environment — inspiring students to excellence.

CATALOG DESCRIPTION
The course covers aquaculture, hydroponics, aquaponics, sustainable aquatic feed production, renewable local seeding technologies and micronutrient supplementation, fish and plantphysiology, renewable energy systems, water catchment and conservation techniques, and bestaquaponic food safety practices. The basic physical and biological principles governing sustainable farm and agribusiness operations are emphasized.

ACTIVITIES REQUIRED AT TIMES OTHER THAN CLASS TIMES
Data record collection during the week
Feeding of finfish

PRE-REQUISITES
For a student to work with fish during this course, he/she must pass the IACUC certification process for a basic understanding of working with vertebrate animals within the University and working with fish in research. This is a federal and University requirement.

Also in operating an aquaponic system, you will need to have handheld meters for total dissolved solids or electrical conductivity and temperature, and one for pH. Both of these meters cost less than $50. I previously provided these and have lost too many devices.

LEARNING OUTCOMES
The student learning outcomes for the course are at the end of the course the student will be able to:

Design and construct a basic aquaponic system that uses all three growout technologies (e.g., nutrient film technique (NFT), ebb and flow and floating raft) either alone or in combination.

Apply best aquaculture practices (BAP) for culturing fishes (e.g. Tilapia) in an aquaponic setting.

Identify the water quality parameters and manage them in order to maximize fish, plant and microbial outputs in an aquaponic setting.

Use best agricultural practices (BAP) for plant crop production in an aquaponic setting.

Prepare seedlings for planting, harvest produce, stagger production of both plant and fish, and apply
food safety procedures.

**COURSE CONTENT**
Concepts or Topics include:

- Water cycle
- Nitrification cycle
- The ahupuaa model of resource management
- Scientific method
- Hydroponic growing methods of growing – nutrient film technique (NFT), floating raft, ebb and flow filter bed
- Fish (e.g., aquaculture) production systems
- Growing mediums – cinder, expanded clay balls
- Management of water and nutrients
- Water chemistry testing and test equipment
- Fish and plant anatomy
- Pumps, filtration
- Use of basic tools used in carpentry and plumbing
- Food safety and hygiene
- Marketing, Packaging, labelling etc
- Create a business plan

**COURSE TASKS**
1. Attend all lectures and laboratories
2. Participate in the online group online discussions, read all assigned readings online, and turn in all online writing assignments
3. Construct and successfully operate an aquaponic system
4. Contribute towards a group project

**ASSESSMENT TASKS AND GRADING**
There will be no make up examinations, field trips or laboratories. Your grade will be based on your attendance, participation and performance in completing the above tasks according to these points:

- Attendance 100 points (lecture and laboratory each)
- Laboratories 20 points x 16
- Groups Discussion 20 points x 16
Problem Reflection  15 points x 16
Group Project (laboratory)  100 points

Corresponding letter grades are as follows:

A = 100 – 90 pts  
B =  89 – 80 pts  
C =  79 – 70 pts  
D =  69 – 60 pts  
F =  59 and below.

Please refer to the WCC College Catalog for audit, withdrawal, and incomplete options.

**LEARNING RESOURCES**
No textbook ($0) will be used in this course, instead we will used public domain online information. Descriptions of lectures, copies of presentations, handouts and laboratory assignments and activities will be made available as downloadable files over the course period on Laulima. Having access and use of a computer with internet connection will be essential to complete the course.

The course, particularly the laboratory section is to be taught with a “hands-on, learn-by-doing” philosophy as described in an ‘ōlelo no’eau (Hawaiian Proverb) compiled by Mary Kawena Pukui:

*Ma ka hana ka ‘ike    In the task is the knowledge and understanding.*

Lectures covering the various course content and topics are to be accompanied with Powerpoint presentations on Laulima. The online component with selected reading materials (Laulima) or you will be given URLs for retrieval, group discussion and problem reflections will be on Canvas. The laboratory will consist of a variety of hands on learning activities and objectives.

**Additional Information**
Students are expected to participate in all laboratory and field activities and complete all course assignments on time.

Students are expected to be prepared in advance when they arrive to class.

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 also 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.

If the instructor’s office hours do not work with your schedule, please e-mail or call to set up an appointment.

The schedule and activities in this course are subject to change.

**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.*