Authorization to Plan (ATP)

Associate in Science (AS)
Certificate of Achievement (CA)
Certificate of Completion (CC)

Plant Biology and Tropical Agriculture (PBT)

Draft – 7-9-13

Date of ATP
July 17, 2013

Proposed Date of Implementation
Fall 2014
Authorization to Plan (ATP) a New Academic Program

1. Prior to completion of the ATP, proposers must consult with the Vice Chancellor for Academic Affairs (VCAA) regarding the interest in proposing a new degree/certificate.

Plant Biology and Tropical Agriculture Planning Committee met with Michael Pecsok, Leeward CC Vice Chancellor for Academic Affairs on multiple occasions prior to the completion of the ATP.

2. Identify the campus, school/college and department/division requesting the ATP.

Leeward CC, Math and Science Division, Plant Biology and Tropical Agriculture (PBT) Program

3. List the planning committee chair and members

- Kabi Neupane, Program Coordinator and Co-chair - PBT
- Yawadee Srimake, Instructor and Co-chair - PBT
- Lynne Constantinides, Sustainable Agriculture Specialist
- Ron Umehira, Dean of Career and Technical Education
- Jennie Thompson, Division Chair - Math and Science
- Michael Reese, Program Coordinator - Associate in Science Natural Sciences

4. Identify the degree/certificate proposed

- Stackable certificate/degree in Plant Biology and Tropical Agriculture (PBT) Program
  a. Certificate of Completion (CC) in PBT
  b. Certificate of Achievement (CA) in PBT
  c. Associate in Science (AS) in PBT

5. Describe the need for program:

A. Program Description

About 85-90% of Hawaii’s food is imported, which makes it particularly vulnerable to natural disasters and global events that might disrupt shipping and the food supply. Both government and non-government sections have established various strategies in order to increase food security and food self-sufficiency, which will also keep money circulating in Hawaii and greatly help Hawaii’s economy\(^1\). The strategy objectives are to: 1) increase demand and, provide an access to locally grown food, and 2) provide policy and organizational support to meet food self-sufficiency needs.

In preparation for the expansion in agriculture, post-secondary levels of education will not only prepare farmers, returning non-traditional students and youth to start various occupations in agriculture successfully, but also lead to more employment opportunities and better pay in the workforce.

The PBT Program at Leeward Community College is proposing a new CC, CA, and AS in addition to the existing Academic Subject Certificate in PBT. Leeward’s PBT program will:

- Provide students with a transfer level degree to four-year programs at UH Manoa, UH Hilo, UH West Oahu, or other institutions or provide students with a terminal degree to enter the agriculture workforce directly;
- Utilize the existing classes offered in the Academic Subject Certificate;
- Expand the PBT program to include a CC, CA and AS degree;
- Use approved Leeward CC courses and existing resources;
- Build on existing non-credit courses to develop new credit courses for approval and vice versa;
- Address the UH System Strategic Plan and Leeward CC Mission Statement, Hawaii Department of Agriculture (HDOA) and Department of Labor and Industrial Relations (DLIR) strategies;
- Provide a new program to Leeward Coast students with a higher skill, higher wage, and higher demand career;
• Offer a program with hybrid courses to meet the needs of Leeward Coast students going into government, non-government, and business sectors;
• Work with other University of Hawaii campuses to meet the agriculture workforce and the community needs.

1) Program Learning Outcomes

a. Employ the knowledge in plant biology, crop production, pest management, plant propagation, landscaping, and business concepts to improve agriculture practices.
b. Demonstrate introductory commands, terminologies and techniques of horticulture and soil science and apply their principles to identify, analyze, and solve problems.
c. Utilize the physical, chemical and biological information of plants and environmental factors as they relate to quality in crop production.
d. Define the concepts of a sustainable management and apply the functional applications to manage farm, nursery and other agriculture systems.
e. Evaluate growth and development of agriculture and food industry, locally and national, and identify the solution to adopt more sustainable practices.

2) Program Justification

In 2011, Hawaii farm gate revenues increased to $719.5 million from the revised 2010 level of $674.6 million. The 15 top value-increased commodities included seed crops, cattle, macadamia nuts, algae, bananas, milk, sweet potatoes, basil, lettuce, potted palms, dry onions, potted dracaena, honey, and taro (Table 1). Although farm value is also increasing steadily from 2007-2011, most of Hawaii's food is imported. Hawaii spends more than $3.1 billion in food of which an estimated 85% is imported. Replacing just 10% of the food import would be worth $313 million and generate more than 2,300 jobs².

The State of Hawaii Office of Planning, the Department of Business, Economic Development & Tourism, and HDOA published "Increased Food Security and Food Self-Sufficiency Strategy" in October 2012, which emphasized increasing local food production by promoting local food consumption, strengthening agricultural infrastructure i.e. agricultural parks, irrigation systems and distribution systems/facilities. It also recommended actions to provide for food safety, pest prevention and control, workforce training, research and extension services; and policy and organizational support. These ongoing strategies and projects included:

• Continue to fund new farmers through program such as ‘USDA National Organic Certification Cost-Share Program’ (HDOA)
• Develop a coordinated pathway of agricultural training at elementary, secondary and post-secondary school levels. Lead organizations: Department of Education (DOE), University of Hawaii at Manoa (UHM), University of Hawaii Community Colleges (UHCC), and DLIR.
• Continue the support of the Trade Adjustment Assistance Community College and Career Training (TAACCCT) Grant, which will develop new training programs and support existing ones that lead to jobs in the agriculture, energy, and health industries.
### Table 1: Hawaii diversified agriculture rank and value

<table>
<thead>
<tr>
<th>Commodity</th>
<th>Rank</th>
<th>Value of production (1,000 dollars)</th>
<th>Year</th>
<th>Sugar (unprocessed cane)</th>
<th>Pineapples (fresh equivalent)</th>
<th>Diversified agriculture</th>
<th>Total (1,000 dollars)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Seed crops</strong></td>
<td>1</td>
<td>239,375</td>
<td>2010</td>
<td>153,700</td>
<td>102,100</td>
<td>264,427</td>
<td>520,227</td>
</tr>
<tr>
<td><strong>Sugar cane (unprocessed)</strong></td>
<td>2</td>
<td>69,800</td>
<td>1992</td>
<td>163,000</td>
<td>79,850</td>
<td>271,094</td>
<td>513,944</td>
</tr>
<tr>
<td><strong>Cattle</strong></td>
<td>3</td>
<td>30,000</td>
<td>1993</td>
<td>127,700</td>
<td>87,360</td>
<td>291,632</td>
<td>506,692</td>
</tr>
<tr>
<td><strong>Macadamia nuts</strong></td>
<td>4</td>
<td>30,000</td>
<td>1994</td>
<td>160,100</td>
<td>78,890</td>
<td>273,826</td>
<td>512,816</td>
</tr>
<tr>
<td><strong>Coffee</strong></td>
<td>5</td>
<td>33,440</td>
<td>1995</td>
<td>127,700</td>
<td>87,360</td>
<td>291,632</td>
<td>506,692</td>
</tr>
<tr>
<td><strong>Algae</strong></td>
<td>6</td>
<td>16,725</td>
<td>1996</td>
<td>108,100</td>
<td>95,914</td>
<td>297,314</td>
<td>511,343</td>
</tr>
<tr>
<td><strong>Bananas</strong></td>
<td>7</td>
<td>10,680</td>
<td>1997</td>
<td>85,500</td>
<td>91,721</td>
<td>271,001</td>
<td>506,342</td>
</tr>
<tr>
<td><strong>Papayas</strong></td>
<td>8</td>
<td>11,123</td>
<td>1998</td>
<td>79,850</td>
<td>92,776</td>
<td>272,626</td>
<td>509,926</td>
</tr>
<tr>
<td><strong>Milk</strong></td>
<td>9</td>
<td>8,750</td>
<td>1999</td>
<td>86,800</td>
<td>101,448</td>
<td>342,846</td>
<td>531,094</td>
</tr>
<tr>
<td><strong>Potatoes, sweet</strong></td>
<td>10</td>
<td>6,510</td>
<td>2000</td>
<td>62,200</td>
<td>101,530</td>
<td>358,170</td>
<td>521,900</td>
</tr>
<tr>
<td><strong>Basil</strong></td>
<td>11</td>
<td>5,540</td>
<td>2001</td>
<td>57,800</td>
<td>96,337</td>
<td>370,241</td>
<td>524,378</td>
</tr>
<tr>
<td><strong>Lettuce</strong></td>
<td>12</td>
<td>3,629</td>
<td>2002</td>
<td>64,300</td>
<td>100,616</td>
<td>374,602</td>
<td>539,518</td>
</tr>
<tr>
<td><strong>Palms, potted</strong></td>
<td>13</td>
<td>3,613</td>
<td>2003</td>
<td>64,400</td>
<td>101,470</td>
<td>382,253</td>
<td>548,123</td>
</tr>
<tr>
<td><strong>Dendrobiums, potted</strong></td>
<td>14</td>
<td>3,468</td>
<td>2004</td>
<td>61,500</td>
<td>83,104</td>
<td>407,453</td>
<td>552,057</td>
</tr>
<tr>
<td><strong>Onions, dry</strong></td>
<td>15</td>
<td>2,223</td>
<td>2005</td>
<td>58,900</td>
<td>79,288</td>
<td>444,597</td>
<td>582,785</td>
</tr>
<tr>
<td><strong>Dracaena, potted</strong></td>
<td>16</td>
<td>2,752</td>
<td>2006</td>
<td>50,200</td>
<td>73,652</td>
<td>455,738</td>
<td>579,590</td>
</tr>
<tr>
<td><strong>Honey</strong></td>
<td>17</td>
<td>2,118</td>
<td>2007</td>
<td>47,600</td>
<td>3</td>
<td>3</td>
<td>577,999</td>
</tr>
<tr>
<td><strong>Anthuriums, cut</strong></td>
<td>18</td>
<td>3,143</td>
<td>2008</td>
<td>44,200</td>
<td>3</td>
<td>3</td>
<td>605,570</td>
</tr>
<tr>
<td><strong>Cabbage, head</strong></td>
<td>19</td>
<td>3,107</td>
<td>2009</td>
<td>44,200</td>
<td>3</td>
<td>3</td>
<td>641,850</td>
</tr>
<tr>
<td><strong>Taro</strong></td>
<td>20</td>
<td>2,516</td>
<td>2010</td>
<td>69,800</td>
<td>3</td>
<td>3</td>
<td>674,590</td>
</tr>
</tbody>
</table>

1. Cucumbers, pineapples, sod, tomatoes, and watermelons not ranked due to disclosure of individual operations.
2. Floriculture categories include only growers with total sales of $10,000 or more.
3. Pineapples and diversified agriculture not shown separately to avoid disclosure of individual operations.
5. Includes all agricultural commodities.

Despite the expected continued consolidation of farmland and the projected decline in overall employment of agriculture nation-wide, an increasing number of small-scale farmers have developed successful market niches that involve personalized, direct contact with their customers. Many are finding opportunities in horticulture and organic food production, which are among the fastest growing segments of agriculture. Table 2 below reflects the agriculture related employment outlook for community college graduates with a certificate or associates degree of both national and local levels.

A diverse range of agriculture-related employment opportunities exist for certificate or AS graduates including agricultural and food science technicians, precision agriculture technicians, agricultural inspectors, greenhouse and nursery managers, first-line supervisors of workers, and purchasing agents. These occupations are considered ‘Bright Outlook’, which are expected to grow rapidly in the next several years, and will need large numbers of new job openings, or are new and emerging occupations. The job mobility and median yearly income for community college graduates also far exceeds that of workers without any post-secondary education.
<table>
<thead>
<tr>
<th>Occupational employments</th>
<th>SOC Code</th>
<th>National job projection 2020¹</th>
<th>Annual job opening</th>
<th>Median wage</th>
<th>Typical education for entry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farmers, Ranchers, and Other Agricultural Managers (included Nursery and Greenhouse Managers)</td>
<td>11-9013.01, 11-9013.02</td>
<td>1,106,400</td>
<td>23,450</td>
<td>30 $64,700</td>
<td>NA</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>High school diploma or equivalent 96% have some college, no degree or higher degree</td>
</tr>
<tr>
<td>Soil and Plant Scientists</td>
<td>19-1013.00</td>
<td>18,300</td>
<td>860</td>
<td>NA $57,340</td>
<td>NA</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Bachelor's degree 100% have bachelor degree or higher degree</td>
</tr>
<tr>
<td>Agricultural Technicians</td>
<td>19-4011.01</td>
<td>22,800</td>
<td>870</td>
<td>20 $33,600</td>
<td>$37,400</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Associate's degree 55% have some college, no degree or higher degree</td>
</tr>
<tr>
<td>Forest and Conservation Technicians</td>
<td>19-4093.00</td>
<td>36,100</td>
<td>1,540</td>
<td>NA $34,900</td>
<td>$38,400</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Associate's degree 56% have some college, no degree or higher degree</td>
</tr>
<tr>
<td>Precision Agriculture Technicians</td>
<td>19-4099.02</td>
<td>69,400</td>
<td>3,350</td>
<td>20 $43,100</td>
<td>$50,800</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Associate's degree 99% have some college, no degree or higher degree</td>
</tr>
<tr>
<td>First-Line Supervisors of Landscaping, Lawn Service, and Grounds keeping Workers</td>
<td>37-1012.00</td>
<td>233,600</td>
<td>6,010</td>
<td>30 $42,100</td>
<td>$44,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>High school diploma or equivalent 44% have some college, no degree or higher degree</td>
</tr>
<tr>
<td>Landscaping and Grounds keeping Workers</td>
<td>37-3011.00</td>
<td>1,392,300</td>
<td>44,440</td>
<td>240 $23,400</td>
<td>$29,100</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Less than high school 16% have some college, no degree</td>
</tr>
<tr>
<td>Pesticide Handlers, Sprayers, and Applicators, Vegetation</td>
<td>37-3012.00</td>
<td>32,500</td>
<td>820</td>
<td>NA $30,000</td>
<td>$34,900</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>High school diploma or equivalent 43% have some college, no degree or higher</td>
</tr>
<tr>
<td>First-Line Supervisors of Farming, Agricultural Crop, Horticultural and Forestry Workers</td>
<td>45-1011.07</td>
<td>46,300</td>
<td>1,360</td>
<td>10 $42,600</td>
<td>$44,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>High school diploma or equivalent 18% have some college, no degree or higher</td>
</tr>
<tr>
<td>Agricultural Inspectors</td>
<td>45-2011</td>
<td>19,600</td>
<td>600</td>
<td>NA $42,200</td>
<td>$46,800</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Bachelor's degree 48% have some college, no degree or higher</td>
</tr>
<tr>
<td>Farmworkers and laborers, crop, nursery, and greenhouse</td>
<td>45-2092.01, 45-2092.02</td>
<td>727,300</td>
<td>22,740</td>
<td>130 $18,700</td>
<td>$23,900</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Less than high school 13% have some professional degree or higher</td>
</tr>
</tbody>
</table>

² State Data Source: State of Department of Labor and Industrial Relations, Research and Statistics Office; projection period based on year 2008-2018. The median wage based on years 2011 data; NA; not available.

Recognizing the increasing demand for agriculture and food production, Leeward’s PBT program will provide comprehensive courses in sustainable agriculture. The subjects included plant, soil, crop science, pest management, business principles, adoption, growth and development of sustainable agriculture. The PBT program builds on several existing courses in Math and Science and will expand existing curriculum in the department. Additionally, the PBT program will also share faculty and resources with the college’s Office of Continuing Education and Workforce Development (OCEWD) to meet the needs of the community. At Leeward CC, students will have the opportunity to interchange between the two programs, which will provide more educational options for students (Appendix 1).
3) Impact on Economic Development and Workforce Needs

The new PBT program will address a current workforce need in agriculture and support state and federal strategies for increased food security and self-sufficiency. The program will also prepare students for Hawaii’s agribusiness and natural resource management sectors. It will provide education and experience needed for various agriculture-related occupations. The students, both traditional and non-traditional, will enter the workforce with higher-level skills and training.

The program will increase enrollment in existing courses and add new credit and non-credit courses creating new career pathways for students.

4) Alignment of Program with System and Campus Strategic Plan and Missions

The PBT program will provide an opportunity for non-traditional returning adult learners (industry professionals) to return for a degree that is suitable for the workforce needs. The traditional college students will be prepared to start their career with better job skills and training.

The Leeward CC 2008-2015 Strategic Plan is aligned with the University of Hawaii Community College (UHCC) System and the University of Hawaii (UH) System Strategic Plan.

The PBT program will be offered traditionally, hybrid, and online. Students on the Leeward Coast will be active participants in this program thus reaching low-income and underrepresented students in Leeward-Waianae region. This program will lead to career advancement opportunities for our students, and will fulfill the needs of the community in term of local food and agricultural security.

The PBT Program addresses the Leeward CC Institutional Learning Outcomes of Critical Thinking and Problem Solving; Written, Oral Communication, and Use of Technology; and Values, Citizenship, and Community.

The new PBT program will address core values of Leeward Community College’s mission (2012-2013):

**Community:** We value cooperation, collaboration, social responsibility, and concern for others as crucial elements in building a sense of community inside and outside of the institution.

**Diversity and respect:** We value individual differences and the contributions they bring to the learning process. Students are enriched through a diverse intellectual and social environment, where learning occurs through exposure to world cultures, and through interaction with peoples of diverse experiences, beliefs, and perspectives.

**Integrity:** We value personal and institutional integrity by fostering a culture of continuous improvement to open pathways to student success. We hold ourselves accountable for providing a high-quality academic experience.

**Open access:** We value all students. We seek to meet their needs, as well as those of the community, by offering a diversity of courses, degree and certificate programs, and training opportunities, through traditional and distance education modes of delivery.

B. Impact on Existing UH Programs

There is a Certificate of Completion in Sustainable Agriculture offered at Windward CC, with a program focus on farm renewable energy and aquaponics. There are Associate of Applied Science degrees (AAS)
in Agriculture and Natural Resource offered at Maui College and AAS in Agriculture at Hawaii Community College; however, there is no Associate level degree in Agriculture offered at any of the Oahu campuses.

1) Similar Degrees or Certificates Offered in UH System

Windward Community College: Certificates of Completion (CC) in Agricultural Technology, Plant Landscaping, Sustainable Agriculture

Hawaii Community College: Certificate of Achievement (CA), and AAS in Agriculture

Maui College: Certificates of Completion (CC) in Turfgrass Specialist, Sustainable Tropical Crop Production, Landscape Maintenance; Certificate of Achievement (CA) in Floriculture Management, Horticulture & Landscape Maintenance, Nursery Management, Sustainable Tropical Crop Management; AAS in Horticulture & Landscape Maintenance, Sustainable Tropical Crop Management.

2) Impact of the Proposed Program on Current Courses or Programs at the Campus and within the System

The PBT Program will increase enrollment in existing credit courses. Nine courses already exist in Academic Subject Certificate in the PBT program, three of which include courses in other departments. At least two bridge courses will be offered through OCEWD as non-credit certificates, which will also articulate with credit-courses for the program. Resources, including faculty, will be shared to support the program.

Kauai CC currently has an Academic Subject Certificate which was modeled after Leeward CC’s program. Leeward CC and Kauai CC are currently partnering together to develop the new AS in Plant Biology and Tropical Agriculture along with the CA, and CC certificates. This partnership will include coordination of curriculum between Leeward and Kauai faculty.

As indicated above, Hawaii CC and UH Maui College has courses in agriculture, including an AAS degree. However, many of these courses differ from Leeward and Kauai CC’s existing courses. In order to make Leeward CC’s course offering align with some of the courses already offered in other UHCC campuses, we need to add several courses to Leeward CC curriculum. With the addition of new courses, the new AS degree will be built upon the existing courses in the PBT Academic Subject Certificate. Discussions at the faculty-level are already ongoing to develop a comprehensive strategy to build courses and degrees that will articulate across different campuses at this time. Leeward CC faculties have been also working with the other CC’s to tailor the new programs.

3) Consultation with Other Campuses

The PBT Advisory Board has met monthly, since 2009. In spring 2013, the PBT program coordinator initiated meetings with Windward CC, Kauai CC, Hawaii CC, and Maui College in order to identify the needs of the students and the community and align courses and curriculums. Several meetings have been coordinated with the UH System Statewide.

6. Planning the New Program

1) Planning Period

Plans are to offer the PBT Program beginning Fall 2014, subject to the UH Board of Regents’ approval in Spring 2014.
2) Activities to be Undertaken During the Planning Phase

2012-2013:
1. Create an Advisory Board and meet for industry feedback.
2. Create and submit ATP proposal for the PBT program.
3. Research library resources
4. Establish a system for students switching from non-credit to credit programs and vice versa.
5. Establish a teaching equivalency for non-credit instructors teaching credit courses and vice versa.
6. Prepare new courses, include courses for online delivery

2013-2014:
1. With approval of the ATP, the program and four new credit courses will be submitted to the Curriculum Committee in Spring 2014.
2. Market new program
3. Hire lecturers
4. Obtain online library resources

3) Anticipated Submission Date of Program Proposal
The PBT Program Proposal is anticipated to be submitted to the UH Board of Regents in Spring 2014.

4) Workload Budget Implications During Planning Period
The faculty involved with the planning will be from the Math and Science Division and OCEWD.

5) Program Sustainability
The PBT program will address the needs of the Leeward CC and UH System Strategic Plan by providing education to the underserved and underrepresented populations in an area that addresses workforce development needs and opportunities. Current resources will be used.

The Department of Labor has awarded a consortium of UH Community Colleges a $24 million TAACCCT grant which is focused on the development of three sectors: healthcare, energy, and agriculture. The TAACCCT grant is being used to offset some of the initial start-up costs for developing the PBT program at Leeward CC including faculty salary and purchasing supplies and equipment for the agriculture program. Therefore, equipment costs will be provided by the TAACCCT grant prior to the beginning fiscal year of the new AS, CA, and CC programs. Additional grant opportunities are currently being investigated as means to support start-up costs for the new agriculture program and maintain the economic sustainability of the program. These may include submitting a joint proposal with Kauai CC for a NIFA Higher Education Challenge Community College Curriculum Development grant in spring 2014, or other relevant grant opportunities.

6) Proposed Program Impact on Accreditation
The PBT program will be created under the Math and Science Division and the new CC, CA, and AS in PBT will be assessed based on the ACCJC standards.

7) Program will fit within campus and/or system organizational structure
The PBT program will continue to be housed in the Math and Science Division.
Description of Resource Required

Faculty Resources

At this time, no new resources including faculty are required to offer the new program. Majority of courses required for the new certificates and degree were approved and have already been offered. The additional expense and salary is being funded from a U.S. Dept. of Labor Community College Career and Technical Training grant. However, with a total of four new courses to be developed, the new AS degree will have 61-62 instructional credits. The current faculties are qualified and will teach the four new classes at the beginning of the fall 2014 semester.

Library Resources

Research will be done on library resources for the PBT program. The PBT courses will be offered via face-to-face, online, and hybrid modes of delivery, the resources must be accessible for students taking classes through all delivery modes. However, hard copy resources will be housed in the library.

Physical Resources

PBT courses will be held in the Math and Science Division and OCEWD classrooms.

7. Resources Required for Program Implementation

In the Three-Year Business Plan below (Table 3), expenditures and revenues are projected for Fall 2014 through Spring 2017; the rationale for the projections is provided following the table. Calculations of Instructional Costs without Fringe (A) are based on a teaching workload of 27 credits. Salary is based on 9-month faculty at the C2 (Instructor) rank and lecturers at the B level. Other personnel costs without fringe (B) include a 0.5 FTE APT to maintain and expand the various crops in the “Living Lab.”

<table>
<thead>
<tr>
<th>Table 3. Three-Year Business Plan for Program Implementation.</th>
</tr>
</thead>
<tbody>
<tr>
<td>YEAR</td>
</tr>
<tr>
<td>PROGRAM COSTS</td>
</tr>
<tr>
<td>Faculty w/o fringe (A)</td>
</tr>
<tr>
<td>Other personnel costs w/o fringe (B)</td>
</tr>
<tr>
<td>Library (C)</td>
</tr>
<tr>
<td>Equipment (D)</td>
</tr>
<tr>
<td>Supplies (E)</td>
</tr>
<tr>
<td>TOTAL Expenses</td>
</tr>
<tr>
<td>REVENUES</td>
</tr>
<tr>
<td>Projected Enrollment (F)</td>
</tr>
<tr>
<td>No. of Courses</td>
</tr>
<tr>
<td>No. of Credits</td>
</tr>
<tr>
<td>SSH (G)</td>
</tr>
<tr>
<td>Tuition Rate/Credit</td>
</tr>
<tr>
<td>Total Revenue from Tuition (H)</td>
</tr>
<tr>
<td>TOTAL Revenues</td>
</tr>
</tbody>
</table>
Program Costs (C, D, E) were calculated based upon an annual allocation for program textbooks and DVDs in the library, essential equipment and supplies for classroom and laboratory needs.

The Headcount Enrollment (F) and Annual SSH (G) is calculated based on 10, 30, and 40 students in 2014-2015, 2015-2016, and 2016-2017 respectively. SSH is calculated based on the projection that the program will continue to increase in enrollment.

Revenues generated by Tuition (H) are based on the number of SSH multiplied by the applicable tuition; the tuition was based on the Proposed Tuition Schedule for the UHCC's. [http://www.hawaii.edu/offices/app/]

8. Describe the impact on current courses or programs.

The new PBT certificates and degree will utilize all the existing PBT courses, include other science, social science and business courses offered in other divisions. Students who will enroll or are interested in the program will have options earning the CC, CA, and AS in addition to the current Academic Subject Certificate (ASC).

9. If the curriculum includes courses that are offered at other UH campuses, describe how articulation of these courses will be assured prior to the program proposal submission.

The existing PBT courses in the ASC have been articulated with UH Manoa TPSS courses. On March 1, 2013, the agriculture faculty in the Program Coordinating Council met at Windward CC to initiate a UHCC system-wide course alignment. Leeward and Kauai Community Colleges have been coordinating regarding the proposal and curriculum for the new AS program in PBT. The course outlines and resources will be accessible for PBT instructors. The new PBT courses will be articulated among UHCC campuses.

10. If this program is multidisciplinary, provide evidence of commitment for support from the colleges, departments, programs, and/or individuals expected to participate.

The Leeward CC administrators, OCEWD and the Math and Science Division, are committed to this joint venture. The PBT program addresses the needs of our community for the expanding of agriculture and food industry by preparing students to enter the workforce with higher skill and training.

References


(4) The Occupational Information Network (O*NET) under the sponsorship of the US Department of Labor/Employment and Training Administration (USDOL/ETA) http://www.onetonline.org/
Reviewed by:

Campus Chief Academic Officer:

_____ Recommend

Comments:

--------------------------------------------------
Print Name __________________________ Signature __________ Date __________

Chancellor:

_____ Approved    _____ Disapproved

Comments:

--------------------------------------------------
Print Name __________________________ Signature __________ Date __________

Council of Chief Academic Officers (Systemwide Consultation):

Comments:

--------------------------------------------------
Print Name __________________________ Signature __________ Date __________

(A copy of the signed document is provided to the Office of the Executive Vice President of Academic Affairs/Provost)
## APPENDIX 1

**Propose Plant Biology and Tropical Agriculture courses**

<table>
<thead>
<tr>
<th>Credit</th>
<th>Existing Course</th>
<th>New Course</th>
<th>Course will be bridged with OCEWD non-credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>AG 112 Introduction to Organic Agriculture</td>
<td>4</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>MGT 135 Agriculture Entrepreneurship in Hawaii or MGT 125 Starting a New Business, or BUSN 164 Career Success</td>
<td>3</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>HWST 107 Hawaiʻi: Center of the Pacific or HIST 151 World History I</td>
<td>3</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>PBT 100 Orientation to Hawaii’s Agriculture Industry</td>
<td>1</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>PBT 120 Tropical Fruits and Vegetables</td>
<td>3</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>PBT 122 Introduction to Soils (Soil Technology)</td>
<td>3</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>PBT 141 Integrated Pest Management</td>
<td>3</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>PBT 200/200L Introduction to Plant Science/Lab</td>
<td>4</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>PBT 250 Tropical Landscaping</td>
<td>3</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>PBT 251 Sustainable Crop Production</td>
<td>4</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>PBT 264 Introduction to Horticulture and Plant Propagation</td>
<td>3</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>PBT 275 Introduction to Crop Improvement</td>
<td>4</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>PBT 290V PBT Internship</td>
<td>3</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>BOT 101/101L General Botany or BIOL 101 Biology for Non-majors or BIOL 171L Introduction to Biology</td>
<td>4</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>CHEM 151B Elementary Survey Chemistry or CHEM161B General Chemistry</td>
<td>4</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>ICS 101 Digital Tools for the Information World or BUS 101 Business Computer Systems</td>
<td>3</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>BOT 130L Plants in Hawaiian Environment or HORT 110 Hawaii Horticulture &amp; Nutrition</td>
<td>4</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>GEOG 101 Natural Environment</td>
<td>3</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>ENG 100 Composition</td>
<td>3</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>MATH 100 Survey Math or MATH 103 College Algebra</td>
<td>3</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>SOC 151 Introduction to the Sociology of Food</td>
<td>3</td>
<td>✓</td>
<td></td>
</tr>
</tbody>
</table>
July 3, 2013

Michael Pecsok,
Vice Chancellor of Academic Affairs/CAO
Leeward Community College
96-045 Ala’ike
Pearl City, Hawaii 96782

Dear Mr. Pecsok,

My name is Charles Kinoshita, Associate Dean for Academic and Student Affairs, College of Tropical Agriculture and Human Resources (CTAHR), University of Hawaii at Manoa, and I am writing to express my strong support for the proposed Plant Biology and Tropical Agriculture Associate in Science (A.S.) program at Leeward Community College (LCC).

In the past decade, I have teamed with LCC’s Dr. Kabi Neupane and Professor Priscilla Millen on several different projects, including our USDA/NIFA-funded Alaska Native/Native Hawaiian Serving Institutions Education Grant and two NSF ATE grants, and numerous outreach activities. I’ve observed the growth of Plant Biology and Tropical Agriculture courses at LCC and have participated in several meetings of LCC’s Plant Bioscience Technology (PBT) Advisory Committee. I also helped in articulating several LCC PBT courses with UH Manoa.

Training the next generation agriculture and natural resource management workforce is critical to ensuring food security and food safety for our State. The establishment of an A.S. degree in Plant Biology and Tropical Agriculture (PBTA) will open a new pathway for students in the central region of Oahu to serve that workforce need and will help PBTA students transition more seamlessly to CTAHR/UH Manoa if they wish to pursue a four-year degree or graduate studies. Establishment of the PBTA program will have the added benefit of allowing faculty and researchers at both LCC and UH Manoa to collaborate even more in the future.

At this point in time, it’s critical that faculty, administrators, students and advisors work together to develop a coordinated pathway in agricultural education at the secondary and post-secondary levels to meet pressing needs in Hawaii.

I strongly support the establishment of an A.S. Program in Plant Biology and Agriculture at LCC. I look forward to continuing and strengthening our collaboration as that new program develops.

Sincerely,

Charles Kinoshita
Associate Dean
To Michael Pcsok,
Vice Chancellor of Academic Affairs/CAO
Leeward Community College
96-045 Ala'iike
Pearl City, Hawaii 96782

Dear Mr. Pcsok,

This letter expresses my strong support for the development of Plant Biology and Tropical Agriculture Associate is Science (A.S.) program at Leeward Community College.

I have spent close to 30 years teaching Horticulture for the UHCC. I have observed the growth of Plant Biology and Tropical Agriculture courses at Leeward CC since 2009. I am the convener of the PCC in Agriculture and the coordinator of the system wide efforts under c3T grant in Sustainable Agriculture.

Our programs will help local Agriculture and Food security of our State. Development of food production has been a top priority for our State government the past few years. This will lead to an expansion of agribusiness and natural resource management leading to job creation.

The establishment of the AS in Plant Biology and Tropical Agriculture will open a new pathway for students in Leeward and Central District of Oahu and further deepen collaboration between our two colleges.

At this point in time, it is critical that faculty, administrators, students and advisors work together to develop a coordinated pathway of agricultural training at secondary and post-secondary school levels to meet community needs. The establishment of the new Leeward Plant Biology and Tropical Agriculture A.S. degree will address a current workforce demand in expanding careers in the field of agriculture.

I strongly support the establishment of an AS Program in Plant Biology and Agriculture at Leeward Community College. I look forward to continuing and enriching our collaboration as your new programs develop.

Sincerely,

David Ringuette

Professor Windward Community College
To Michael Pecsok  
Vice Chancellor of Academic Affairs/CAO  
Leeward Community College  
96-045 Ala’Ike  
Pearl City, HI 96782  

Dear Mr. Pecsok:  

It is with great pleasure that I provide this letter expressing my very strong support for the development of Plant Biology and Tropical Agriculture Associate in Science (A.S.) program at Leeward Community College.  

I am the executive director of Hawaii Agriculture Research Center, a non-profit, privately owned research institution re-established in 2008 as a 501c3. Its purpose to maintain, advance, improve and protect agriculture industry in Hawaii and to support the development of agriculture in general, including the support of an experiment station, worker housing and agricultural infrastructure for the industry.  

I have closely observed the growth of Plant Biology and Tropical Agriculture courses at Leeward CC since 2009, and attended a few meetings as a member of the PBT Advisory Committee.  

The Leeward Community College has partnered with HARC in the first ‘Seeds for Tomorrow Adventure Camp’, and was instrumental in developing the curriculum for this one-week camp. This coordinated effort between LCC and HARC is focusing on creating awareness in students of the many career and job opportunities related to agriculture in genetics, biology, entomology, pathology, etc.  

At this point in time, it is critical that faculty, administrators, students and advisors work together to develop a coordinated pathway of agricultural training at secondary and post-secondary school levels to meet community needs. The establishment of new Leeward Plant Biology and Tropical Agriculture AS degree will address a current workforce demand in expanding careers in the field of agriculture.  

I strongly support the establishment of an AS Program in Plant Biology and Agriculture at Leeward Community College. I look forward to continuing and enriching our collaboration as your new programs develop.  

Sincerely,  

Stephanie A. Whalen
July 5, 2013

Michael Pecskok  
Vice Chancellor of Academic Affairs/CAO  
Leeward Community College  
96-045 Ala‘iike  
Pearl City, Hawaii 96782

Dear Mr. Pecskok,

DuPont Pioneer extends our strong support to establish an Associates of Science degree program in Plant Biology and Tropical Agriculture at Leeward Community College. The A.S. degree program will allow students to earn a science focused degree and enter the workforce, or provide course work that prepares students to enter a Bachelors of Science degree program leading to a range of careers in farming, landscaping, horticulture, and natural resource management.

I serve as the chairperson of the Plant Biology and Tropical Agriculture advisory committee and other DuPont Pioneer employees have served on the advisory committee and instructed classes. Firsthand knowledge of the PBT program shows the curriculum proposed for the AS degree aligning well with the education and skills desired for our jobs in horticulture, agronomy, seed production, and other fields requiring agriculture science knowledge.

We have had paid interns from the LCC Plant Biology and Tropical Agriculture program work at DuPont Pioneer. These interns have made positive contributions and come to our workplace with skills we desire. They in turn have had many opportunities to learn new processes, gained technical understanding and hands on training, and are gaining experience that can lead to successful transition to employment.

As DuPont Pioneer hires employees to fill positions, we seek applicants with degrees that include life sciences and technical agricultural science. Students coming out of the LCC Plant Biology and Tropical Agriculture program with an A.S. degree will be well suited for careers at our 4 locations in Hawaii.

DuPont Pioneer strongly supports the establishment of the Associate in Science degree for the Plant Biology and Tropical Agriculture program at Leeward Community College.

Sincerely,

Cindy Goldstein, Ph. D  
Business and Community Outreach Manager  
DuPont Pioneer  
Waialua Parent Seed, Kekaha Parent Seed  
Kunia Research Center, Waimea Research  
PO Box 520  
Waialua, HI 96791

Dr. Cindy Goldstein, Ph D
Michael Pecsok,
Vice Chancellor of Academic Affairs/CAO
Leeward Community College
96-045 Ala‘Ike
Pearl City, Hawaii 96782

Dear Mr. Pecsok,

With this letter I would like to express my very strong support for the development of the Plant Biology and Tropical Agriculture (PBT) Associate in Science (A.S.) program at Leeward Community College.

As a Research Scientist and the site Agronomist for DuPont Pioneer seed corn production in Kunia I have been working as a volunteer member of the PBT Advisory committee for nearly 4 years. In addition to serving on the committee I have also been teaching PBT 141, Introduction to Integrated Pest Management, which was offered in the fall 2011 and spring 2013 semesters.

In my professional capacity as Chair of the Hawaii Farm Bureau Federation Environmental Stewardship Committee and a 38-year member of the Hawaii Farm Bureau I see that there is an urgent need for individuals educated in crop science so that the reins of leadership in the agriculture industry can begin to be taken up by the young people of Hawaii. Ramping up the PBT program to the AS status can provide the educational vehicle to prepare students for a vibrant career in Hawaiian agriculture.

As you know we live in very exciting times. Agricultural science and technology are “pushing the envelope” to devise new ways of producing crops so that we can continue to feed an ever expanding population. In Hawaii much agricultural diversification has taken place since the demise of the sugar and pineapple industries. Fruit and vegetable production have increased considerably on Oahu since 1996 and there are a number of new farms that continue to supply fresh produce for the people of Hawaii. From my perspective I see nothing but opportunity for students who are well prepared for a career in agriculture here. Through my association with the PBT program I currently have 2 interns from that program at my site who have an outstanding work ethic and who are contributing positively to the expansion of activities on our farm.
At this point in time, it is critical that faculty, administrators, students and advisors work together to develop a coordinated pathway of agricultural training at secondary and post-secondary school levels to meet community needs. The establishment of a new Leeward Community College Plant Biology and Tropical Agriculture A.S. degree will address a current workforce demand in expanding careers in the field of agriculture in Hawaii.

I strongly support the establishment of an AS Program in Plant Biology and Agriculture at Leeward Community College and I look forward to continuing and enriching our collaboration as new programs develop.

Sincerely,

John J. McHugh, Jr. Ph.D.
Chair, Environmental Stewardship Committee
Hawaii Farm Bureau Federation
MA`O ORGANIC FARMS
a non-profit ʻaina-based project of the Waiʻanae Community Re-Development Corporation
P.O. Box 441, Waiʻanae, Hawaiʻi 96792 • Tel/Fax. 808-696-5569
info@maoorganicfarms.org • www.maoorganicfarms.org

Michael Pecsok,
Vice Chancellor of Academic Affairs/CAO
Leeward Community College
96-045 Ala ʻIke
Pearl City, Hawaii 96782

Aloha Mike:

This letter expresses my very strong support for the development of Plant Biology and Tropical Agriculture Associate is Science (A.S.) program at Leeward Community College.

Established in 2001 in the Waiʻanae community, MAʻO Organic Farms (MAʻO) is a social enterprise non-profit 501(c)3 project of the Waiʻanae Community Re-development Corporation. Our mission is to simultaneously grow certified organic fruits and vegetables, and young people educated/empowered to work for a sustainable Hawaiʻi. Working as a community development mechanism designed to revive agriculture in rural Oʻahu, we farm 24-acres in Lualualei Valley growing/supplying over 70 different varieties of fruits and vegetables – in “co-producer” relationships – to local natural foods stores and grocery’s, restaurants, farmer’s markets and through a Community Supported Agriculture (CSA) program with over 160 members. MAʻO has become one of the largest growers of organic foods in the State of Hawaii, and the largest by land area on the island of Oʻahu.

To empower young people for careers in sustainability we have developed an educational ʻauwai or pathway to college. Presently our core program is the Youth Leadership Training (YLT), a 2.5-year internship that annually accepts 40 high school graduates. The YLT combines paid work experience on the farm, and matriculates students through an Associates degree program at Leeward Community College (LCC). In addition, students complete a Certificate in Community Food Security that includes an Introduction to Organic Agriculture lab which runs at MAʻO. We have been able to rehire five graduates and they are now fulltime employees managing the farm, and are all attending or have graduated with their baccalaureate degrees.

All our interns are highly sought after especially as local food production is going through a major growth spurt in an effort to counter Hawaii’s 85% dependency on imported foods. Moreover, there are now more career opportunities in a wider range of agriculture sub-sectors – from farm-to-table teaching positions with schools and NGO’s; to management positions in retail and food service with specialty and organic foods.

In addition we work in collaboration with a wide range of partners in an effort to get young people college ready, and enthusiastic about careers in organic agriculture. For example, we are working with Kamehameha Schools (KS) to expand programs to the entire Leeward region and this will include farming new areas of land that KS currently owns. We anticipate in support increased numbers of youth into college, and the programs of the Plant Biology and Tropical Agriculture (PBT) department at Leeward CC
will fit a critically important role both for ourselves in the entire agriculture sector. We look forward to encouraging more and more students to pursue careers in sustainable agriculture via programs like the A.S. in Plant Biology and Tropical Agriculture.

There is obviously a great need and urgency for the PBT. As a State we produce only 15% of our own food, agriculture infrastructure is in decay and had been generally designed for mono-crop production (pineapple and sugar), and the average age of farmers in Hawaii is now over 60-years. On the other hand there are new entrepreneurial endeavors that have stepped into the space and they are looking for motivated/educated young people for entry-level management positions. In addition, there opportunities for more young people to step-up to become entrepreneurs, and large land owners like Kamehameha Schools are anxious to find new young farmers with skills in science, business, conservation and organic agriculture.

At this point in time, it is critical that faculty, administrators, students, advisors and community work together to develop a coordinated pathway in sustainable food production at secondary and post-secondary school levels to meet community needs. The establishment of new Leeward Plant Biology and Tropical Agriculture A.S. degree will address a current workforce demand in expanding careers in the field of sustainable agriculture.

I strongly support the establishment of an AS Program in Plant Biology and Agriculture at Leeward Community College. I look forward to continuing and enriching our collaboration as your new programs develop.

Sincerely,

Gary Manuakea-Forth
Managing Director/Co-Founder
MA'O ORGANIC FARMS
TWIN BRIDGE FARMS, INC.

P. O. Box 31

Waialua, Hawaii 96791

Michael Pecsok

Vice Chancellor of Academic Affairs/CAO

96-045 Ala‘lke

Pearl City, Hawaii 96782

Dear Mr. Pecsok,

This letter expresses our very strong support for the development of Plant Biology and Tropical Agriculture Associate Science (A. S.) program at Leeward Community College.

My name is Milton Agader. I am the president and co-owner of Twin Bridge Farms in Waialua. We lease 300 acres and employ 22 employees. We grow asparagus all year and sweet onions and potatoes seasonally. We plant yearly around 600 acres of seed corn and 100 acres of sunflowers for Pioneer Hybrid. We also conduct seed potato post harvest tests for seed companies from Minnesota, Western Canada, Idaho and Wisconsin. We plant around 70 acres of these test plots. The post harvest test is a requirement for seed certification.

We have every intention of keeping Twin Bridge Farms operating well into the future. But in order to do so we need to staff our farm with qualified persons who are willing to make the commitment to working on a farm. Most graduates with B.S. or higher degrees tend to seek jobs in civil service or corporate farming. Persons completing an A. S. program in agriculture may find better opportunities working on a small farm like ours.

The public in general wants more local grown produce. The farms need qualified committed workers to produce more local grown products. Leeward Community College has the opportunity to fill that need.

We strongly support the establishment of an AS Program in Plant Biology and Agriculture at Leeward Community College. We will consider future graduates for employment, and encourage current employees to enroll in classes.

Sincerely,

Milton Agader, President
June 27, 2013

Michael Pecsok,
Vice Chancellor of Academic Affairs/CAO
Leeward Community College
96-045 Ala‘ike Street
Pearl City, Hawaii 96782

SUBJECT: Plant Biology and Tropical Agriculture Associate
Leeward Community College

Aloha Mr. Pecsok,

The Landscape Industry is a strong supporter for the development of the Plant Biology and Tropical Agriculture Associate in Science program at the Leeward Community College.

Hawaii’s landscape industry is one of the fastest growing and largest segments of the green industry with an economic impact of over $520 million annually and full time employment of over 11,000 landscape professionals. The landscape industry is comprised of small local businesses with a high multiplier effect on the economic impact.

Formed in June 1986, the Landscape Industry Council of Hawaii (LICH) is a statewide alliance representing Hawaii’s landscape trade associations. Our mission is to build unity by promoting industry guidelines and professionalism through education, training, and certification. LICH has been a leader on sustainability issues including invasive species, water conservation and native species.

The landscape industry has a larger economic impact then agriculture and double the employment work force but has little support in the form of educational programs. Leeward Community College’s development of the Plant Biology and Tropical Agriculture department is critical to the landscape industry for their education and pursuit of an Associate of Science in Plant Biology and Tropical Agriculture. Hawaii’s major environmental sustainability lies in mitigating the unsustainable development of the urban landscape over the past 50 years; LCC can play a key role in making our islands sustainable.

It is important that faculty, administrators, students and advisors work together to develop a pathway of agricultural training at secondary and post-secondary school levels to meet our community needs. The establishment of a new Leeward Plant Biology and Tropical Agriculture Associate of Science degree will address a current workforce demand in the expanding careers in the field of agriculture and landscape.
The landscape industry strongly supports the establishment of an A.S. Program in Plant Biology and Agriculture at Leeward Community College. I look forward to continuing our support and collaboration as your new programs develop. If you have any questions, don’t hesitate to contact me at 799-3101 or chris.dacus@gmail.com.

Sincerely,

Chris Dacus
President
Landscape Industry Council of Hawai’i