

**UNIVERSITY OF HAWAI'I COMMUNITY  
COLLEGES**

**COMPREHENSIVE PROGRAM REVIEW**

**MAUI COMMUNITY COLLEGE**

**ELECTRONICS & COMPUTER ENGINEERING  
TECHNOLOGY**

**December 2009**

## **OVERVIEW OF THE PROGRAM**

### **A. Mission and Vision of the College:**

#### **Mission:**

Maui Community College is a learning-centered institution that provides affordable, high quality credit and non-credit educational opportunities to a diverse community of lifelong learners.

#### **Vision:**

We envision a world-class college that meets current and emerging Maui County education and training needs through innovative, high quality programs offered in stimulating learning environments. The College mission, goals, and actions will be guided by the Native Hawaiian reverence for the ahupua`a, a practice of sustaining and sharing diverse but finite resources for the benefit of all.

### **B. Mission and vision of the ECET program**

The ECET program complies with the mission and vision of Maui CC in that the program offers quality credit instruction to students looking for an affordable education in a supportive environment, promotes competence in the discipline, and aims to successful careers.

#### **Mission:**

The mission of the ECET program is to provide students relevant and rigorous training and education for entry-level engineering technology positions in Maui County. It aims also at giving graduates mobility within the field and the ability to adapt as the field changes.

The ECET program is designed to satisfy the workforce needs of the Maui local employers. The ECET program works closely with its high-technology industry advisory board to insure students gain skills required for employment with local companies. In this respect, the program builds upon skills, duties and tasks considered critical by these prospective employers.

#### **Vision:**

The vision of the ECET program for the next five years can be summarized as follows:

- A continuous improvement of the program through a documented plan incorporating relevant data to regularly assess the program educational objectives and program outcomes, and to evaluate the extent to which they are being met
- A curriculum that develops effectively the subject areas in support of the program objectives
- An alignment of the program with the needs of industry partners
- The development of an appropriate sustainable Bachelor in Applied Science in Engineering technology degree (BAS/ET)

**Program Student Learning Outcomes:**

The program must demonstrate that graduates have:

- an appropriate mastery of the knowledge, techniques, skills, and modern tools of their disciplines
- an ability to apply current knowledge and adapt to emerging applications of mathematics, science, engineering, and technology
- an ability to conduct, analyze and interpret experiments, and apply experimental results to improve processes
- an ability to apply creativity in the design of systems, components, or processes appropriate to program educational objectives
- an ability to function effectively on teams
- an ability to identify, analyze and solve technical problems
- an ability to communicate effectively
- a recognition of the need for, and an ability to engage in lifelong learning
- an ability to understand professional, ethical and social responsibilities
- a respect for diversity and a knowledge of contemporary professional, societal and global issues
- a commitment to quality, timeliness, and continuous improvement

**Faculty:**

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**Facilities:**

Adequate facilities are provided to the students and faculty in the form of:

- suitable classrooms, laboratories, and associated equipment necessary to accomplish the program educational objectives in an atmosphere conducive to learning
- laboratory equipment characteristic of that encountered in the industry and practice served by the program
- modern computing equipment and software, characteristic of that encountered in the industry and professional practice served by the program
- Internet and information infrastructures, including electronic information repositories, equipment catalogs, professional technical publications, and manuals of industrial processes and practices adequate to support the educational objectives of the program and related scholarly activities of students and faculty

**Support:**

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**C. Relation to Maui CC strategic plan 2003- 2010**

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## Part 1. QUANTITATIVE INDICATORS FOR PROGRAM REVIEW

- Program Demand

1. Annual new and replacement positions for the State

Year	2003	2004	2005	2006	2007
State	N/A	N/A	N/A	129.7	6

2. Annual new and replacement positions for the County

Year	2003	2004	2005	2006	2007
County	N/A	N/A	N/A	12.7	1

3. Number of majors

Year	2003	2004	2005	2006	2007
Number of majors	45	51	58	59	62

4. Student semester hours for program majors in all program classes

Year	2003	2004	2005	2006	2007
SSH	90	141	173	215 or N/A	135

5. Student semester hours for non-program majors in all program classes

Year	2003	2004	2005	2006	2007
SSH	N/A	N/A	N/A	N/A	625

6. Student semester hours for all program classes

Year	2003	2004	2005	2006	2007
SSH	N/A	N/A	N/A	951	760

7. FTE program enrollment

Year	2003	2004	2005	2006	2007
FTE	N/A	65	70.33	63.40	50.67

8. Number of classes taught

Year	2003	2004	2005	2006	2007
Number of classes taught (ETRO & ICS)	13	18	21	20	12

● Program Efficiency

10. Average Class Size

Year	2003	2004	2005	2006	2007
Average class size	N/A	14.47	14.13	12.89	19.92

11. Class Fill Rate

Year	2003	2004	2005	2006	2007
Class fill rate	N/A	61.77	N/A	45.20	87.87

(Fill is determined using all ETRO and ICS classes. Not all ICS classes are required by the program)

12. FTE of BOR appointed faculty

Year	2003	2004	2005	2006	2007
FTE	N/A	N/A	N/A	3	2

13. Student/Faculty Ratio

Year	2003	2004	2005	2006	2007
Student/faculty ratio	N/A	N/A	N/A	19.7	31.00

14. Major per FTE faculty

Year	2003	2004	2005	2006	2007
Majors/FTE	N/A	54	N/A	19.7	23.85

#### 15. Program Budget Allocation

Data not Available

#### 16. Cost per SSH

Data not Available

#### 17. Number of classes less than ten students

Year	2003	2004	2005	2006	2007
Number	N/A	4	N/A	7	1

#### ● Program Effectiveness

#### 19. Persistence of majors fall to spring

Year	2003	2004	2005	2006	2007
Persistence (%)	N/A	77.78	N/A	74.56	58.06

#### 20. Number of degrees and certificates earned

Year	2003-04	2004-05	2005-06	2006-07	2007-08
AS Degrees	7	5	2	4 3?	11 17?
Certificates of Achievement	0	1	2	4 2?	4 7?
Certificates of Completion	0	0	2	5	4

#### 21. Number of students transferred

Year	2003	2004	2005	2006	2007
Students transferred	N/A	77.78	N/A	2	0

#### 22-28. Perkins core indicators (in %)

Year	2003	2004	2005	2006	2007
1P1 Academic Attainment	N/A	N/A	N/A	87	100
1P2 Technical Skill Attainment	N/A	N/A	N/A	100	100
2P1 Completion rate	N/A	N/A	N/A	13	14.29
3P1 Place in Employment, Education, and military	N/A	N/A	N/A	225	N/A
3P2 Retention in Employment	N/A	N/A	N/A	100	N/A
4P1 Non Traditional Participation	N/A	N/A	N/A	28	19.64
4P2 Non Traditional Completion	N/A	N/A	N/A	33	25.00

## 29. Determination of program's health

Semester	Spring 2006	Fall 2006	Spring 2007	Fall 2007
Demand	Healthy	Healthy	Healthy	Unhealthy
Efficiency	Cautionary	Healthy	Healthy	Healthy
Effectiveness	Cautionary	Healthy	Cautionary	Unhealthy
Overall	Cautionary	Healthy	Healthy	Cautionary

## Part II. ANALYSIS OF THE PROGRAM

### A. Strengths and weaknesses in terms of demand, efficiency, and effectiveness based on an analysis of data.

The student demand has increased since 2003, remaining quite stable between 2005 and 2008. However, at the time of this writing, enrollment in some of the ECET classes has doubled; to fulfill the demand, we had to open some classes in spring that used to be taught in fall only.

In terms of efficiency, we witness a 54% increase in the average class size, and the class fill rate reaches 88%. The student faculty ratio of 31.00 is up from 19.7 last year, a 50% increase. There is only one class with less than ten students.

**B. Significant Program Actions (new certificates, stop-out; gain/loss of positions, results of prior year's action plan)**

5 year NSF grant awarded for \$2.8M to Maui CC ECET and UH IfA partnership

UH IfA faculty involved in curriculum development

New courses in electro-optics are implemented.

Teaching teams of visiting faculty facilitate inquiry in two classes each semester.

Akamai internship program

Po'okela high school bridge program

New faculty hired

Two positions in recruitment

New laboratory equipped and configured

Engineering software tools installed

**C. Determination of program's overall health (Healthy, Cautionary, Unhealthy)**

Program Health is Cautionary. This rating is based on incorrect data that do not accurately represent the industry need or students in the major. New SOC codes are under review at the VP CC office. Data errors have been reported to administration.



### **Part III. ACTION PLAN**

Follow up on SOC code modifications and ensure data collection is providing valid statistics

Review AS program to meet BAS entry requirements. Include SLO review and course outline updates. Make SLOs very clear.

Develop assessment rubrics for AS classes and program.

Review Math 107 and Physics 105 courses to ensure they meet BAS entry requirements.

Review Phys 105 lab content and integrate labs into syllabus.

Hire a lecturer to relieve Dr. Reader. Reader then works on NSF grant and BAS program development.

Develop and update prototype mill labs, labview courses, matlab materials, and cad labs for lower division courses.

Develop additional student workstations to lower number of students per lab station in Kaaike 217.

Install Windows 7 and migrate software applications to new platform. Includes software application updates.

Develop program orientation materials for AS and BAS students.

Develop academic planning tools for counseling and coordinate with counseling.

Hire ICS and ETRO faculty for program support.

ICS faculty to develop lower division AS ICS courses in Linux sysad and programming using engineering tools.

ETRO faculty develops photonics coursework for lower division and upper division curriculum.

Connect lab to lab polycom with Hawaii and Kauai Engineering Technology programs. Pilot activities.

Develop MauiCC pre engineering with Kapiolani to send more students to Manoa Engineering. Work with Bruce and John McKee.

Develop BAS curricular materials for review in STEM and committee Spring 2010.

## **Part IV. RESOURCE IMPLICATIONS (physical, human, financial)**

### **A. Program Faculty**

Two additional faculty are required to support both upper and lower division coursework in Engineering Technology. One ET and one ICS. These positions are allocated and need to be recruited.

Current faculty workloads and program development are stressing faculty to functional limits.

ICS faculty involvement in ECET and ET programmatic activities, such as course development, lab development, recruitment, data analysis, web site development would be desirable.

ET program coordinator required to start professional development in order to build program credentials.

### **B. Program Interactions**

Akamai Workforce Initiative

Started Aug 2009. ~80K per year for ET.

This is a five-year NSF grant awarded to Maui CC ECET and UH Institute for Astronomy. We are working jointly on AS and BAS curricular materials with the Institute for Science and Engineering Educators.

Rural Development Project – Engineering Tech phase 1 and 2

Pending award ~100K FY10; supplemental 125K FY 11-12

Funding provided for ET program development. Phase two application and budget to be drafted.

Marine Animal Life Tracking

Grant needs a renewal application for 20K calendar 10

Pacific Disaster Center

Grant needs a renewal amendment and budget for calendar 10.

Boston University Photonics Center

Award activities start January 10. 18K for Q1/10

Rural Development Project – Information Technology and Computational Sciences

Funding is available in Phase one award to hire one person. Project is to develop 4-yr program.

Phase 2 proposal and budget to be drafted.

### **C. Staff support and Facilities**

#### **-Staff**

Lecturers are needed to allow program faculty re-assign time to develop curriculum. A lecturer needs assessment to be presented to STEM chair.

A full-time counseling position is needed for ECET and ET student support. Currently funded by grants. Needs to be requested by David T once economy recovers. A program support position is funded for 5 years on NSF award.

Full time lab technical support needs to be institutionalized. Currently funded by grants.

Part time fiscal support needs to be institutionalized. Currently funded by grants.

#### **-Space and Equipment for Instruction**

In summer 2009 Kaaie 218 was converted to an electro-optics lab facility. This meets our current requirements for teaching. The lab is not appropriate for research. A research lab is planned for the new Science building. Requires \$80K

We do not have enough lab equipment for instruction. The current facilities are appropriate for 8 students and can accommodate 12. We would like to have 24 students in lower division labs and 16 in upper division labs. This limits the number of students served. There should be an institutional operating budget for ECET and ET that is a separate sub account under STEM. Requires \$60K

We require computer replacement every two years in order to stay state of the art in our technology programs. This is a separate issue from the tech support fee committee and should be part of an institutionalized budget for ECET and ET. Requires \$40K per lab every two years.

We require software licensing maintenance and upgrades. These start up costs have been partially funded by grants. The ET BAS program will require licenses for professional software products and on going maintenance agreements. There is no institutional budget or plan for Windows upgrades, office upgrades, or fees for professional engineering products. This should be addressed and become part of an ECET/ET operational budget under STEM. Requires \$35K per year.

There should be implemented an institutional process for faculty and student data back up. Currently funded by grants and done ad-hoc.

Require web site updates and marketing materials for BAS program advertisement.