

University of Hawaii Maui College

2011 Annual Report of Instructional Program Data

Electronics & Computer Engineer Tech

Program Mission:

The ECET program complies with the mission and vision of UH-MC 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; and
- The development of an appropriate sustainable Bachelor in Applied Science degree in Engineering Technology (BAS ENGT).

Part I: Program Quantitative Indicators

Overall Program Health: **Cautionary**

Majors Included: ECET

Demand Indicators		Program Year			Demand Health Call
		08-09	09-10	10-11	
1	New & Replacement Positions (State)	9	11	12	Unhealthy
2	New & Replacement Positions (County Prorated)	1	1	1	
3	Number of Majors	65	81	89	
4	SSH Program Majors in Program Classes	656	797	965	
5	SSH Non-Majors in Program Classes	1,423	2,172	1,770	
6	SSH in All Program Classes	2,079	2,969	2,735	
7	FTE Enrollment in Program Classes	69	99	91	
8	Total Number of Classes Taught	33	47	41	

Efficiency Indicators		Program Year			Efficiency Health Call
		08-09	09-10	10-11	
9	Average Class Size	20.3	20.3	20.8	Healthy
10	Fill Rate	89%	93%	100%	
11	FTE BOR Appointed Faculty	3	3	3	
12	Majors to FTE BOR Appointed Faculty	21.5	26.8	29.5	
13	Majors to Analytic FTE Faculty	17.1	14.8	18.2	
13a	Analytic FTE Faculty	3.8	5.4	4.9	
14	Overall Program Budget Allocation	Not Reported	\$308,648	\$246,719	
14a	General Funded Budget Allocation	Not Reported	\$308,648	\$246,719	
14b	Special/Federal Budget Allocation	Not Reported	\$0	\$0	
15	Cost per SSH	Not Reported	\$104	\$90	
16	Number of Low-Enrolled (<10) Classes	5	6	3	

Effectiveness Indicators		Program Year			Effectiveness Health Call
		08-09	09-10	10-11	
17	Successful Completion (Equivalent C or Higher)	62%	64%	67%	Unhealthy
18	Withdrawals (Grade = W)	52	58	52	
19	Persistence (Fall to Spring)	86%	71%	69%	
20	Unduplicated Degrees/Certificates Awarded	2	5	12	
20a	Degrees Awarded	1	5	12	
20b	Certificates of Achievement Awarded	1	3	9	
20c	Academic Subject Certificates Awarded	0	0	0	
20d	Other Certificates Awarded	0	0	0	
21	Transfers to UH 4-yr	2	0	8	
21a	Transfers with credential from program	1	0	1	
21b	Transfers without credential from program	1	0	7	

Distance Education: Completely On-line Classes		Program Year			
		08-09	09-10	10-11	
22	Number of Distance Education Classes Taught	1	6	5	
23	Enrollment Distance Education Classes	59	187	162	
24	Fill Rate	98%	100%	100%	
25	Successful Completion (Equivalent C or Higher)	58%	70%	70%	
26	Withdrawals (Grade = W)	6	13	3	
27	Persistence (Fall to Spring Not Limited to Distance Education)	0%	72%	81%	

Perkins IV Core Indicators 2009-2010		Goal	Actual	Met	
28	1P1 Technical Skills Attainment	90.05	81.25	Not Met	
29	2P1 Completion	44.50	31.25	Not Met	
30	3P1 Student Retention or Transfer	55.50	77.08	Met	
31	4P1 Student Placement	50.50	80.00	Met	
32	5P1 Nontraditional Participation	16.00	24.71	Met	
33	5P2 Nontraditional Completion	15.10	37.50	Met	

Last Updated: August 25th, 2011

Part II: Analysis of the Program

a. PLO assigned

In spring 2011, ETRO 110 (Electronic Technology I) was chosen to assess PLO1: Analyze, design, and implement electro-optic systems, control systems, instrumentation systems, communication systems, computer systems, or power systems.

Overview of ETRO 110:

ETRO110	Electronic Technology I	
	Course Topics	Lectures
	Review of Engineering Math and Multisim	1
	Review of Electromagnetism and Inductor	1
	Transformers: Step-up and down transformers, Impedance matching, tapped and multiple windings.	4
	RC Integrator and Differentiator	5
	Exam I	1
	Diode Characteristics	2
	Rectifier Circuits	3
	Bipolar Junction Transistor Circuits	4
	Field Effect Transistor Circuits	3
	Feedback Oscillators	4
	Final Test	1
	Laboratory Topics	Labs
	Step-up and Step-down Transformers	1
	Transformers	1
	Integrating and Differentiation Circuits	1
	Thevenin's Theorem	1
	Diode Characteristics	1
	Rectifier Circuits	1
	Bipolar Junction Transistors	1
	Common Emitter Amplifiers	1
	Field-Effect Transistors	1
	Feedback Oscillators	1
	Projects	Hours

CAD and
ComputerTools Used: Multisim, MATLAB

OtherComputerUsage:

Last Review Spring Semester 2005

Course Coordinator Mark Hoffman

Signature

Desired Outcome Performance Criteria:

Outcome	Outcome Description	A-B: Exceeds	C: Meets	D: Needs Improvement	F:Insufficient Progress
1	Analyze, design, and implement electro- optic systems, control systems, instrumentation systems, communication systems, computer systems, or power systems	80>	70>	60%>	<59%

b. Assessment tools used:

1. Homework assignments
2. Quizzes
3. Tests
4. Laboratories

1. Homework assignments:The assigned problems dealt with theoretical and applicable concepts and were picked from the text book. Some of the homework assignments included an additional extra credit problem.

Assignment1

PLO 1: 5, 9, 14, 15

Assignment2

PLO 1: 20, 21, 24, 26, 30, 32, 34, 35, 44

Assignment3

PLO 1: 5, 8, 10, 14, 24

Assignment4

PLO 1: 17, 19, 26

Assignment5

PLO 1: 17, 18, 19, 23

Assignment6

PLO 1: 25

Assignment7

PLO 1: 6, 8, 9, 10, 11

Assignment8

PLO 1: 15, 16, 17, 18, 20, 21, 22

Assignment9

PLO 1: 42, 43, Extra credit problem 1, 2

2. Quizzes: Quizzes asked questions about course material and problems.

Quiz1

PLO 1: 1, 2, 3

Quiz2

PLO 1: 1, 2, 3

Quiz3

PLO 1: 1, 2

Quiz4

PLO 1: 5, 6, 7, 9, 10, 11, 13, 16, 18

Quiz5

PLO 1: 1

Quiz6

PLO 1: 1

Quiz7

PLO 1: 1

3. Tests: Three required tests were used. The tests covered topics that were discussed in class.

ExamI

PLO 1: 3, 4, 7, 8, 9, 10, 15, 16

ExamII

PLO 1: 4, 8, 9, 10, 11, 12, 13, 14

Final Exam

PLO 1: 1, 6, 7, 8, 11, 12, 13

4. Laboratories: The laboratory activities covered topics that were discussed in class.

Lab1-9: PLO1

Homework assignments are listed below as an example of an assignment tool:

Homework 1

There is no credit given for ONLY an answer. To receive full credit, you must show your work in a neat and orderly fashion and do all the assigned problems.

Due: Tuesday, Jan. 25, 2011.

Problems:

Section 14-1: 2-(2 pts)

Section 14-2: 4 (b)-(2 pts), 5-(6 pts)

Section 14-3: 6-(3pts), 7-(3 pts), 8-(5 pts), 9-(10 pts), 12-(3 pts), 13-(9 pts),
14-(6 pts), 15-(10pts)

Total : 59 points

Homework 2

Due: Tuesday, Jan. 25, 2011.

Assigned: Jan. 20, 2011

Problems:

Section 14-5: 20-(3 pts),21-(3 pts)

Section 14-6: 24-(3 pts),26-(10 pts)

Section 14-7: 27-(3 pts),28-(2 pts), 29-(3 pts), 30-(6 pts), 31-(3 pts) Section 14-8: 32-(8 pts),34-(5 pts), 35-(10 pts)

Advanced problem: 44-(10 pts)

Total: 69 points

Homework 3

Due: Tuesday, Feb. 8, 2011.

Assigned:Feb. 1, 2011

Problems:

Section 15-1: 2. (b), (d)-(3 pts), 4 -(3 pts)

Section 15-2: 5 -(3 pts),6.(d)-(10 pts), 8-(5 pts) Section 15-3: 9 -(5 pts),10 -(15 pts)

Section 15-4: 12 -(10 pts) Section 15-5: 14 -(10 pts) Advanced problem: 24 -(10 pts)

Total: 74 points

Homework 4

Assigned:Feb. 8, 2011

Due: Tuesday, February 15,2011.

Problems:

Section 15-6: 16 (5 pts), 17 (5 pts)

Section 15-7: 18 (6 pts), 19 (8 pts) Advanced problem: 26-(10 pts)

Total: 34 points

Homework 5

Due: Tuesday, March1, 2011.

Assigned:Feb. 22, 2011

Problems:

Section 16-1: 4, 8, 9

Section 16-2: 10 -13

Section 16-3: 14-19

Section 16-4: 20-23

Total: 90 points

Homework 6

Assigned: Mar. 1, 2011

Due: Thursday, March10, 2011.

Problems:

Section 16-4: 24-28

Total: 57 points

Homework 7

Assigned: Mar. 29, 2011

Due: Thursday, April 7, 2011.

Problems:

Section 17-1: 6 (15 pts), 8 (26 pts), 9 (6 pts), 10 (20 pts), 11 (6 pts)

Total: 73 points

Homework 8

Assigned: April 12, 2011

Due: Thursday, April 21, 2011

Problems:

Section 17-2: 15 (20 pts), 16 (15 pts), 17 (30 pts), 18 (25 pts), 20 (20 pts), 21 (10 pts), 22 (10pts)

Total: 130 points

Homework 9

Assigned: April 26, 2011

Due: Tuesday, May 3, 2011.

Problems:

Section 17-7: 41, 42, 43

1. Assume a feedback network in a Hartley oscillator returns 5% of the signal to the input.

What is the minimum gain of the amplifier to sustain oscillation?(15 pts)

2. Assume the ac collector voltage of a common-emitter amplifier shows a sinusoidal waveform that is clipped on top. Is this saturation clipping or cutoff clipping? Explain your answer.(20 pts)

Total :65 points

ASSESSMENT DATA

Data assessing PLO1 were recorded in tables for each homework, quiz, test, and lab. As an example, the tables for the homework are shown below.

Homework #1

PLO1							Comments
No	Name	A	B	C	D	F	
1		*					
2		*					
3		*					
4		*					
5				NA			
6		*					
7		*					
8		*					
9			*				
10		*					
11		*					

12	*	*NA:NotApplicable			
13	*				
14	*				
15	*				
Total	13	1	0	0	0

Homework #2

No	Name	PLO1					Comments
		A	B	C	D	F	
1		*					
2		*					
3		*					
4		*					
5			*				
6				*			
7			*				
8					*		
9		*					
10				*			
11					NA		
12					NA		*NA:NotApplicable
13			*				
14		*					
15		*					
Total		7	3	2	1	0	

Homework #3

No	Name	PLO1					Comments
		A	B	C	D	F	
1		*					
2		*					

3				*		
4		*				
5		*				
6		*				
7			*			
8		*				
9		*				
10				*		
11					*	
12					*	
13				*		
14			*			
15			*			
Total		7	3	2	1	2

Homework #4

PLO1

No	Name	A	B	C	D	F	Comments
1		*					
2				*			
3					*		
4				*			
5		*					
6		*					
7		*					
8				*			
9				*			
10		*					
11		*					
12				*			

13	*					
14	*					
15	*					
Total	9	0	5	1	0	

Homework #5

PLO1

No	Name	A	B	C	D	F	Comments
1		*					
2		*					
3		*					
4		*					
5		*					
6		*					
7			*				
8						*	
9			*				
10					NA		
11		*					
12		*					*NA:NotApplicable
13						*	
14					NA		
15		*					
Total		9	2	0	0	2	

Homework #6

PLO1

No	Name	A	B	C	D	F	Comments
1		*					
2		*					
3		*					

4	*					
5	*					
6	*					
7	*					
8				NA		
9	*					
10				NA		
11				NA		
12				NA		*NA:NotApplicable
13				NA		
14	*					
15	*					
Total		10	0	0	0	0

Homework #7

PLO1

No	Name	A	B	C	D	F	Comments
1		*					
2		*					
3		*					
4		*					
5		*					
6		*					
7		*					
8					NA		
9		*					
10		*					
11		*					
12		*					*NA:NotApplicable
13		*					
14		*					

15		*				
	Total	14	0	0	0	0

Homework #8

		PLO1					Comments
No	Name	A	B	C	D	F	
1		*					
2		*					
3				*			
4					NA		
5			*				
6					NA		
7		*					
8					NA		
9		*					
10					NA		
11					NA		
12		*					*NA:NotApplicable
13		*					
14					NA		
15		*					
	Total	7	1	1	0	0	

Homework #9

		PLO1					Comments
No	Name	A	B	C	D	F	
1		*					
2		*					
3		*					
4		*					
5					NA		

6				NA	
7	*				
8	*				
9	*				
10	*				
11	*				
12	*				*NA:NotApplicable
13	*				
14				NA	
15				NA	
Total	11	0	0	0	0

Summary of Data

All assessment data for PLO1 using the different assessment tools were collected and assembled in the table below:

Program Learning Outcome 1

Assessment Tool	A	B	C	D	F	Comments
Homework1	13	1	0	0	0	
Homework2	7	3	2	1	0	
Homework3	7	3	2	1	2	
Homework4	9	0	5	1	0	
Homework5	9	2	0	0	2	
Homework6	10	0	0	0	0	
Homework7	14	0	0	0	0	
Homework8	7	1	1	0	0	
Homework9	11	0	0	0	0	
Quiz1	12	1	0	1	0	
Quiz2	11	1	2	0	0	
Quiz3	14	0	0	0	0	
Quiz4	4	4	3	0	1	
Quiz5	10	0	4	1	0	
Quiz6	13	0	0	0	0	

Quiz7	15	0	0	0	0
Examl	2	4	3	3	2
ExamII	6	3	3	2	1
FinalTest	4	3	1	4	2
Lab1	13	0	0	0	1
Lab2	4	5	4	0	1
Lab3	11	1	0	0	0
Lab4	8	2	1	0	2
Lab5	6	3	1	0	4
Lab6	13	0	0	0	1
Lab7	14	0	0	0	0
Lab8	12	0	0	1	0
Lab9	9	1	2	0	0
Total	268	38	34	15	19

Percent(%) **71.7%** **10.2%** **9.1%** **4.0%** **5.1%**

c. Summative evidence

According to the assessment rubric scale (A-B: Exceeds, C: Meets, D: Needs Improvement, F: Insufficient progress), the results collected from the assessment of PLO1 in all home assignments, quizzes, tests, and labs lead to the final program assessment rubric as shown in the table below.

Program Assessment Rubric

<i>Program Learning Outcome</i>	<i>Needs</i>			
<i>(PLO)</i>	<i>Exceeds</i>	<i>Meets</i>	<i>Improvement</i>	<i>Insufficient Progress</i>
1. Analyze, design, and implement electro-optic systems, control systems, instrumentation systems, communication systems, computer systems, or power systems.	81.9%	9.1%	4.0%	5.1%

d. Result of assessment evidence

The student's program learning outcomes required in PLO1 (analyze, design, and implement) are essential to this particular course and the program in general. They pertain to knowledge and skills which are taught throughout the program's curriculum: therefore evidence covers this. Evidence is also backed by the fact that multiple techniques have been used to assess students performance such as homework, quizzes, tests and labs.

More than one course should be used to assess this PLO, which should be done in the five-year period.

e. What have you discovered about Student Learning

It is obvious that the more practice, the more hands-on, and the more real problems the students are exposed to, the more engaged into the academic process and well prepared to the work place they will be.

g. Changes

According to the program assessment rubric, 91% of the students exceed or meet the expectations: there is no need to make any changes.

Also, since PLO1 has been assessed in one class only, there are not enough results that allow us to make any changes for now.

Time permitting, it would be interesting to investigate the reasons why students failed PLO1 in a certain assignment (like Lab #5 : an unusual 4 students out of 14 failed).

h. Program strengths and weaknesses

- Strengths: the program allows the students to be exposed and use numerous tools they will work with in the real world: students are well prepared to enter the work place.

- Weaknesses: There is not enough equipment. Students have to share the equipment. Some equipment becomes obsolete and needs to be replaced.

RESPONSE TO DEMAND INDICATORS

The data in part I does not accurately reflect the number of positions available in the County and State.

The Standard Occupational Classification (SOC) code jobs are predicted to provide over 300 new positions in Maui County from 2006 to 2017.

EMSI historical data trend analysis:

SOC code	Description	2006 jobs	2017 jobs	New jobs	Replacement jobs	Annual jobs
19-2021	Atmospheric and space scientists	9	9	0	3	0
17-2011	Aerospace engineers	26	32	6	7	1
17-2061	Computer hardware engineers	28	36	8	5	1
17-2071	Electrical engineers	44	55	11	9	2
17-2199	Engineers, all other	40	51	11	8	2
17-2072	Electronics engineers, except computer	52	66	14	11	2
15-1021	Computer programmers	94	109	15	24	4
15-1051	Computer systems analysts	69	97	28	9	3

SOC code	Description	2006 jobs	2017 jobs	New jobs	Replacement jobs	Annual jobs
15-1032	Computer software engineers, systems software	58	87	29	6	3
15-1071	Network and computer systems administrators	83	124	41	10	5
15-1031	Computer software engineers, applications	98	153	55	11	6
15-1081	Network systems and data communications analysts	97	163	66	13	7

Totals	696	980	284	117	36
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RESPONSE TO EFFECTIVENESS INDICATORS

The ECET program has students that have declared ECET as their major, yet never attend any technical classes in the major. The result is that the graduation rate is incorrectly deflated. We are working with the admissions department and counseling department to attempt rectify this situation. Additionally the number of graduates is increasing. The number of freshman entering the program is also increasing. In Fall 2010 the program started two sections of students, more than doubling the number from 2009.

Part III: Action Plan

a. The planned changes for ECET include having laboratory supplies available for every student. No funding from the campus or the system has been appropriated to support the purchase of the required supplies.

No actions are being taken on the perkins core indicator data.

b. The assessment supports our program goals in that it prepares the students to enter the workplace by providing them with the necessary knowledge and essential skills that a technician needs. Students would even be better trained if there were more up-to-date equipment. Therefore there is a need to plan for more financial support or funding in order to be able to acquire the indispensable equipment.

Part IV: Resource Implications

Following is a budget summary of additional resources needed to implement change.

Description		Budget				
		Total	Q1	Q2	Q3	Q4
CURRENT EXPENSES						
(Supplies over \$500, describe item in Budget Elements)						
1	Micro-Mark Microlux Drill Press	220	220			
2	LPKF ProtoMat S42 Extended Warranty	2,000	2,000			
3	Fine Line Milling Tool	1,100	1,100			
4	FR4 double-side copper clad board material	700	700			
5	MATLAB	3,812	3,812			
6	Multisim	Software	4,250	4,250		
7	Labview	4,000	4,000			
8	Shipping & Handling	1,030	1,030			
TOTAL OTHER CURRENT EXPENSES		17,110	17,110			
EQUIPMENT (Itemize)						
1	Function Generator	24,000	24,000			
2	Digital Oscilloscope	15,200	15,200			
3	Digital Multimeter	10,400	10,400			
4	DC power supply	10,400	10,400			
TOTAL EQUIPMENT		60,000	60,000			
TOTAL OPERATING COSTS		77,110				

Program Student Learning Outcomes

a. Program Learning Outcomes:

1. Analyze, design, and implement electro-optic systems, control systems, instrumentation systems, communication systems, computer systems, or power systems.
2. Apply project management techniques to electrical/electronic(s) and computer systems.
3. Utilize appropriate mathematics at the level of algebra and trigonometry to solve technical problems.
4. Demonstrate critical engineering technology skills and experiences such as: making existing technology operate, creating/selecting new technology, troubleshooting, calibrating, characterizing, and optimizing.
5. Demonstrate engineer's way of thinking, analyzing technology as systems.
6. Demonstrate engineer professional skills such as communication and managing projects.
7. Demonstrate proficiency in the general education college core requirements: creativity, critical thinking, oral and written communication, information retrieval, quantitative reasoning.
8. Demonstrate a respect for diversity and knowledge of contemporary professional, societal and global issues.
9. Commit to quality, timeliness, and continuous improvement.

b. Program Map:

Keys

- I: the PLO is introduced in the course
 R: the PLO is reinforced in the course
 E: the PLO is evaluated in the course

PLO	ETRO 101	ETRO 102	ETRO 105	ETRO 110	ETRO 112	ETRO 140	ETRO 161	ETRO 193v	ETRO 201	ETRO 205	ETRO 240	ETRO 293v	ETRO 298	MATH 107
1	I, E	I, E	R, E	R, E	R, E	I, R, E	R, E	I, R	I	I	I, R, E	R	E	R
2													I, R, E	
3	I, E	I, E	R, E	R, E	R, E	R, E	R, E		I	R	R, E			I, R, E
4	I, E	I, E	R, E	R, E	R, E	R, E	R, E	R	I	R, E	R, E	R	E	
5	I	I	R	R	R	R	R	I, R	I	R	R	R	E	I, R
6						I		I, R, E			R	R, E	E	
7	I	I	R	R	R	R	R	R, E	R	R	R	R, E	E	R
8								I, E				R, E	R, E	
9	I	I	R	R	R	R	R	I, E	R	R	R	R, E	R, E	R

c. Assessment Plan

PLO	Spring 11	Fall 11	Spring 12	Fall 12	Spring 13	Fall 13	Spring 14	Fall 14	Spring 15	Fall 15
1	ETRO 110				ETRO 105					
2			ETRO 298						ETRO 298	
3				ETRO 112						ETRO 161
4		ETRO 112					ETRO 240			
5			ETRO 298						ETRO 298	
6					ETRO 298					ETRO 298
7		ETRO 293v		ETRO 293v						
8						ETRO 293v		ETRO 293v		
9						ETRO 293v		ETRO 293v		