HAWAI`I COMMUNITY COLLEGE
Information Technology
PROGRAM REVIEW REPORT
February 8, 2007
Assessment Period: July 1, 2003 to June 30, 2006

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Program/ Unit Review at Hawai`i Community College is a shared governance responsibility related to strategic planning and quality assurance. It is an important planning tool for the college budget process. Achievement of Student Learning Outcomes is embedded in this ongoing systematic assessment. Reviewed by a college- wide process, the Program/Unit Reviews are available to the college and community at large to enhance communication and public accountability.

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Part I. Report Summary

The Information Technology (IT) Program's Mission is to

Assist students to learn and develop skills, competencies, and values required by employers and necessary to become contributing members of a technological society.

Information Technology (IT) Program History

The IT program was established effective fall 1999 by Board of Regents' action that approved the modification of the existing A.A.S. degree in Data Processing to an A.S. degree in Information Technology. The establishment of the modified program included increasing program entrance requirements and course prerequisites, making extensive revisions to the program curriculum, and changing the program name to reflect the industry accepted standard – Information Technology.

Since the program was established there have been regular curriculum actions to maintain course currency and reflect industry changes in technology, applications, and practices. The IT program is a career-ladder, competency-based program that provides training in the use and support of business-related computer systems, data communications networks, and the development of business computer information systems programs.

The IT program includes a combination of business, computer, and information technology courses. Campus-based computer and networking projects, faculty supervised laboratories, and workplace internships provide hands-on experience designed to prepare students for positions in computer support, programming, network administration, or systems development in a business information technology system.

Part II. Program

- Program Goals

  Associate in Science Degree

  Provide course work that prepares employable graduates with quality entry-level skills for positions in computer support, network administration or system development by teaching the

  Basic concepts of programming in a business environment,
  Fundamentals of data communications in a business environment, and
  Knowledge and problem solving skills required to provide hardware and software computer support.

Certificate of Achievement

Provide course work that prepares students to function with the basic skills required in IT positions by teaching the

Functions of computers and the components of computer systems,
Use of business software applications to carry out basic functions in the workplace,
Basic programming functions used in common business applications.

- Program Courses

		CA	AS
First Semester			
ICS 101	Microcomputer Applications Software	4	4
ITS 103	Introduction to the Programming Process	4	4
ITS 104	Computer Hardware Support	4	4
ACC 201	Elementary Accounting I	3	3
Eng 102	College Reading Skills	3	3
	Total	18	18
Second Semester			
ITS 108	Computer Software Support	3	3
ITS 118	Visual Basic Programming for Business Applications	4	4
ITS 121	Computing Topics	3	3
ENG 100	Expository Writing	3	3
MATH 100	Survey of Mathematics (MATH 100 or higher)	3	3
	Total	16	16
Third Semester			
ITS 151	Applied Database Programming in an Object Oriented Environment	-	4
ITS 215	Network Administration	-	4
ITS 218	Help Desk Support	-	3
SPCOM 151	Introduction to Speech and Communications	-	3
Elective	Humanities, Natural Science, or Social Science	-	3
	Total	-	17
Fourth Semester			
ITS 193	Cooperative Education / Internship / Practicum	-	3
ITS 221	Advanced Computing Topics	-	3
ITS 284	Data Communications Fundamentals	-	3
Elective	Humanities, Natural Science, or Social Science	-	3
Elective	Humanities, Natural Science, or Social Science		3
	Total		15
	Credential Total	34	66

- Additional Program Requirements

Earn a "C" or better in all ICS and ITS courses.
Earn an overall GPA of 2.0 or better.
General Education requirements consist of one course in each of the three areas: Humanities, Natural Science, and Social Sciences. ICS 100 may not be utilized to satisfy a General Education requirement.

- Program Entry Requirements

Proficiency levels in both reading and mathematics must be met for entry into the program:

Subject Area	Course Completion or	Placement into Course
Mathematics	Math 25X or Math 26	Math 100 or higher
Reading	Eng 21	Eng 102

- Faculty and Staff Listing

Name	Grade	Discipline
Annie Brown	Associate Professor	Information and Computer Science
Kent Killam	Professor	Information and Computer Science

- Brief Description of Facilities and Equipment

The classroom utilized for all IT courses is Room 136 in Building 346. The room consists of twenty-one Dell Dimension GX 240 Pentium 4 desktop systems with Windows XP Professional and Microsoft Office 2003 (twenty student workstations and one instructor workstation.) These computers are utilized for instructor led student courses.

In addition there is a hands-on lab consisting of 12 obsolete PC systems retired from various classrooms for use in ITS 104 Computer Hardware Support and ITS 108 Computer Software Support. These systems are only capable of running the Microsoft Windows 98 operating system.

This classroom is also equipped with an overhead LCD projector connected to the instructor's workstation.

In fall of 2006 the IT program was assigned the use of Room 140 in Building 346. This room is adjacent to the IT classroom and is utilized for hands-on additional assignments for ITS 104 and ITS 108. There are plans to establish a wireless network in this space, locate the network server for the network administration courses (ITS 215 and ITS 284), and establish a web server for the internet content of the website content course (ITS 121).

- Program Articulation Agreements

Agreement	Date
Information and Computer Science /	May 2002

Information Technology (ICS/IT)
Program Coordinating Council (PCC) Report –
Associate in Science degree program

University of Hawai`i — November 2005
System Articulation Agreement
Information and Computer Science(s) /
Computer Science – ICS 100 and ICS 101

- Advisory Board – Information Technology Advisory Council

Number of Board Members	Meeting Dates
Six	November 7, 2003
Six	April 27, 2004
Six	November 16, 2004
Six	April 26, 2005
Six	September 27, 2006

- Distance Education – None offered.

Part III. Quantitative Trend Data Table – as of 10-5-06

	Fall 2003	Spring 2004	AY	Fall 2004	Spring 2005	AY	Fall 2005	Spring 2006	AY
#1 Number of Unduplicated Majors	61	49	63	41	30	44	41	28	45
#2 Total Student Semester Hours	596	438	1034	304	228	532	253	225	478
#3 FTE Student Majors	39.73	29.20	34.47	20.27	15.20	17.73	16.87	15.00	15.93
#4 Number of Graduates			9			6			4
#5 Number of classes	5	8	13	7	7	14	7	6	13
#6 Avg Class size	14.00	10.88	12.08	8.71	8.00	8.36	8.43	6.00	7.31
#7 Avg Class fit	70.0%	62.0%	65.1%	48.4%	44.4%	46.4%	42.1%	30.0%	36.5%
#8 FTE of BOR Appointed Program Faculty			2			2			2
#9 Number of FTE Faculty based on credit hours (FTE = 27)			1.93			1.89			1.74
#10 Student semester hours for all PPC class enrollments	240	299	539	188	150	338	134	96	230
#11 Student-Faculty Ratio			9.33			5.96			4.40
#12 PPC Credits Earned Ratio	.83	.96	.90	.69	.84	.77	.66	.87	.77
#13 Non-PPC Credits Earned Ratio	.93	.84	.88	.69	.89	.79	.58	.69	.64
#14 PPC Avg GPA	2.63	2.20	2.41	2.77	2.37	2.57	2.31	2.23	2.27
#15 Non-PPC Avg GPA	2.42	2.36	2.39	2.85	3.10	2.97	1.99	2.71	2.35
#16 Budget			$27,997.80			$14,673.96			$18,031.71
#17 College Cost per SSH			$57.25			$108.43			$167.67
#18 Grant Cost per SSH			$0.00			$0.00			$0.00

Part IV. Quantitative Data Analysis

Analysis of the program data reflects a decrease in the number of majors and an attendant increase in the program costs. Charts of representative data values are included below.

This declining enrollment trend is not unique to Hawaii Community College or the Big Island as there has been a decline in the enrollment of Information Technology and Computer Science majors throughout the country and the state.

The American Association of Community Colleges, Advanced Technical Education National Principal Investigators Conference held in October 2005 addressed this concern in Session 11: Declining IT Program Enrollments – Who Moved My Cheese?

> Description:
> Declining IT enrollments is a national trend at colleges and universities. Based on this trend this session addressed the process of curricula and degree program change. Common approaches to the learning of basic IT skills were discussed stressing the importance of domain or contextual knowledge for employability of technicians across IT and IT enabled sectors. Also discussed were common approaches to the learning of basic IT skills across different program areas.
>
> Summary:
> Most of the attendees expressed concern about declining enrollments in IT programs and wanting to improve their programs by designing/offering new programs and needing new strategies to connect their graduates to employers who seem to prefer hiring graduates from 4-year degree programs. There was also general interest in defining what we mean by core IT skills, cyber security, and scenario-based learning.

Conference Link:
http://www.aacc.nche.edu/Content/NavigationMenu/ResourceCenter/Projects_Partnerships/Current/AdvancedTechnologicalEducation/2005ATEPresentations.htm
Session Link:
http://www.aacc.nche.edu/Content/NavigationMenu/ResourceCenter/Projects_Partnerships/Current/AdvancedTechnologicalEducation/11_Summary.pdf

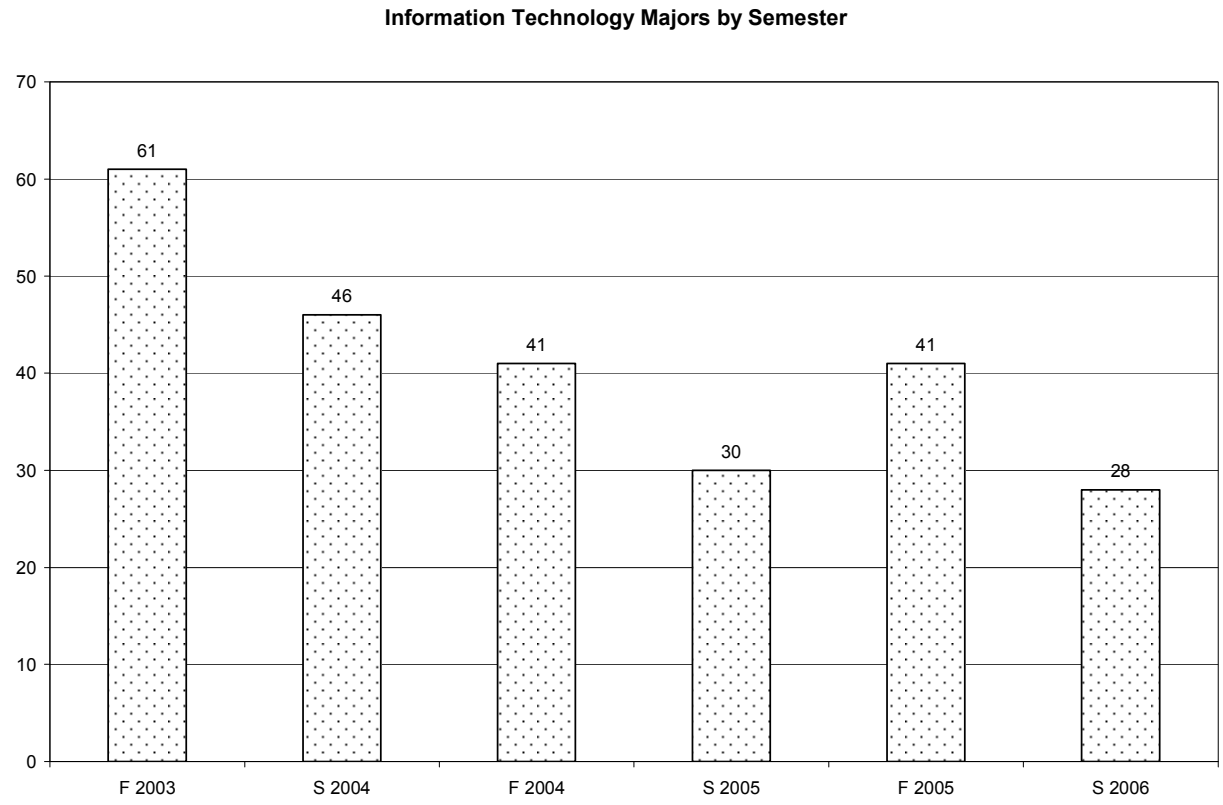
Other Links on this topic:

Exploring Declining CS/IS/IT Enrollments	http://www.aitp.org/isedj/isecon/2005/3124/ISECON.2005.Lenox.txt
Students saying no to computer science	http://news.com.com/2100-1022_3-5306096.html
As outsourcing gathers steam, computer science interest wanes	http://www.computerworld.com/printthis/2006/0,4814,111202,00.html

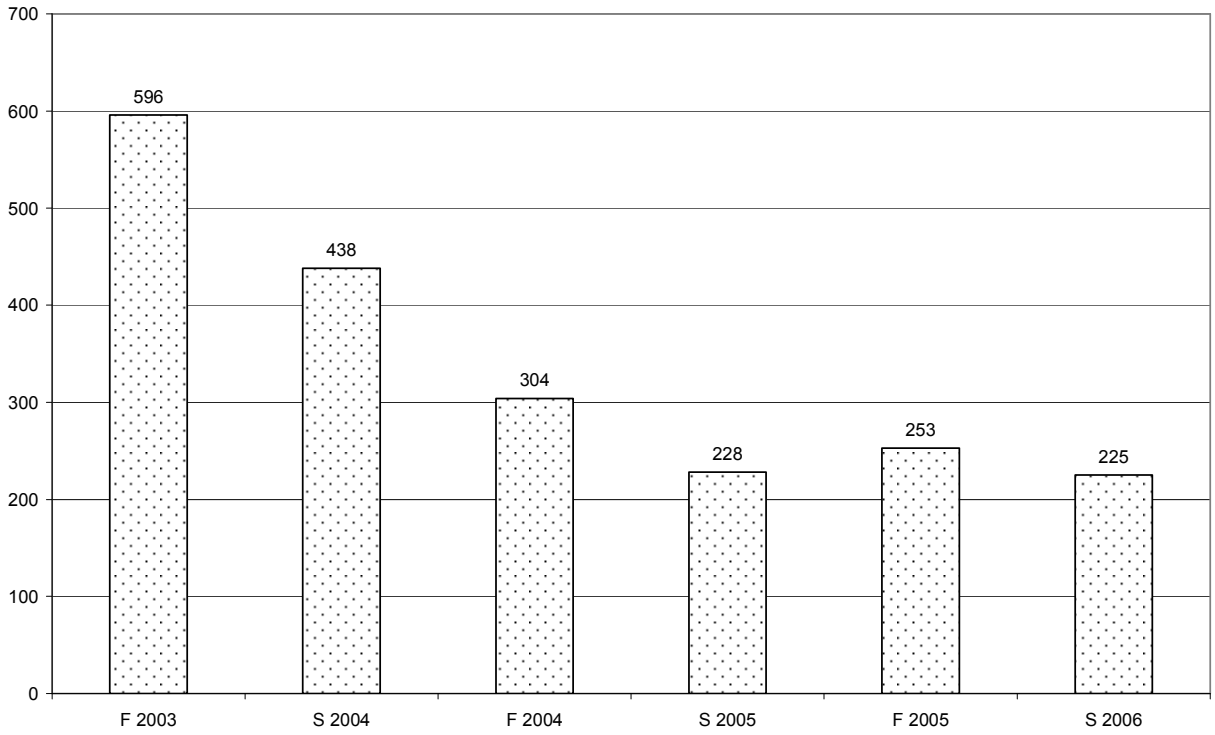
In Hawaii a decline in the enrollments has also been experienced in the Information Technology Programs at the community colleges. According to a Head Count Enrollment by Program at the

University of Hawaii Community Colleges from Fall 1995 to Fall 2005 the enrollments in IT Programs increased to 807 majors in Fall 2000 and then declined to 320 majors in Fall 2005.

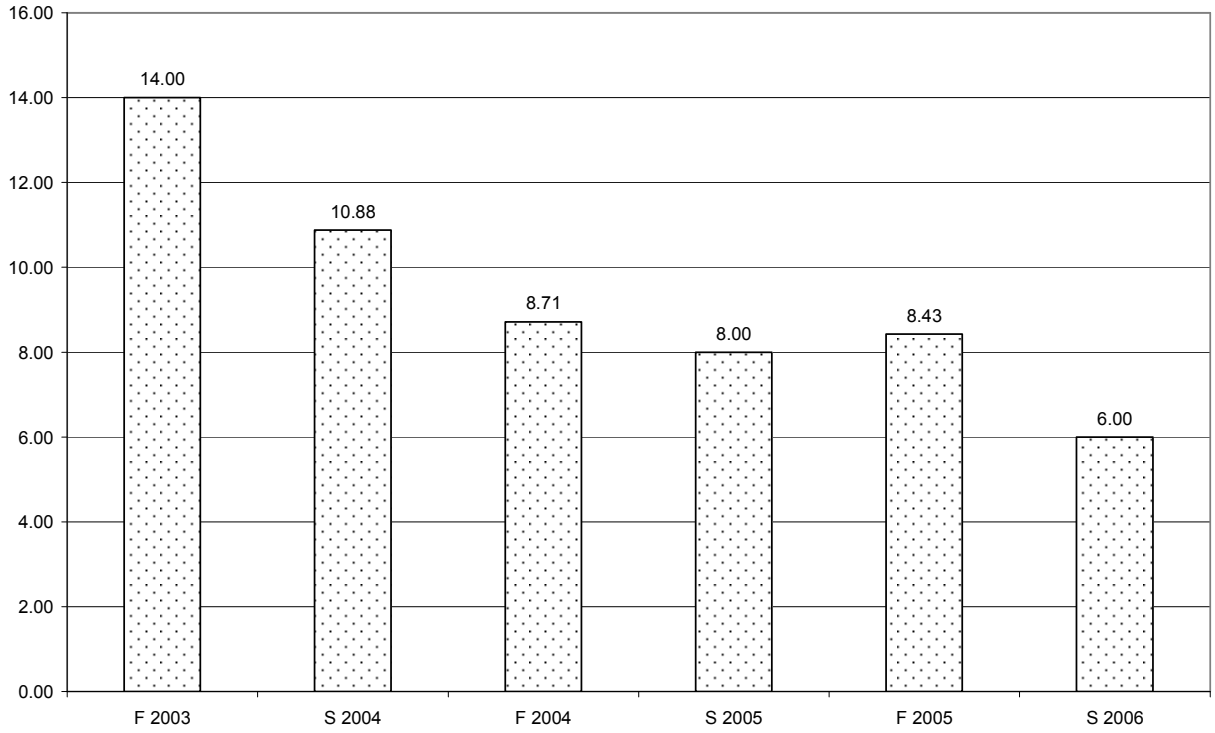
While the decline in IT majors is certainly a challenge that reaches beyond the campus of Hawaii Community College it is expected to stabilize as the national and state economies recover strength over the next few years. Future employment in the field of computer and information technology will be more competitive and will require an increasingly complex set of skills and knowledge that may be acquired only through extensive baccalaureate level courses, on-the-job training, and an Associate in Science
degree.

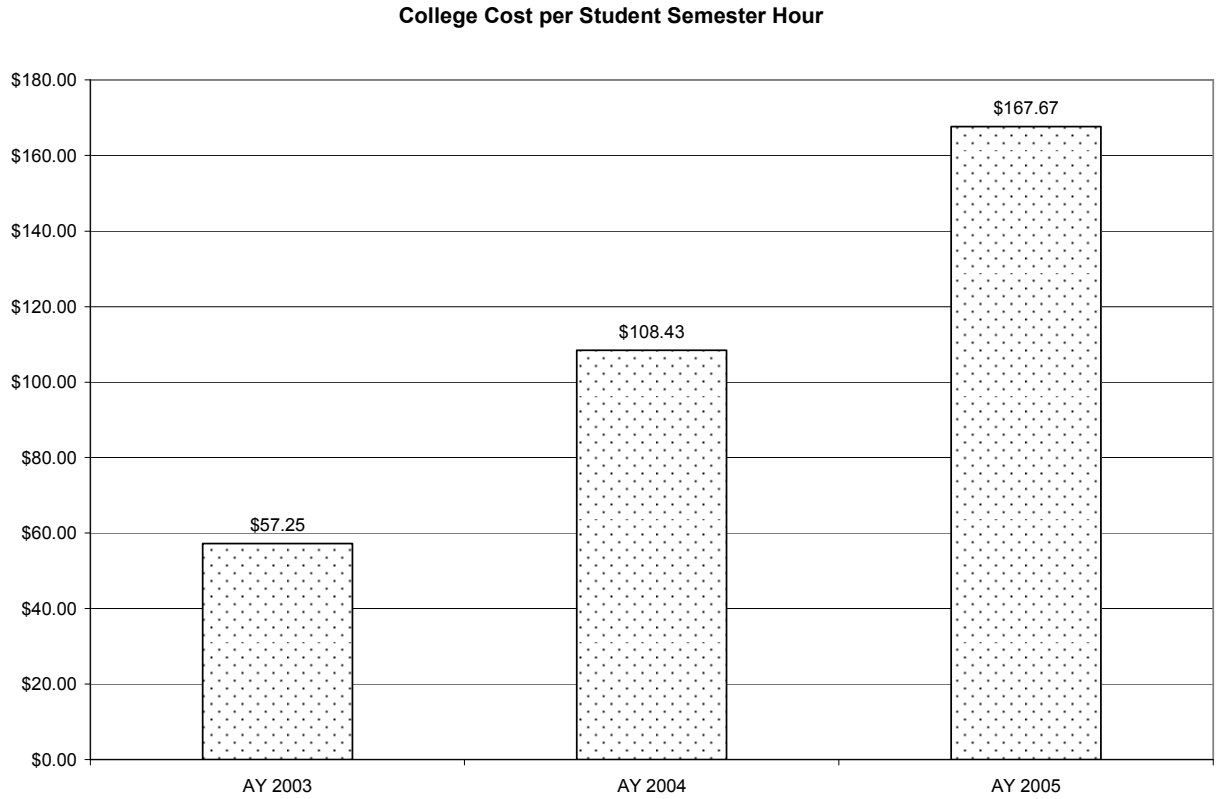


Student Semester Hours by Semester



Average Class Size by Semester





The efficiency of the IT program has been decreasing during this review period. Average Class Size and Student Semester Hours are trending lower. As a result the Percentage of Small Classes and Cost per Student Semester Hour are both increasing. During this review period there has been a significant drop in the number of students entering the program. Small cohorts of students have occurred in fall 2004 – 8 and fall 2005 – 4. Attrition rates of 25-35% have been experienced with each starting group. While there are more majors declared for the program, many students are not ready for the college level courses required for the Associate in Science degree. For example, in fall 2005 there were 41 declared majors. While about 10 – 12 of these were second year students of the remaining approximately 30 students only 4 met the prerequisites for ICS 101 and ITS 103.

The IT program courses are offered on a Fall/Spring rotation to maximize class enrollment and distribute course assignments between the two IT faculty members. There are no courses that have multiple sections and each faculty member has three or four course preparations each semester.

The decline in enrollments is attributed to the complexity of the program, the need for entrance requirements – preparation for college level reading, writing, and mathematics, and the fact that many of our students are not able to meet the math prerequisite – completion of Math 25X or Math 26, or placement in Math 100 or higher. Many of our students do not have these basic skills and become discouraged while taking courses to develop these skills.

In addition to small cohort size, there are two factors that contribute to even smaller class sizes in the second, third, and fourth semester courses. First, students fail to satisfactorily complete prerequisite courses and are unable to continue a program thread in the later semester. (The program consists of three threads: computer support, networking, and database programming. A student is not able start one of these threads if they have not passed the prerequisite course(s): computer support – ICS 101 and ITS 104; networking – ITS 108; and database programming – ITS 103 and ITS 118.) The second factor is students choosing to take the threads serially, rather than in parallel, because of the course workload. Many of our students are working in outside jobs and do not have sufficient time to satisfactorily complete course requirements. The program is demanding and students will take one set of courses and then take another set of courses the following year. Several of our students have spent three to four years completing all of the program requirements.

Part V. Other Data

While the number of IT graduates has not been large they have been successful. Once they graduate, the majority of our program graduates have obtained employment and most of them in the field of Information Technology. A major factor for this accomplishment is the requirement for the capstone course ITS 193, Cooperative Education / Internship / Practicum which places students into IT positions in local public and private business providing a wealth of work site experiences for our interns. Our program has received excellent support from several community partners such as: the Hawaii County Police Department, Office of the Prosecuting Attorneys, YWCA, Aha Punana Leo, Inc., Pahoa High School, KTA, Hilo Medical Center, Bay Clinic, Goodwill, Hawaii Island Food Bank, Hospice of Hilo and Mauna Kea Observatory Support Services.

Supervisors of these students are requested to complete a survey concerning their satisfaction with students in their internship. Questions in the survey include queries about the student's attitude, job related knowledge, quality of work performed, and ability to get along with co-workers. Overall supervisor comments have been extremely positive: 86% of the supervisors rated our IT interns "Excellent"; 9% rated them as "Very Good"; and 5% as "Good."

Supervisors are asked to provide comments to three questions:

1. Did the intern fulfill the learning objectives stated at the beginning of the internship?

Almost all our interns received a feedback of "Yes" to "Exceptional". Other comments included: "He was able to learn some of our jobs and do them with little or no intervention by my staff. Very willing to learn and always did what was asked of him." "Beyond all expectations"

2. Did your agency benefit from the internship program of Hawaii Community College?

"Yes, very much" "He was very valuable" "Very much. We are appreciative of the help" "Yes, *** and *** worked well as a team, dividing up assignments on their own initiative." "The interactive learning between *** and my staff benefited us well." "Quality of work extremely good. And has the ability to be a great teacher of programs."

3. Other Comments:

"Mr. *** is both talented and very professional, traits that will serve both him and the community well upon completion of your program." "It was really a pleasure for me and my staff to work with *** as we took this inventory project from just a concept of something needed to a developed program, with an administrator's manual and user manuals for each work station."

The feedback from the supervisors was extremely positive and documents the achievement of several of our program learning outcomes. As our graduates mature we expect even greater

*** Student names are available from the ITS 193 Cooperative Education / Internship / Practicum course instructor.

success for our students. For example, in 2003 one of our students served an internship under the supervision of a former student from our first cohort of graduates in 2001. Our students are beginning to move up from entry level jobs into supervisory positions. One student (graduate of our first cohort) is now employed as an IT Systems Specialist I for the County of Hawaii. Another is the IT Specialist in charge of the network and computer systems for the Kamahamaha Secondary School. Other positions held by our graduates include the network administrator for HELCO and the executive assistant for the Hawaii Island Board of Realtors.

Part VI. Information Technology Program Outcomes:

What should our students be able to do "out there" that we are responsible for in the Information Technology AS Program?

1. Select and create software and hardware systems that meet unique information needs of an organization.

   In the computing literacy element of most courses the concept of data processed into relevant information is presented. The introductory courses emphasize the importance of information in our "digital world" as well as the information explosion of numerous facts. Students are evaluated on their use of hands-on computing hardware and software to plan, store, and even remove this information.

   Many of the courses offer labs or lecture-lab situations for students to utilize the available software and hardware. The emphasis throughout the IT program is the assessment of the importance of the computer as a tool to assist in managing information and influencing the way we work.

2. Implement the hardware, software, and procedural components of a data communication system in a business environment.

   A+ certification topics are utilized for the computer support courses. The Windows 2003 Standard Server network operating system is covered in the local area network course. Finally understanding of wide area network protocols is contained in data communication fundamentals.

3. Display a professional attitude and abide by the legal and ethical guidelines of the information technology field.

   The impact of computers and information on society are emphasized in several of the IT courses. Students are required to develop computer usage policies and procedures in memorandums and oral presentations.

4. Work both independently and cooperatively to meet an organization's information technology goals.

   Individual and group deliverables are assessed in the IT courses. Assignments require the students investigate system requirements, develop questions and complete surveys to determine the appropriate information system for an organization.

5. Teach technical skills to others.

   In many IT classes students are asked to explain concepts to the class. Lab situations often encourage students to teach and assist each other.

6. Organize and manage multiple tasks and co-workers making efficient use of time and resources.

   Project, exams, and papers are all a part of most IT courses. Students develop the ability to meet deadlines while studying and preparing for tests and course deliverables. In the IT program, penalties are written into course outlines for late submission of work. In classes where outside computing requirements are mandatory, students become proficient with time management skills to complete lab assignments.

   In group work students are often required to divide tasks and provide feedback to one another. Team participation is often required for lab assignments. Group projects are assigned requiring the integration of individual efforts. Students in labs work closely together to solve problems. In some classes analysis groups and programming teams are utilized to solve larger project and problems. Peer evaluations are included in many of these group projects.

7. Take advantage of opportunities for continuous learning and development in the information technology profession.

   The requirement to search for current information is emphasized in each of our courses. It has been estimated that the half-life of IT knowledge is measured in months. Students must be able to remain current in the field.

All of the IT courses require examinations, projects, and quizzes. Generally examinations and projects constitute 90% of the course grade and quizzes count 10%. Students are examined to measure the retention of course content; individual projects are assigned and presented within classes; and group projects are required in several courses to assess students' ability to complete tasks and to work with others; several of the group projects require the completion of peer evaluations.

A major improvement to assessing outcomes would be the requirement for students to create e-portfolios containing selected course deliverables and their experiences at several points in the program. Students would be able to document their performance and develop portfolios of their program work for employment applications. The inclusion of portfolios would provide an excellent assessment tool for students in the IT program.

Part VII. Information Technology Course Student Learning Outcomes

There are twelve ICS/ITS courses required to complete the AS degree in Information Technology. Student Learning Outcomes have been developed for all twelve courses.

Relationship of Course Learning Outcomes to Program Learning Outcomes

IT Program Learning Outcomes	ICS 101	ITS 103	ITS 104	ITS 108	ITS 118	ITS 121	ITS 151	ITS 193	ITS 215	ITS 218	ITS 221	ITS 284
1. Select and create software and hardware systems that meet unique information needs of an organization.	X	X	X	X	X	X	X	X	X	X	X	X
2. Implement the hardware, software, and procedural components of a data communication system in a business environment.			X	X				X	X			X
3. Display a professional attitude and abide by the legal and ethical guidelines of the information technology field.	X			X		X		X		X	X	
4. Work both independently and cooperatively to meet an organization's information technology goals.	X	X	X	X	X	X	X	X	X	X	X	X
5. Teach technical skills to others.			X	X			X	X		X	X	
6. Organize and manage multiple tasks and co-workers making efficient use of time and resources.	X	X	X	X	X	X	X	X	X	X	X	
7. Take advantage of opportunities for continuous learning and development in the information technology profession.	X		X	X		X		X		X	X	X

As mentioned in the section on program student learning outcomes the course learning outcomes are assessed with a combination of examinations, projects, and quizzes as appropriate to each course.

Electronic portfolios would be a major improvement to assessing course learning outcomes.

Part VIII. Program Summary

- Alignment with college mission and ADP

  The A.S. degree in Information Technology directly supports Hawai`i Community College's Academic Development Plan Long-Range Goal – "To provide semiprofessional, technical and vocational education and training that prepares students for immediate employment and supplies the paraprofessionals, technicians, and craftspeople needed by Hawai`i business and industry." The degree program has been designed to provide a pathway for Big Island high school computer programs to proceed into a two year IT program and onto a four year program or into entry level professional employment. This program supports the State's School-To- Work and Pathways programs.

- Alignment with college imperatives

  The IT program directly supports three of the college's imperatives: workforce development, community development and technology. The program provides students with the skills necessary for success in the business environment, the ability to work with others and to use teamwork in achieving workplace and community goals. The IT program focuses on teaching technological skills enabling students to find jobs and advance the general ability level of the Hawaii workforce to handle the ever-changing environment caused by technological advances.

- Achieving the goals set in the last program review

  This is the first program review for the IT program.

- Program Strengths

  The vast majority of graduates have found good jobs and they are very satisfied with their experiences in the program.

  Employers are satisfied with the quality of the graduates they have employed, making future hires likely.

  Students receive current information in the IT field and have the opportunity for extensive hands-on experience in their course work.

- Program Weaknesses

  Need to better balance program selectivity and rigor with ability to increase enrollment and retention, and to help students complete the degree program within a two year period.

Need better assessment tools for overall student learning outcomes from the program, including adding a self-assessment report from all students as they complete program requirements.

- Program goals/plans for the next review period

Action Plan Tasks	Year	Responsible Party
Survey needs of present students	2007	Annie Brown / Kent Killam
The proposed Action Plan tasks are designed to address weaknesses and increase strengths of the IT Program in the next two years. We will survey our present students concerning their needs, including optimal course scheduling, time for completion of program, prerequisite courses, and prerequisite skills. Results of the survey will be used in detailed planning for Program improvement.		
Establish certificates of completion in Information Technology.	2007	Annie Brown / Kent Killam
Establishment of the Certificate of Completion in IT will permit students who cannot take the full two-year course of study for the AS degree in IT to receive sufficient training for employment in basic entry-level IT jobs. This will also permit students with marginal skills to obtain remedial training and then obtain a credential in IT within a reasonable period of time.		
Offer more sections of a college information technology service course including adding the requirement of an information retrieval/computing literacy course for the AA liberal art students.	2008	Annie Brown / Kent Killam
Creation of a requirement for information retrieval computer literacy for all HawCC AA seeking students will provide our students with skills necessary for all educated people in the twenty-first century with these skills especially necessary in the workplace. The current IT Program faculty will be able to cover many of the sections necessary for this requirement because of available seats in our introductory courses. It may be necessary to hire lecturers to cover additional sections of those courses depending upon enrollment patterns. Students' exposure to the introductory course is likely to aid in the program's recruitment of IT majors.		

Action Plan Tasks	Year	Responsible Party
Review the similarities and differences between technical programs on campus to strengthen complementary requirements and reduce duplication.	2008	Annie Brown / Kent Killam / Other individuals as assigned by the VCAA.
A review of the technical programs at HawCC – IT, Cisco, and ETRON – is required to develop areas of mutual support and complimentary courses. There are not enough students to offer duplicative, competing technical courses such as Website Development and Computer Support. There is a need to identify a single program to offer IT courses and IT related curriculum for the college. The technical courses offered should also support the state's initiative to create technical academies.		
Participate in a campus supported pilot program for electronic portfolios.	2008	Annie Brown / Kent Killam / Other individuals as assigned by the VCAA.
Electronic portfolios are envisioned as a way to have students demonstrate their accomplishments in the IT program to possible employees, other students, and faculty reviewers. A subset of the required course deliverables will be required to be included in the student's portfolio. This will increase competition among students and have the course products available to advertise the IT program. The hosting of the e-portfolios is a considerable task and must be part of a college-wide program. The IT program would volunteer to be an early participant in the program.		

Part IX. Budget Implications

Facilities Assigned to the IT Program	
Building 346, Room 136	Instructional classroom and hands-on lab
Building 346, Room 140	Instructional hands-on lab

Recurring Instructional Costs	
MSDN Academic Alliance Program	$415 per year
The Business Education and Technology Division participates in the Microsoft Development Network Academic Alliance Program. This program is designed specifically for academic labs, faculty, and students in curriculum areas of Computer Science, Engineering, and Information Systems to make it easier and less expensive to get Microsoft developer tools, platforms, and servers for instructional and research purposes. Annual membership currently costs $415 and is a significantly reduced cost for Microsoft products used in instruction.	

Inventory List		
Location	Equipment	Acquired
Building 346, Room 136	19 PDC Systems Ultrastation II 22 Dell Optiplex GX240 1 PDC Systems Intel PIII 2 Hewlett Packard Laserjet 4100N	11/17/1999 6/10/2002 11/17/1999 10/8/2001

Budget Requests	
Printers and workstations for Room 136 and Room 140	$25,500 - $30,000
Equipment for Room 140	$5,000 – 7,000

The major budget requirements for the IT program during the next review period are the replacement of the printers and workstations in Room 136 and the equipping of the IT lab in Room 140.

The systems in Room 136 are four years old and are not capable of running the next generation of Windows operating system – Microsoft Vista. In addition the hands-on machines are not capable of running Windows XP. Industry standards and certification objectives will require that the classroom be updated and the current systems be made available for hands-on use in Rooms 136 and Room 140. It is estimated that this will require approximately $25,500 to $30000.

As requirements for the IT lab in Room 140 are refined equipment purchases will be required to complete the systems needed for instruction and extensive hands-on activities. It is estimated that this will require approximately $5000 to $7000.