

# UNIVERSITY OF HAWAI‘I SYSTEM ANNUAL REPORT



REPORT TO THE 2011 LEGISLATURE

Annual Report on  
The Construction Academy Curriculum

HRS 304A-1144  
Act 234, SLH 2006

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# THE CONSTRUCTION INITIATIVE BACKGROUND

The Construction Academy began in 2004 with a \$1.4 million grant from the U.S. Department of Labor. This grant started a pilot program whereby the University of Hawai'i's Honolulu Community College (HonCC) partnered with eight Department of Education high schools on O'ahu—Kahuku, Kailua, McKinley, Mililani, Pearl City, Radford, Waipahu, and Waialua—to prepare high school students with the technical, academic, and employability skills necessary to pursue a career in the construction industry. The initial results of this federally-funded academy model displayed such great potential that in late 2005 many associated within education and construction disciplines felt it warranted expansion.

By late 2005, the construction and building industry found itself in a dire situation. Construction projects and developments could move no faster unless there were more qualified workers for the job sites. In late 2005, the industry approached HonCC to request its assistance in educating and training a greater number of qualified construction workers. In a true industry-education partnership, HonCC, with its experience in the pilot Construction Academy as well as its long history in Apprenticeship Training, developed a comprehensive proposal (the "Construction Initiative") that encompassed both high school education (Construction Academy) and post-high school career training (Apprenticeship).

In 2006 session, the Hawai'i State Legislature passed Senate Bill 2980 SD2, HD1, CD1, which appropriated \$5.4 million to expand the Construction Academy to other public high schools on O'ahu as well as on the islands of Kaua'i, Maui, and Hawai'i, and to increase Apprenticeship Training at Honolulu, Hawai'i, and Kaua'i Community Colleges and Maui College.

# THE CONSTRUCTION ACADEMY

*Our mission is to prepare high school students with the technical, academic, and employability skills necessary to pursue a career in the construction industry.*

From servicing over 200 students at 8 pilot schools during the 2005–2006 school year, the Construction Academy has grown to a capacity of over 2000 students in 35 high schools statewide in the Fall 2010. In this pre-apprenticeship program, students actively participate in an integrated classroom setting that promotes the use of math, reading, and writing skills as they engage in building and construction activities. At the end of the course, students build real world projects such as picnic tables and storage sheds to test the skills they have learned throughout the year. This hands-on approach to learning requires students to apply skills in math, communication, construction technology, problem solving, and most importantly, teamwork.

## CONSTRUCTION ACADEMY STATEWIDE ENROLLMENT SUMMARY

SCHOOL YEAR 08-09 through 10-11

Community College	Hawai'i			Honolulu			Kauai			Maui			Total		
	08-09	09-10	10-11	08-09	09-10	10-11	08-09	09-10	10-11	08-09	09-10	10-11	08-09	09-10	10-11
Participating High Schools	9	9	9	16	17	17	3	3	2	7	7	7	35	36	35
Building & Construction 1	251	275	229	614	766	655	130	27	78	213	163	197	1208	1231	979
Building & Construction 2	52	61	81	163	231	283	35	81	0	86	96	74	336	469	438
Mechanical Drawing	n/a	n/a	n/a	209	59	64	n/a	n/a	n/a	n/a	n/a	n/a	319	59	64
Drafting Technology	50	33	43	112	299	171	n/a	n/a	36	78	123	110	240	455	360
Electricity and Electronics	n/a	n/a	n/a	117	76	175	n/a	n/a	n/a	n/a	n/a	n/a	117	76	175
<b>Total</b>	<b>353</b>	<b>369</b>	<b>353</b>	<b>1215</b>	<b>1431</b>	<b>1348</b>	<b>165</b>	<b>108</b>	<b>114</b>	<b>377</b>	<b>382</b>	<b>381</b>	<b>2220</b>	<b>2290</b>	<b>2016</b>

\*10-11 enrollment counts reflect Fall 2010 semester registration only.

## Participating High Schools SY 2010-2011

Hawai'i Community College		Honolulu Community College		Kaua'i Community College	Maui College
Hilo	Konawaena	Campbell	McKinley	Kapaa	Baldwin
Kau	Laupahoehoe	Farrington	Nanakuli	Kaua'i	Lahainaluna
Keaau	Pahoa	Kailua	Pearl City		Lana'i
Kealakehe	Waiakea	Kaimuki	Radford		Hana
Kohala		Kalaheo	Roosevelt		Maui
		Kahuku	Waialua		Moloka'i
		Kapolei	Waianae		King Kekaulike
		Leilehua	Waipahu		
		Mililani			

The statewide implementation of the Construction Academy model continues to make progress. The four participating community colleges have completed the University of Hawai'i System Articulation Agreement for its carpentry and architectural, engineering and CAD technology programs. Remaining flexible to the individual needs of each high school and its surrounding communities remains an essential element of implementation. Each community college continues to evaluate its curriculum and will revisit its current articulation agreements in the coming academic year. A brief description of the progress being made by each community college campus is provided in the appendices of this report.

## **APPRENTICESHIP**

The second component of the Construction Initiative is focused on improving and expanding the apprenticeship training on the four community college campuses. In 2004-06, as the construction industry experienced a boom; the community colleges, in turn, experienced substantial increases in apprenticeship enrollments, which made it imperative that campuses resources be increased. The Construction Initiative, funded by the 2006 legislative appropriations, allowed the community college campuses to hire support staff and lecturers, purchase up-to-date instructional materials/supplies, and upgrade equipment.

The current slump in the construction industry has resulted in decrease in enrollments from 6954 apprentices in 2009 to 5500 apprentices in 2010.. However, enrollment levels remain well beyond those in pre-Construction Initiative years. For example, in the 2004 and 2005 academic years that immediately preceded the funding of the Construction Initiative, there was an average of approximately 4525 apprentices enrolled each year which is 975 fewer than in the 2010 academic year.

Due to the almost unprecedented numbers of apprentices on the campuses in recent past semesters, shop equipment was over taxed and materials and supplies depleted. The Construction Initiative funding enabled the colleges to gradually replace equipment that was outdated and/or unsafe with e different kinds of equipment that programs utilized to expand the scope of training and to meet industry standards. For example, electric paint sprayers were bought for the Associated Builders and Contractors painters to help them expand their hands-on training beyond brush applications; PVX software was purchased for the Plumbers and Fitters to enable them to pilot Polycom delivery of their curriculum to remote sites; Deep Freeze software was installed in an apprenticeship computer lab to improve the stability of the programs and processors, and a number of power tools including circular saws and miter saws were bought to replace old, overused ones. Funds from the budget were also used to purchase materials such as sand and concrete for the masons, lumber for the carpenters, electrodes for the welders, and oxygen, argon and acetylene gases for the boilermakers and ironworkers

In summary, with the continued funding, the University of Hawai'i Community College Apprenticeship Offices are better able to serve their training programs. The funding for lectureship costs has helped the colleges satisfactorily fund a very full schedule of classes. Allocations for supplies and materials have enabled the colleges to at least partially restock shop consumables that constitute huge and growing expense as the cost of materials continues to increase dramatically. Perhaps the most significant beneficial outcome of this funding is that the colleges have been able to purchase much needed equipment. Therefore, in several significant ways, the colleges have and will continue to be able to more completely meet the training needs of the construction industry.

# APPENDIX

## HAWAI`I COMMUNITY COLLEGE

Community College	Hawai`i	
	08-09	09-10
School Year		
Participating High Schools	9	9
Building & Construction 1	275	229
Building & Construction 2	61	81
Mechanical Drawing	n/a	n/a
Drafting Technology 1	33	43
Electricity and Electronics	n/a	
<b>Total</b>	<b>369</b>	<b>353</b>

Participating high schools include Hilo, Kau, Keaau, Kealakehe, Kohala, Konawaena, Laupahoehoe, Paho, and Waiakea High Schools.

Construction Academy classes on the island of Hawai`i continue to be offered in nine of the ten identified public high schools on the island. Enrollment for 2010-11 is 353 students, a slight drop from the 369 reported for the previous year. The drop in enrollment was in Building & Construction I, which can be attributed to the ongoing slowdown in construction. There was a significant increase in the number of Building & Construction 2 students, a positive sign that students are progressing through the program as intended. There was also an increase in the number of Drafting Technology students. Graduates of the Construction Academy continue to articulate to the UHCC Community College system and apprenticeship programs, fulfilling the vision of the program.

Safety, math, and construction terminology continue to be priorities of the program. Construction Academy personnel have articulated student learning outcomes and assessments with the Carpentry Program at Hawai`i Community College. The Academy held its third annual Safety-First Hand Tools Face-Off in May 2010, inviting Big Island high school students taking Construction Academy Classes to visit Hawai`i Community College and participate in a series of appropriate challenges. The competitive events tested the students' use of hand tools and safe practices in the areas of joint construction, stud framing, nailing, and measurement calculations. A competition solely for

blueprint reading students was added to the May 2010 event. Participants at the daylong event represented 8 of the 9 high schools with Construction Academy programs.

The Construction Academy has home-based instructors in nine high schools. The Academy has ten FTE positions filled, which includes six instructors and four full-time equivalent casual hires. It is currently without a coordinator and clerk. The Construction Academy coordinator retired June 2009, returning as a .5 casual hire fall 2009. A decision was made to not fill the position starting in spring 2010 to help cover budget reductions. The Construction Academy's clerical position became vacant fall 2010 when the incumbent accepted a temporary reassignment to gain experience in a higher level position. The clerical position has not been filled due to Civil Service hiring restrictions and the temporary nature of the incumbent's reassignment. The 11 positions originally assigned to the construction academy were reduced to 10.5 with the decision to place a .5 FTE instructor at Laupahoehoe High instead of a 1.0 FTE instructor.

	FTE Position Allocated	FTE Position Filled
Home-Based Instructors *Laupahoehoe position changed from 1.0 FTE to .5 FTE	5.5	5 FTE/3.5 Casual Hires
Traveling Instructors	2	1.5 FTE
Counselor (funds used for Instructors)	1	n/a
Clerical	1	Temporary Vacancy
Coordinator (funds used for instructor)	1	n/a
Total	10.5	10.0

HONOLULU COMMUNITY COLLEGE

Honolulu Community College continues to increase school participation with the addition of Kapolei High School’s Building and Construction program. Student interest continues to be high with an enrollment of over 1300 students.

Post-testing with the ACT® ASSET numerical skills test is being used to determine Construction Academy student performance in math. Honolulu Community College determined that a scale score of 42 is needed for students to place into *Math 24, 50, and 53*— the entry-level mathematics courses required by most HCC building and construction-related degree programs; and the level students will be tested at for acceptance into a typical apprenticeship program. Students who score at a 42 or better are considered to have passed the test. Construction Academy student participants have consistently demonstrated a need to improve their math skills. One of the issues that the instructors are facing is the wide range of math skills that students bring with them to the program. The table below demonstrates the range of students’ success in the ASSET testing.

Course	Grand Total Spring 09	% Passed Spring 09	Grand Total Spring 10	% Passed Spring 10
Building & Construction 1	428	26.17%	521	25.53%
Building & Construction 2	112	35.71%	167	35.93%
Directed Studies---IET	6	66.67%	12	83.33%
Drafting Technology 1	88	43.18%	132	31.82%
Drafting Technology 2	30	73.33%	29	62.07%
Electricity & Electronics	33	45.45%	51	43.14%
Electronics Technology 1	28	53.57%	31	67.74%
Electronics Technology 2			38	52.63%
Mechanical Drawing	30	50.00%	21	52.38%
<b>Grand Total</b>	<b>755</b>	<b>34.57%</b>	<b>1,002</b>	<b>33.63%</b>

Of the students who took the ASSET test in Building and Construction 1 only 25.53 percent passed the test as contrasted by those students in Drafting Technology 2 where 62.07 percent have passed the ASSET test. Our faculty continues to stress the importance for math in the industry and integrated math in all projects. However, the curriculum impact on math scores seems to be

negligible. This trend has been observed over the past four years. The Construction Academy staff and faculty will consider a different means of assessing math achievement in the academic year of 2010-2011. UHCC instructors have no control over student preparation and enrollment at the high school level: there are no prequalifying elements. Therefore, the program will turn its focus on the readiness of those students who matriculate to the community college system. The challenge remains however: What can be done at the high school level to better assure that these students are program ready when they come to the community college system?

The Construction Academy counselor provides direct services to academy students at the high school. Services include classroom presentations and one-on-one counseling in completion of college and employment applications, financial aid, resume writing, and preparing for job interviews. Soft skills training in time management, stress management, communication, note taking and test taking are also part of the service package provided by the Construction Academy counselor.

The Honolulu Community College Construction Academy Program currently has four vacant faculty positions. Due to budget short falls, three (3) of these vacancies will not be filled. Remaining faculty positions are assigned to multiple schools to cover the reduction in staff. The program will need to evaluate its current use of existing positions to better meet the needs of the high school program.

<b>Positions:</b>	<b>FTE Position Allocated</b>	<b>FTE Position Filled</b>
Home-Based Instructors:	16	12
Traveling Instructors	4	4
Administrative Profession Technical	1	1
Clerical	1	1
Counselor	1	1
	23.00	19.00

The Construction Academy has deployed its new welding trailer at participating Construction Academy high schools. Over the past 15 years, welding programs in the Department of Education schools have been declining. There are currently only two high schools that have fully functional welding shops on the island of O`ahu. The goal of the welding trailer is to introduce high school students to the career opportunities in welding and sheet metal within the construction industry. The trailer gives students hands-on experience in stick and tig welding, plasma and gas cutting and

sheet metal fabrication. The welding trailer is scheduled to visit ten high schools this school year as well as participate in the 4<sup>th</sup> Annual Hawai`i Construction Career Days event held in Hilo in October 2010. The Hawai`i Construction Career Day partnership included the Hawai`i Department of Transportation, Hawai`i Local Technical Assistance Program, Department of Labor and Industrial Relations, the Federal Highway Administration, Union Apprenticeship programs and more than a hundred volunteers.

The Construction Academy program has introduced the Honolulu Community College's CARP 43 course into the high schools' building and construction program. CARP 43 introduces the student to basic sustainability concepts and provide activities to demonstrate "green" building practices. The curriculum was developed in partnership with the Hawai`i Chapter of Building Industry Association (BIA) and industry partners. Training in photovoltaic (PV) systems and CARP 43 curriculum has been provided to the Construction Academy instructors.

**MAUI COLLEGE**

The Maui College Construction Academy (CA) program, now in its fifth year, serves students in the seven high schools located on Maui, Moloka`i, and Lana`i. Enrollment in the program has grown, from 382 in school year 2009-10 to 389 in 2010-2011. Even with the challenges of the Department of Education (DOE) furloughs, reductions and restructuring of classes, the Construction Academy continues to thrive on the three islands of Maui County. The following are some of the accomplishments of the past year, made possible by continued legislative funding of the program:

- Students in all seven Maui County high schools completed projects in their classes according to professional guidelines and Construction Academy curriculum requirements. The projects included renovation of neighbor island faculty/staff housing in conjunction with the Department of Accounting and General Services (DAGS); professionally detailed playhouses that were donated to childcare centers; sturdy benches for county parks; a covered pergola for student use; shelters for a local animal rescue organization; and a number of other structures completed for various worthwhile purposes. In the summer of 2010 many Construction Academy students participated in summer building and construction projects, funded through government stimulus programs. As they carried out the projects, students gained hands-on practice in professional construction skills as well as in reading, writing, mathematics, communication, and teamwork.
- Sixteen 2010 high school seniors who had taken part in the Construction Academy Program enrolled at Maui College in fall 2010. In reformatting tracking information, it was realized that not all students take Construction Academy aligned classes in their senior year. Updated information indicates that thirty students, enrolled in DOE/ Maui College Construction Academy classes from the 2006-2007 through 2009-2010 school years, attended New Student Orientation at Maui College in the fall of 2010. Through verbal communication with Construction Academy students, the staff has learned that many of the students are pursuing post secondary and four-year degrees throughout The University of Hawai`i System, as well as Architectural and Engineering degrees abroad. Improved tracking of these students is being implemented.
- Renewable and sustainable energy practices, e.g., solar thermal hot water, photovoltaic energy, and wind power, were incorporated in all aspects of the educational programs.

- Instructors introduce aspects of green building to the students, focusing on the requirements contained in the National Association of Home Builders (NAHB) “*National Green Building Standards*” as well as the requirements of the U.S. Green Building Council’s (USGBC) Leadership in Energy and Environmental Design (LEED) certifications, related to green building.
- Informational and planning meetings were held with Maui County DOE teachers, principals, and Career and Technical Education coordinators.
- Maui College Construction Academy faculty worked with high school teachers to consistently implement the articulated curriculum.
- Construction Academy faculty members received training, earned certifications and conducted workshops on safety, green design, and sustainability in the construction industry.
- Construction Academy faculty were guest speakers at events such as the 2010 Hawai`i Science, Technology, Engineering and Math (STEM) Conference, facilitating the introduction and guidance of students to the CA program, as well as the possibilities of post-secondary education and training in the construction, engineering and alternative energy trades.
- The Construction Academy counselor has regularly visited all seven high schools, making presentations in individual CA classes, assisting students with academic planning and goal setting, and answering questions about such things as financial aid, skills testing, and student housing.
- Portfolios were printed, assembled, and distributed to participating high school students for use as part of the assessment practices for the program’s student learning outcomes.
- Construction Academy students participated in shadowing programs at Maui College during DOE breaks, improving the students’ awareness and understanding of post secondary programs at Maui College.
- All Maui College Construction Academy positions funded by the State Legislature in 2006 remain filled by qualified personnel:

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	<u>FTE Position Allocated</u>	<u>FTE Position Filled</u>
Home-based Instructors	4	4
Traveling teacher	1	1
Clerical	1	1
Counselor	1	1

Although three of the high schools are located far from Maui College’s Kahului campus and must be reached by plane (Moloka’i), boat (Lana’i), or a long automobile trip over a winding road (Hana), their programs are thriving. Construction Academy instructors present classes that are designed to meet the needs of the individual communities, and all classes are taught according to the professional standards in the articulation agreement.

The close, cooperative relationship between Construction Academy instructors and Sustainable Construction Technology instructors at Maui College continues to benefit both of the programs and the students, maintaining articulation and promoting post secondary education.

**Maui County High School 2010-11 Registration in Construction Academy Programs**

	TIU5800 (B&C 1)	TIN5814 (B&C 2)	TIN5100	TIK5930	TIU5310 (Draft1)	TIN5320 (Draft2)	TIL5100	TIK5930	Female (B&C)	Female (Drafting)	Special Education
Baldwin	70	28			24				8	7	8
Hana	6	1							1		4
King Kekaulike	18	10			11				7	3	5
Lahainaluna	24	3	2	1	29	33	1	4	4	19	8
Lana’i	20	10				1			2		1
Maui High	49	20							3		16
Moloka’i	10	2			3				1		2
Total	197	74	2	1	67	43	1	4			
Total CA Students	389										

**KAUAI COMMUNITY COLLEGE**

Participation:

The student enrollment for the high schools on Kauai totals 114 students and 35 students in the program are seeking the college credit offered as they are looking to attend college. In addition 36 students have stated that they will be seeking employment in a trade related construction field.

Kauai CC has a total of six females in its programs, two at Waimea High School and four at Kapaa High School.

Kapaa High School enrollment in Construction Academy classes has increased mainly due to a new Drafting Technology 1 course involving blueprint reading and introduction to AutoCAD. There are two classes of Building and Construction -1.

KAPAA HIGH SCHOOL	
COURSE	STUDENTS
BUILDING & CONSTRUCTION – 1	38
BUILDING & CONSTRUCTION – 2	0
DESIGN TECH 1	21
TOTAL STUDENTS	59

Kauai High School’s involvement with the program is continuing to decline, with the school’s attention to other areas of education. There has been some interest in our Design Tech 1 course; however, due to the number of periods and student obligations regarding diploma requirements, Kauai has not been able to offer courses at the school this year.

Waimea High School enrollment has some increases in number and diversity this year. With the addition of the design Technology 1 course, Kauai CC has deployed three different courses that provide a path to Kauai CC offering dual credit.

WAIMEA HIGH SCHOOL	
COURSE	STUDENTS
BUILDING & CONSTRUCTION – 1	38
BUILDING & CONSTRUCTION – 2	0
DESIGN TECH 1	15
TOTAL STUDENTS	53

Equipment:

The equipment to the schools has been distributed and has been completed along with an evaluation of the condition of the equipment. The equipment maintenance program has been imbedded in the construction academy program and is working well. Only minor issues with a limited number of tools in regards to safety and performance have occurred. The acquisition of some additional equipment to minimize risk in working with the students has allowed faculty to widen the scope of their curriculum. Maintaining a safe work environment is still an ongoing challenge. Materials and equipment are being ordered and staged at Kauai CC, and the college is distributing these as needed to each school. Training for the DOE Industrial Arts teachers from the schools at Kauai CC along with conducting general coordination and informational meetings, is proceeding, although due to budget issues, challenges in this area remain.

The introduction of AutoCAD, along with a portable computer lab, has allowed Kauai CC to enhance all classes at the high schools by providing an additional resource and tool for the students.

Special Projects:

Over the past year, we have brought to the Building & Construction 2 class a capstone project: a student built building. From the foundation (including the site location), layout, and construction of the various building systems, the students are engaged in the process and have demonstrated the application of the training they received in the construction of the building. The project will be ongoing as new classes will be involved with additions, alterations, and maintenance of the building. In addition, the project provides an opportunity to invite community members involved in construction to offer comments and criticism. This project also offers an opportunity to expose the

students to the building codes as well as both green and sustainable methods. The Construction Academy program assists the students at the high schools to meet their community service obligations. In the past, the students have built benches and tables using donated materials that the high school seniors prepared for the middle school students to do the final assembly within their limits of skills, abilities, and acceptable tasks. This year Kauai CC is continuing the project, for it allows students to accomplish, on their own, the projects that they are involved in. The students come to the campus after school and work under the supervision of the Construction Academy instructors.

Kauai CC continues to have a strong relationship with the local carpenters' union. Union members have been tremendous supporters of the program by visiting schools, reviewing the students' work, and offering constructive criticism to the students. The students are required to maintain and record their work in a portfolio; the union representatives have let the students know the value of the portfolio as a resume building artifact. These visits provide the students an opportunity to talk and interact with professionals in the industry.