

UNIVERSITY OF HAWAI‘I SYSTEM ANNUAL REPORT



REPORT TO THE 2016 LEGISLATURE

Annual Report on
The Construction Academy Curriculum

HRS 304A-1144

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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 CC partnered with eight Department of Education high schools on O'ahu—Kahuku, Kailua, McKinley, Mililani, Pearl City, Radford, Waipahu, and Waiialua—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 with education and construction 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 Honolulu CC to request its assistance in educating and training a greater number of qualified construction workers. In a true industry-education partnership, Honolulu CC, 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 session 2006, 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, Kaua'i, and Maui Community Colleges.

THE CONSTRUCTION ACADEMY

Partnerships between Community College campuses and the local high schools remain strong. Matriculation to local Community Colleges is strong. Over half of the students in Hawai'i CC's first year carpentry students are Construction Academy participants. Of the 500 seniors serviced by the Honolulu CC's Construction Academy program, 229 (56.7%) were admitted to a University of Hawai'i (UH) System campus after graduating high school. Of the 229 students, 34.5% were admitted to Honolulu CC.

Participating High Schools

Hawai'i Community College		Honolulu Community College		Kaua'i Community College
Kea'au	Konawaena	Aiea	McKinley	Kapa'a
Kohala	Pahoa	Campbell	Nānākuli	Kaua'i
	Waiakea	Farrington	Pearl City	Waimea
		Kaimuki	Radford	
		Kahuku	Roosevelt	
		Kapolei	Wai'anae	
		Leilehua	Waipahu	
		Mililani		
Enrollment: 321		Enrollment: 1,111		Enrollment: 169

The statewide implementation of the Construction Academy model continues to build and strengthen their relationships with the high schools and community. Remaining flexible to the individual needs of each high school and its surrounding communities remains an essential element of implementation.

Students participating in the Construction Academy Program will be able to:

- Make informed career choices regarding potential employment in the construction industry.
- Exhibit an understanding of employment expectations in the construction Industry.

Each campus will work with their respective administration to assure that the program is part of the campus program review process to inform the campus on its progress. All participating campuses agreed to continue with the current articulation agreements until a new agreement is drafted and approved. 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 apprenticeship training. The University of Hawai'i Community Colleges (UHCC) currently administers the Related Instruction component of apprenticeship training for most of the non-union and union construction industry apprenticeship programs. Apprenticeship training is undeniably an expensive endeavor that can strain campuses' budgets and tax facilities and equipment. To meet the building industry's on-going need for high quality training, the Colleges' apprenticeship programs must have access to adequate resources and services. The general fund appropriations received included allocations for support staff, lectureship costs and supplies and equipment.

Enrollment for the 2015-2016 academic year is expected to surpass 2,700 apprentices. Apprenticeship registration levels continue to be robust as the need for strong apprenticeship programs that provide the required training for the State's construction workforce has not diminished.

The funds earmarked for lectureship costs helped Honolulu CC employ a staff of approximately 171 instructors. During the past academic year, wages for approximately 20,534 instructor hours (532 apprenticeship classes) were paid with these funds. The other campuses did not receive allocations for lectureship so instructors' payroll had to be funded from other sources.

Despite the downward trend in the last few years, as compared to a decade ago, apprenticeship enrollments remained elevated at the Honolulu CC this past year and are expected to increase in the current academic year. At this point in the Fall 2015 semester, with several weeks still remaining in the term, enrollment is already beyond 1,600. Some programs register students in short-term classes through mid-December so the student count will increase over the next few weeks. In Spring 2016, the Honolulu CC should also experience an increase in apprenticeship enrollments because there have been solid indications of a resurgence in the building industry after the start of the new year (as reported by different training programs and the media), several trade apprenticeship programs recently conducted recruitments and the Honolulu CC and Workforce Development Office are reviewing requests from several sponsors for approval to create their own programs.

Due to the steady streams of apprentices that came to the campuses, shop equipment suffered considerable wear and tear and materials and supplies were a huge expense. The Colleges continued to use their allocations to replace old equipment and tools, purchase new types of equipment to keep pace with technology and replenish shop supplies and materials. This annual funding enabled the Colleges to replace some of their outdated and/or unsafe equipment and purchase different kinds of equipment that programs utilized to expand the scope of their training.

In summary, with the continued funding, the UHCC Apprenticeship Offices were able to satisfactorily meet the training needs of their trade programs. The Assistant Registrar at Honolulu CC continued to work to ensure the accuracy and integrity of apprenticeship records and to improve data gathering and dissemination procedures. The funding for lectureship costs helped the Honolulu CC fund our very full schedules of classes. Allocations for supplies and materials enabled the Colleges to at least partially restock shop consumables that constitute substantial and growing expenses as the costs of materials continue to increase dramatically. Departments were also able purchase equipment and tools to replace old, outdated and/or unsafe models and different types of equipment that were earlier not available for training.

APPENDIX

Hawai'i Community College

Enrollment at Participating High Schools

School Year	13-14	14-15	15-16 (% change)
Participating High Schools	9	9	5
Building & Construction 1	146	160	133 (↓17%)
Building & Construction 2	61	28	68 (↑59%)
Drafting Technology 1	61	69	86 (↑20%)
Drafting Technology 2	14	8	34 (↑76%)
Total	278	265	321 (↑17%)

Construction Academy classes on the island of Hawai'i are offered at five high schools. Enrollment has increased by a total of 17% from 2014-15 to 2015-16 with individual class enrollment increase ranges from 17% to 76%. Graduates of the Construction Academy articulate to the UHCC Community College system and apprenticeship programs, fulfilling the vision of the program. Construction Academy alumni are enrolled in a variety of programs at the college. At present it is challenging to determine overall matriculation to the College, however, for the 2015-16 academic year, 6 of the 15 students enrolled in Hawai'i Community College's first year carpentry program are graduates of the Construction Academy. 2014-15 enrollment figures showed a slight overall decrease in enrollment; however the latest data show 2015-16 enrollment numbers to be the highest in three years. This is likely a reflection of the recent uptick in Hawai'i Island's economy and construction activity. Anecdotally, there is a strong desire at many of the high schools to increase the number of CTE programs offered. Increased enrollment in Construction Academy is a good indicator that CTE programs are still sought after in the high schools.

Safety, math, and construction terminology/concepts continue to be priorities of the program and are consummated with hands-on learning. Construction Academy faculty have articulated student learning outcomes and assessments with the Carpentry program at Hawai'i Community College.

The Construction Academy program has been well-received by Hawai'i Island high schools since its inception. Hawai'i Community College continues to foster these relationships and build new ones. The slowdown in construction experienced over the last several years has not slowed down the program's efforts. Construction Academy personnel continue to recruit students and expand offerings, promoting the idea that the skills learned through the Academy will benefit students throughout their life, regardless of their career choice.

The Construction Academy has home-based instructors in five high schools with 5 FTE instructors in non-tenure track positions. Our Construction Academy faculty are highly

valued members of the high schools where they teach. As instructors they provide high quality educational experiences, promoting skill development in both technical and academic areas. As community college faculty, they introduce post-secondary education to individuals who might otherwise never consider going to college. They provide school and community service, are engaged in college activities, and seek out professional development opportunities. They share their construction expertise, assisting with special projects at the College and high school when appropriate. They make the schools they serve a better place. They change lives for the better.

Honolulu Community College

For the 2014–2015 school year, the Honolulu CC Construction Academy offered three Department of Education courses at 15 O‘ahu high schools—Aiea, Campbell, Farrington, Kahuku, Kaimuki, Kalaheo, Kapolei, Leilehua, McKinley, Mililani, Nānākuli, Pearl City, Radford, Roosevelt, and Waipahu.

Of the 1,111 students that were serviced, 738 (66.4%) of the students were enrolled in *Building & Construction Technology 1*; 237 (21.3%) in *Building & Construction Technology 2*; and 136 (12.2%) in *Design Technology 1* (Table 1).

Table 1. Course Enrollment—Number of Students Serviced by Course

Course Name	Student Count	%
Building & Construction Technology 1	738	66.4%
Building & Construction Technology 2	237	21.3%
Design Technology 1	136	12.2%
TOTAL	1,111	99.9%

The program had a gender demographic of 128 (11.5%) females and 983 (88.5%) male (Table 2).

Table 2. Student Demographics—Gender

Gender	Student Count	%
Female	128	11.5%
Male	983	88.5%
TOTAL	1,111	100.0%

Matriculation of Students into the UH System

Three quarters (75.1%) of the students serviced were juniors and seniors (*Table 3*).

Table 3. Student Demographics—Grade Level

Grade Level	Student Count	%
9	68	6.1%
10	209	18.8%
11	430	38.7%
12	404	36.4%
TOTAL	1,111	100.0%

Of the 404 seniors serviced by the Academy, 229 (56.7%) were admitted to a University of Hawai'i (UH) System campus after graduating high school; 79 (34.5%) of those students were admitted to Honolulu CC (*Table 4*).

Table 4. Matriculation of CNAC Students into the UH System
*Number of Students Who Matriculated into the UH System by Campus**

UH Campus	Student Count	%
Hawai'i CC	6	2.6%
Honolulu CC	79	34.5%
Kapi'olani CC	42	18.3%
Leeward CC	66	28.8%
UH Mānoa	27	11.8%
UH West O'ahu	4	1.7%
Windward CC	5	2.2%
TOTAL	229	99.9%

*Students who matriculated into the UH System were defined as seniors who were admitted to a UH Campus after graduating from high school (Summer 2015, Fall 2015, or Spring 2016).

Two hundred twenty-two students identified a field of study (seven students are *unclassified* or *undeclared*) among 47 majors (Table 5). Of these 222 students, 66 (29.7%) chose to major in a construction-related field.

Table 5. Matriculation of CNAC Students into the UH System
*Number of Students Who Matriculated into the UH System by Major**

Student Majors	Student Count	%
Accounting	4	1.7%
Administration of Justice	3	1.3%
Aeronautics Maintenance Technology	2	0.9%
Architectural, Engineering and CAD Technologies	4	1.7%
Architecture	1	0.4%
Auto Body Repair & Painting	2	0.9%
Automotive Technology	29	12.7%
Biology	1	0.4%
Business Administration	4	1.7%
Business Technology	1	0.4%
Carpentry Technology	12	5.2%
Civil Engineering	2	0.9%
Computer Engineering	1	0.4%
Computer Science	1	0.4%
Computing, Electronics, & Networking Technology	4	1.7%
Construction Management	1	0.4%
Cosmetology	1	0.4%
Culinary Arts	6	2.6%
Customer Service	1	0.4%
Diesel Mechanics	1	0.4%
Digital Media Production	6	2.6%
Electrical Engineering	1	0.4%
Electrical Installation & Maintenance Technology	10	4.4%
Environmental Design	4	1.7%
Fashion Technology	1	0.4%
Fire & Environmental Emergency Response	5	2.2%
General Arts and Sciences	2	0.9%
General Business	1	0.4%
General---Pre-Business	1	0.4%
General---Pre-Social Work	1	0.4%
Hawaiian Studies	1	0.4%
Hospitality and Tourism---Travel & Tourism Oper Mgmt	1	0.4%
Information & Computer Sciences---Network Support Specialist	2	0.9%
Information Technology	1	0.4%
KRS, Health, & Exercise Science	1	0.4%

Liberal Arts	63	27.5%
Music & Entertainment Learning Experience	4	1.7%
Natural Science	1	0.4%
Natural Science---Engineering	12	5.2%
Plant Biology and Tropical Ag	2	0.9%
Pre-Engineering	8	3.5%
Pre-Psychology	1	0.4%
Refrigeration & Air Conditioning Technology	3	1.3%
Sheet Metal & Plastics Technology	1	0.4%
Teaching	1	0.4%
Unclassified/Undeclared	7	3.1%
Welding Technology	7	3.1%
TOTAL	229	99.10%

*Students who matriculated into the UH System were defined as seniors who were admitted to a UH Campus after graduating from high school (Summer 2015, Fall 2015, or Spring 2016).

Construction-Related Majors

Table 6 lists the degrees and certificates sought by the students who matriculated into the UH System. Of 229 students, 5.7% are pursuing *certificates*, 78.2% *associate* degrees, 12.7% *bachelor* degrees, and 0.4% *doctorate* degrees.

Table 6. Matriculation of CNAC Students into the UH System
*Number of Students Who Matriculated into the UH System by Degree & Certificate Sought**

Degree/Certificate	Student Count	%
Associate of Arts	65	28.4%
Associate in Applied Science	70	30.6%
Associate in Science	44	19.2%
Bachelor of Arts	9	3.9%
Bachelor of Business Administration	1	0.4%
Bachelor of Environmental Design	4	1.7%
Bachelor of Science	15	6.6%
Certificate of Achievement	12	5.2%
Certificate of Completion	1	0.4%
Doctor of Architecture	1	0.4%
Non-Degree	7	3.1%
TOTAL	229	99.9%

*Students who matriculated into the UH System were defined as seniors who were admitted to a UH Campus after graduating from high school (Summer 2015, Fall 2015, or Spring 2016).

Summer Program 2015

The Honolulu CC Construction Academy held its 2015 Summer Program from June 8, 2015 through July 9, 2015. The Summer Program engages high school students, who will be entering grades 10–12 and recent 2015 graduates, in hands-on activities that will give them insight to the careers, educational pathways, and opportunities available in various facets of the construction industry.

First-time Summer Program students participated in *Exploring the Trades* which exposed them to four industry specialties (architectural, engineering, and CAD technologies; carpentry; sheet metal; and welding). Students spent one week learning about each trade where they learned about tool and shop safety; tool, equipment, and material identification; and trade-specific techniques that are used in the industry.

Returning Summer Program students enhanced the construction skills they acquired last year through more in-depth and advanced instruction in carpentry, plumbing, and welding.

This summer, 37 students (69.8%) were enrolled in *Exploring the Trades*; and 16 (30.2%) in *Advanced Carpentry, Plumbing, and Welding*.

Content area instruction was facilitated by Honolulu CC faculty who specialize in each trade. Where available, Honolulu CC faculty who regularly teach on campus were utilized as the content area instructors. This proved to be advantageous for both the program faculty and the students because: 1) they were able to develop instructor-student relationships; 2) students learned about the program from the actual (Honolulu CC) program instructor; and 3) the program faculty were able to personally promote their programs and trades to a captured audience.

To help students develop an identity with fellow students and faculty, students were grouped into cohorts and assigned to a Honolulu CC instructor who served as their “mentor” throughout the course of the program.

The Honolulu CC Job Placement Coordinator also engaged Construction Academy Summer Program students in workshops focused on appropriate business etiquette while highlighting employability skills that are typically valued by employers. They also learned about on- and off-campus employment resources available to Honolulu CC students.

Each of the 2015 high school graduates also met individually with an *Outreach/ Admissions Specialist* who helped them take the next step in making their post-high career or educational goals a reality.

The objectives of the Honolulu CC Construction Academy Summer Program are to:

1. **Engage Student Learning:** Offer students a learning opportunity where they can experience applied instruction in various construction-related fields.
2. **Build Relationships:** Develop relationships with participants to aid in the matriculation of students into the UH System, particularly Honolulu CC.

- 3. Offer Professional Development Opportunities:** Due to the distribution of instructors at various high schools on O‘ahu and the variance in school schedules, it is difficult to offer professional development opportunities during the school year to Honolulu CC Construction Academy instructors. Through this summer program, “mentor” instructors rotate through each trade along with their assigned cohort. This allows them to refresh their knowledge about each trade, learn about the program offerings at Honolulu CC, and observe various instructional styles or ways of presenting curriculum all while servicing the summer program participants.

The 2015 Summer Program afforded 53 high school students from various public high schools on O‘ahu the opportunity to learn about the construction industry. Of these students, 30 (56.6%) were 2015 high school graduates; 10 students (18.9%) were female; and 20 students (37.7%) were of Native Hawaiian descent.

Twenty (66.7%) program participants who recently graduated high school were admitted into the University of Hawai‘i System during the Fall 2015 semester; of the students who matriculated into the University of Hawai‘i System, 18 students (90.0%) were admitted to Honolulu CC.

**KAUA'I COMMUNITY COLLEGE
2015 Construction Academy Report**

Participation:

The forecast student enrollment for the high schools on Kaua'i totals 169 students from our three high schools. In the Building and Construction courses the total number of students is 110 and 43 students are seeking the college credit offered as they have indicated that they will be seeking college enrollment. In the AutoCAD and the Technical Drawing courses we have 59 students and 40 have stated that they will be seeking the college credit offered as they have indicated that they will be seeking college enrollment. In addition, out of the number of students indicating their plans for college, 26 have stated their choice to be Kaua'i Community College. There are a total of 12 females in our programs; 1 at Waimea High School, 4 at Kaua'i High School, and 7 at Kapa'a High School.

KAUA'I HIGH SCHOOL ENROLLMENT	
HIGH SCHOOL	STUDENTS
KAPA'A HIGH SCHOOL	100
KAUA'I HIGH SCHOOL	45
WAIMEA HIGH SCHOOL	24
TOTAL STUDENTS	169

Kapa'a High School enrollment in Construction Academy classes' remains strong. The students are completing their course assignments in one semester and are attending each class every day for 143 minutes. There is one class of Building and Construction -1, and one class of Building and Construction -2, next semester we will have a Design Tech -1 and a Design Tech -2 course and a Building and Construction -2 course.

KAPA'A HIGH SCHOOL	
COURSE	STUDENTS
BUILDING & CONSTRUCTION -1	48
BUILDING & CONSTRUCTION -2	23
DESIGN TECH -1	11

KAPA'A HIGH SCHOOL	
COURSE	STUDENTS
DESIGN TECH -2	18
TOTAL STUDENTS	100

Kaua'i High School is fully participating in the Construction Program. We are working with the teacher, assisting him with understanding our curriculum, and providing both guidance and materials for his class in Building and Construction - 1, a class of 19 students, and a class in Design Tech -1, a class of 21. In addition, we are working with 5 students in the Building and Construction -2 course.

KAUA'I HIGH SCHOOL	
COURSE	STUDENTS
BUILDING & CONSTRUCTION - 1	19
BUILDING & CONSTRUCTION - 2	5
DESIGN TECH 1	21
TOTAL STUDENTS	45

Waimea High School enrollment has a modest increase this year, and the school remains supportive as they struggle with budget restrictions. We are offering two different courses now that provide a path to KCC dual credit, and a BC-2 course, and a Drafting Tech -1 course.

WAIMEA HIGH SCHOOL	
COURSE	STUDENTS
BUILDING & CONSTRUCTION - 1	12
BUILDING & CONSTRUCTION - 2	3
DESIGN TECH 1	9
TOTAL STUDENTS	24

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Equipment:

The equipment to the schools has been distributed and has been completed along with an evaluation of the condition of the equipment after completing our seventh year. Annually we inspect all of our tools and equipment refurbishing or replacing damaged items. The equipment maintenance program that we have imbedded in the construction academy program is working satisfactorily; we have had to replace some hand tools as well as a small amount of power tools to maintain our standards in regards to safety and performance. The acquisition of some additional equipment to minimize risk in working with the students has allowed us to broaden the scope of our curriculum. Maintaining a safe work environment is still an ongoing challenge. A substantial portion of the annual budget is spent in safety equipment for the students; this includes work gloves, safety glasses, ear protection, dust masks, and hardhats. In the Building and Construction classes we have an ongoing challenge with the class sizes of the high schools, the high schools are understanding and cooperative in our maintaining a safe ratio of students to instructors. Materials and equipment are being ordered and staged at Kaua'i CC, and we are distributing them as needed to each school. Our training for the DOE Industrial Arts teachers from the schools at Kaua'i CC along with conducting general coordination and informational meetings is ongoing, providing a path of communication between all of us, although due to budget issues, challenges in this area are ongoing. The DOE has been very cooperative in helping us meet with the teachers outside of the classroom.

The AutoCAD program, along with the portable computer lab, still allows us to enhance all of our classes, and we have introduced both scale modeling and 3D modeling at the high schools in the Drafting Tech -1 course. This introduction is providing an additional resource and tool for the students to work with. We are currently offering classes of Design Tech-1 at all the High Schools. The 3D printers are being introduced to the students in the Design Tech -1 courses, the students are introduced to 3D modeling software and the file conversion to the printer required file structure. Printer maintenance and care instructions are covered along with the safe operation of the equipment, awareness to the extremely high temperatures that are present during the printer operation.

We introduced the Drafting Tech students to Arduino microcontroller programming and circuit design this year. This is helping us expand our offering to the high schools involving the Electronics Program at Kaua'i CC, allowing the students to experience this technology and the career paths that are available.

Special Projects:

Over the past year, in cooperation with the Division of Wildlife, we completed the project involving all three schools. The project was constructing Kiosks to be used at various locations on the island as information stations for visitors. Last year the students were involved with the construction, site preparation, and setting of the Kiosks at their locations. This year the students in the Building and Construction classes at Kapa'a High School are preparing concrete pad sites for future classes to construct picnic tables. Kapa'a High School Alumni Association is funding this project, supplying the concrete, rebar, and wire mesh for the pads. The students prepare and level the pad site, mix the concrete, pour and finish the cement. They are learning how to work with the material and the tools necessary for a successful project. The students calculate the volume of concrete needed, along with calculating the area and perimeter of the concrete slab to provide a complete material list.

Waimea and Kaua'i High Schools are involved in building the set props for Kaua'i CC performance of the play "Carnival". The students in the Drafting Tech classes at Waimea and Kaua'i High Schools designed the different stage props, generating both 3D diagrams of the set and dimensioned

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drawings for the Building and Construction students to fabricate the various items. These range from three large circus wagons, a puppet cart, and other assorted stage props.

In the BC-1 classes we are introducing renewable energy into the curriculum; we have small photovoltaic modules, charge controllers, batteries, and some small equipment to operate on the power generated by the system. The students are introduced to some basic electrical theory, and are given instruction on reading sun charts, and energy production based on available solar resources. Energy efficiency and energy conservation measures are introduced to the students.

The Construction Academy program continues to provide assistance to the students at the high schools as mentors, to meet their community service obligations involving their Senior Projects. In addition we work with the Boy Scouts providing mentoring and guidance as the Scouts attain a variety of badges in building and construction related areas.

We are continuing a strong relationship with the local Carpenters Union. They have been a tremendous supporter of our program, providing school visits to offer a walk-through of the students' work, and constructive criticism to the students. The students are required to maintain and record their work and progress in a portfolio. The representatives have let the students know the value of this and guided the students to hold on to that, as it is a resume of their ability. These visits provide the students an opportunity to talk, interact and experience actual job site processes with the carpenters working in the industry. Our tools and equipment are shared with the apprenticeship program on the weekends; this affords us an opportunity to maintain our strong relationship. This year again we received additional requests from the local carpenters union for a recommendation for some of our students to enter into the apprenticeship program; we are receiving excellent comments back on their performance.