

ENROLLMENT PROJECTIONS
UNIVERSITY OF HAWAI'I SYSTEM
FALL 2013 TO FALL 2018

Institutional Research and Analysis Office
University of Hawai'i System
July 2013

**ENROLLMENT PROJECTIONS
UNIVERSITY OF HAWAII
FALL 2013 TO FALL 2018**

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ENROLLMENT PROJECTIONS THE UNIVERSITY OF HAWAI'I FALL 2013 TO FALL 2018

INTRODUCTION

This report provides a summary of the enrollment projections for the campuses of the University of Hawai'i system: the University of Hawai'i at Mānoa, the University of Hawai'i at Hilo, the University of Hawai'i-West O'ahu, and the University of Hawai'i Community Colleges: Hawai'i, Honolulu, Kapi'olani, Kaua'i, Leeward, Maui College, and Windward. Details of the enrollment projections by campus may be found in the separate reports by UH unit (UH Mānoa, UH Hilo, UH-West O'ahu and the UH Community Colleges).

The enrollment projections are based upon unduplicated headcounts of students enrolled in credit courses. Included are classified students in programs leading to a degree as well as unclassified students. Special students (early admits) have been included for all years, both historical and projected. Historical data are included in the tables and charts to facilitate comparison and analysis. They were extracted from the student enrollment, academic crossover, and course registration data files.

The projections are statistical extrapolations of current trends in enrollment by campus. They do not set enrollment targets and, in general, do not take into consideration planned or potential changes in University or campus policies or procedures. They should be considered as an extension into the future of current enrollment trends.

Beginning this year, the projection reports also make use of a time series analysis conducted by UH IRAO office staff that incorporates a variety of economic and demographic factors. This model has been used to guide and validate the projection methodology for the system-wide enrollment projections. ARIMA (time series) projections were made by UH unit. The analysis is attached to this report as an appendix.

PROJECTION METHODOLOGY

The projections for classified undergraduates are sub-divided by registration status (also called student type): first-time, transfer, returning and continuing. Graduate and unclassified student enrollments are forecast separately. The projection methodology makes use of continuation rates as well as ratios, trends and constants. The specific methods used and assumptions made in forecasting enrollments vary for each campus. Details are found in the separate enrollment projection reports by UH unit.

The projection reports by unit have charts (Figure 3 in this report) which illustrate visually the upper and lower forecast boundaries. These boundaries are based upon the observed average percentage error in the forecast, as measured over the most recent ten year period. Note that the forecast error increases with time. For the UH system as a whole, the 1-year forecast error has averaged 1.9%, while the 6-year forecast error has averaged 7.7%. The projected numbers given here may be considered mid-level forecasts.

Table 1 presents historical and projected enrollments for each campus and for the UH system in aggregate from Fall 2007 to Fall 2018. Historical and projected enrollment by registration status at the UH system level are presented in Table 2. Annual percentage change in enrollment by campus is shown in Table 3. Table 4 provides enrollment indexes, useful for comparing across campuses, calculated using Fall 2012 as the base year. (An enrollment index is illustrated for the UH system in Figure 2 and for each UH unit in Figures 5 to 8.) Tables 5 and 6 show projected student semester hours (SSH) offered and full-time equivalent (FTE) course enrollment served, respectively. Projected enrollments by attendance status (full-time / part-time) are given in Table 7. Appendix A shows historical and projected enrollments of Hawai'i public high school seniors by geographic district. Appendix B gives forecasts of Hawai'i public and private high school graduates through academic year 2027-28.

ANALYSIS AND DISCUSSION

- Headcount enrollment for the University of Hawai'i measured 60,295 in Fall 2012, a very slight (0.1%) decrease from the previous fall semester (Tables 1 & 3 and Figures 1 & 4). Enrollment increased at five campuses: UH-West O'ahu (20.2%); Kaua'i CC (4.3%); Windward CC (1.3%); Leeward CC (0.8%); UH Hilo (0.4%). Enrollment declined at five campuses: UH Mānoa (<-0.1%); Honolulu CC (-0.4%); Kapi'olani CC (-1.5%); Maui College (-3.2%); Hawai'i CC (-6.5%). Overall, the recent period of rapid growth in enrollment appears to have ended.
- **The forecast for the UH system projects a 0.1% decrease for Fall 2013, to 60,292 students, with subsequent annual growth through Fall 2018 averaging 0.4%.** This rate of growth would result in enrollment surpassing 61,500 by 2018 (Table 1). This forecast is lower than the enrollment projection made last year.
- The Hawai'i Department of Education forecast of public high school seniors calls for a 7.9% decline through school year 2015-16, with the number subsequently increasing 5.7% through 2017-18 (Appendix A). The outlook for private high school graduates, as forecast by the Western Interstate Commission for Higher Education (WICHE), is for

graduates to average around 2,760 through 2015-16, then to increase mildly through 2017-18 (Appendix B).

- The going rate (college participation rate) of Hawai'i public high school graduates into the UH system has been stable for the last four years at about 40%, while the private high school going rate has measured between 30% and 33.5% (see the MAPS report entitled: "High School Background of First-Time Students, University of Hawai'i, Fall 2012"). Given the forecasts in seniors and graduates, the first-time freshmen count will be stable to moderately declining through Fall 2016, with subsequent mild growth through Fall 2018.
- Since the admission of lower division students began in Fall 2007, enrollment growth at UH-West O'ahu has picked up. Enrollment has increased 131% since Fall 2006, increasing 20.2% in Fall 2012 alone. The addition of new facilities, which opened in Fall 2012, will help to sustain continued growth for at least the next several years.
- The University of Hawai'i at Hilo is scheduled to open a new undergraduate housing complex in Fall 2013. This complex will add 300 housing units to the current inventory, bringing the total to around 900. This complex is Phase 1 in the University Village development plan, that includes a commercial center, with the goal of creating a college town environment. New housing, along with continued mild growth in graduate level programs, will help to boost enrollment over 4,350 by Fall 2018.
- Classified graduate enrollment at UH Mānoa declined 1.3% in Fall 2011 and another 5.1% in Fall 2012. Further mild decline is anticipated. The decline in graduate enrollment may be offset by increases in undergraduate transfers from the UH Community Colleges, as well as some growth in continuing student enrollment. Overall, enrollment at UH Mānoa is forecast to increase very mildly through Fall 2018.
- Enrollment at the UH Community Colleges grew rapidly from Fall 2006 to 2009, increasing by over 27% in just three years. However, enrollment growth slowed in Fall 2010 and has declined the last two years. One factor for the decrease is the improving labor market (declining unemployment rates), which our model shows has a negative impact on enrollment. The improving labor market may allow more students to opt for work rather than continued post-secondary education. The forecast calls for stability in enrollment for the UHCC system as a whole, with the total remaining above 33,000 through Fall 2018.

SUMMARY AND CONCLUSION

Enrollment for the UH system grew slowly but steadily from the founding of the UH Mānoa campus in 1907 through 1960, when total UH system enrollment measured 7,771 (Figure 4). After that initial period of steady growth, the UH system saw periods of rapid growth through the 1960s and into the early 1970s, from Fall 2000 to Fall 2004, and most recently from Fall 2006 to Fall 2011. During this most recent period of growth, system level enrollment increased by more than 10,300 students (21%), setting a new all-time high of 60,330 in Fall 2011. The decline in enrollment measured in Fall 2012 is the first decrease since Fall 2006.

Despite the decrease in Fall 2012, enrollment for the UH system remains at a very high level historically. Enrollment is forecast to increase further, but at a slower rate and more unevenly across the campuses. Much of the recent growth occurred at the UH Community Colleges. For the next several years, growth will be led by the UH four-year campuses, especially UH West O‘ahu. Furthermore, although mild increase is projected, the current environment includes a stronger possibility of enrollment decline than in the recent past.

University of Hawai'i Credit Students

Figure 1 Historical and Projected Headcount Enrollment

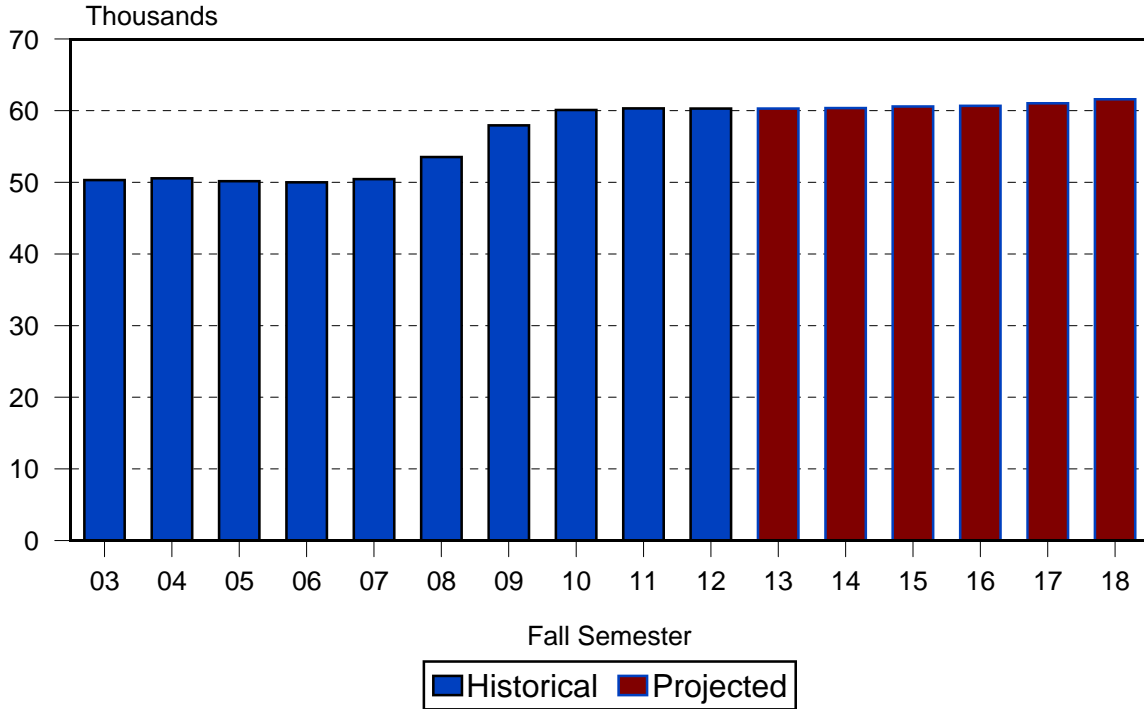
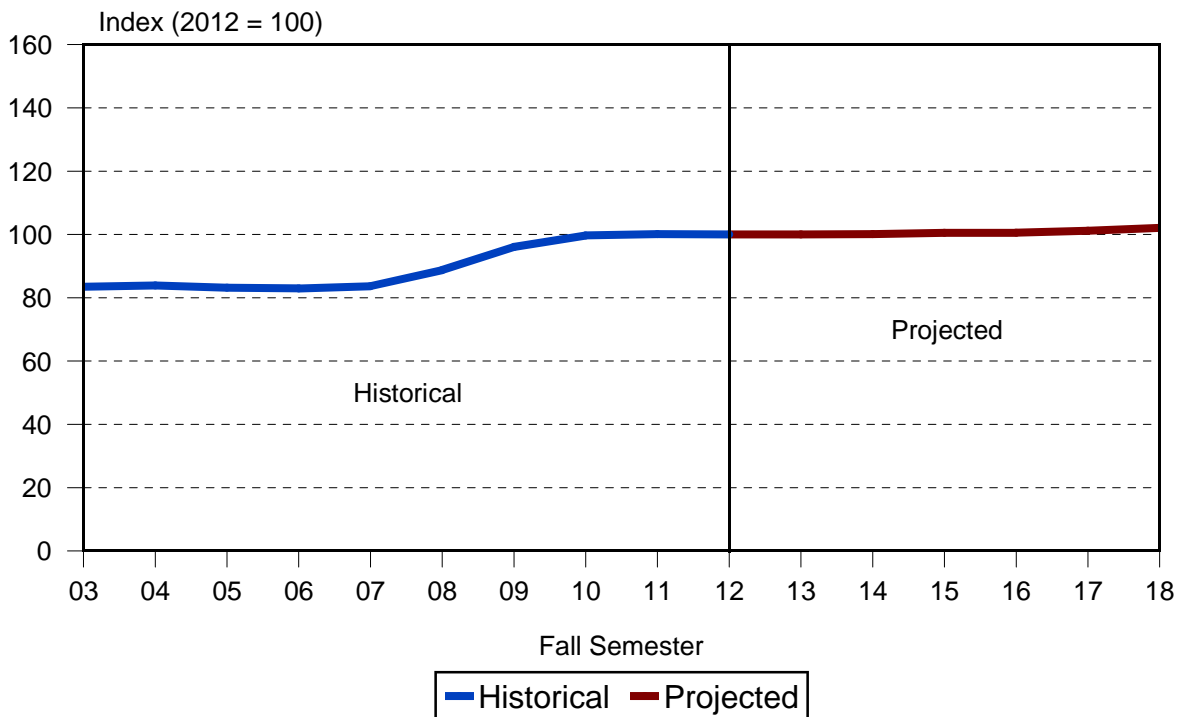


Figure 2 Headcount Enrollment Index - UH System



University of Hawai'i
Credit Students

Figure 3
Projected Enrollment with Error Boundaries

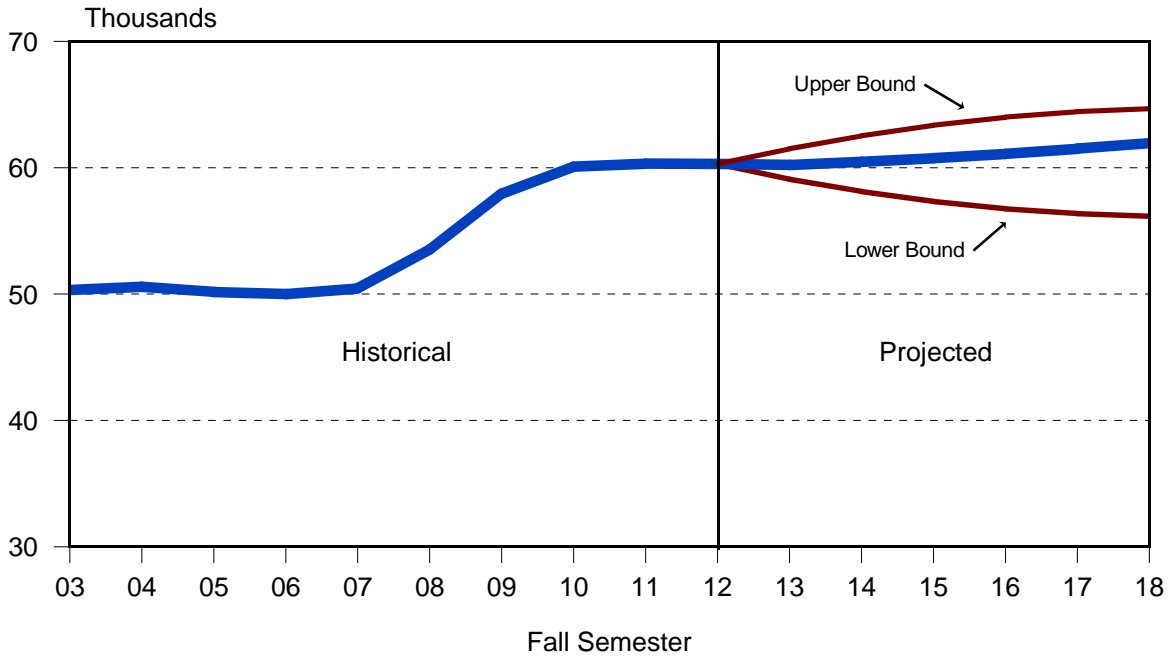
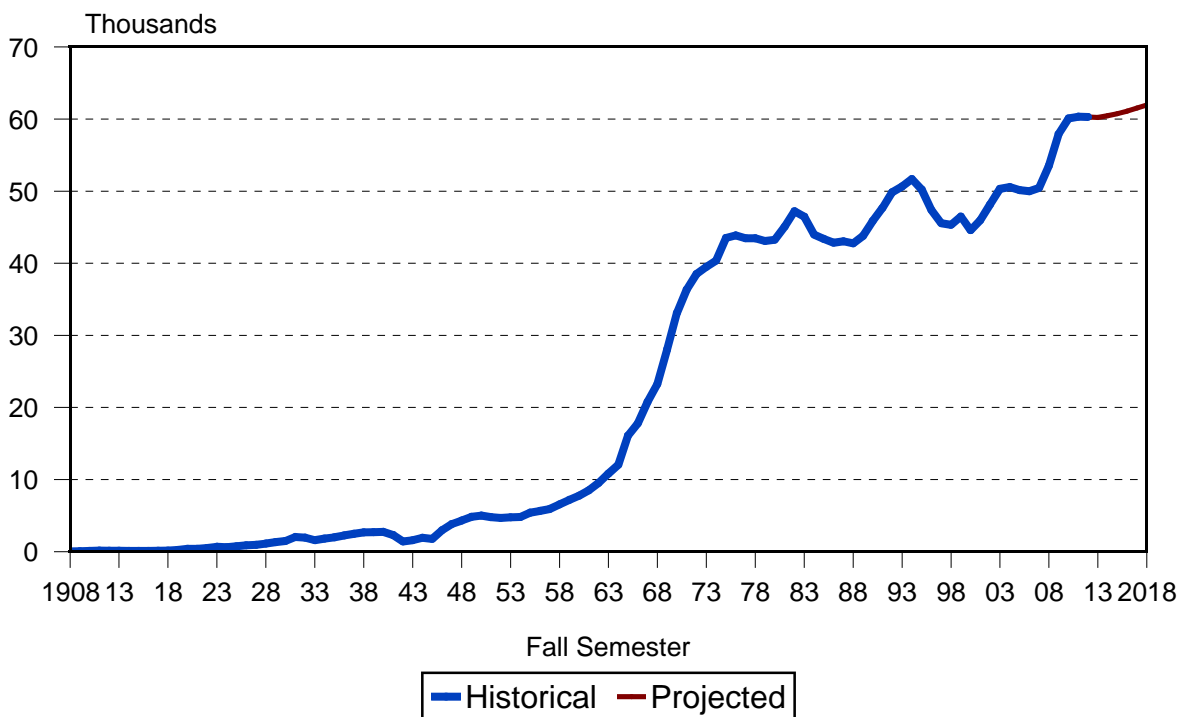


Figure 4
Historical and Projected Enrollment - UH System



University of Hawai'i
Credit Students

Figure 5
Headcount Enrollment Index - UH Mānoa

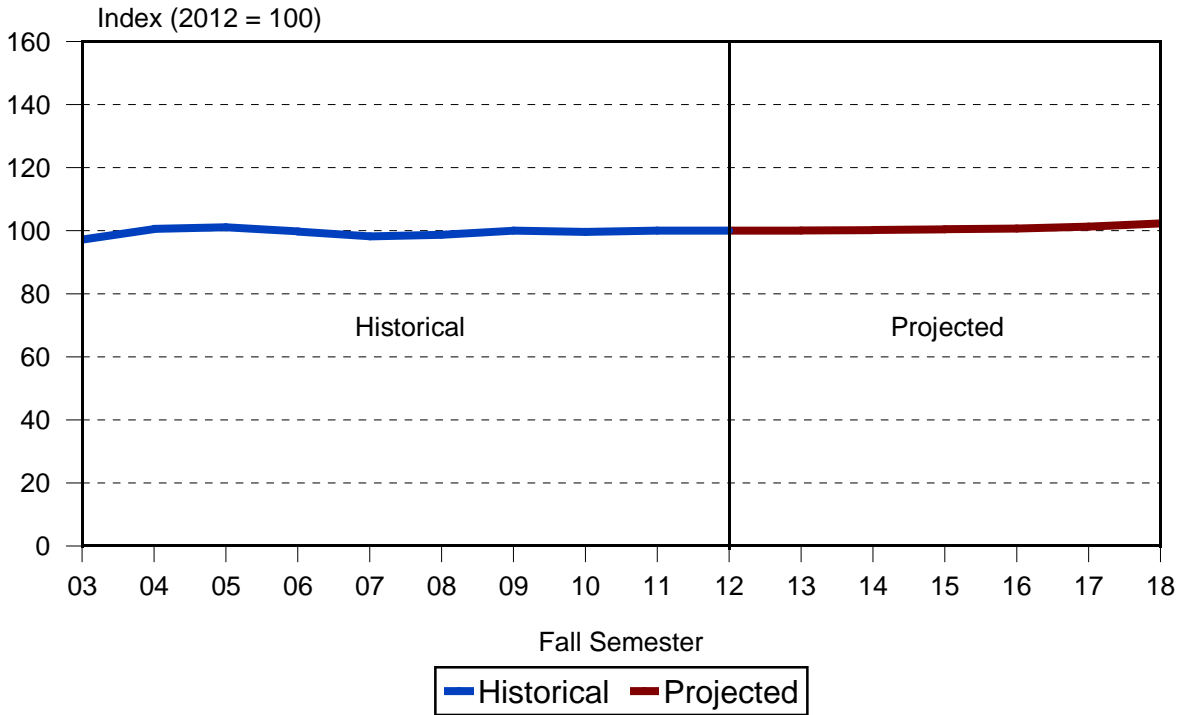
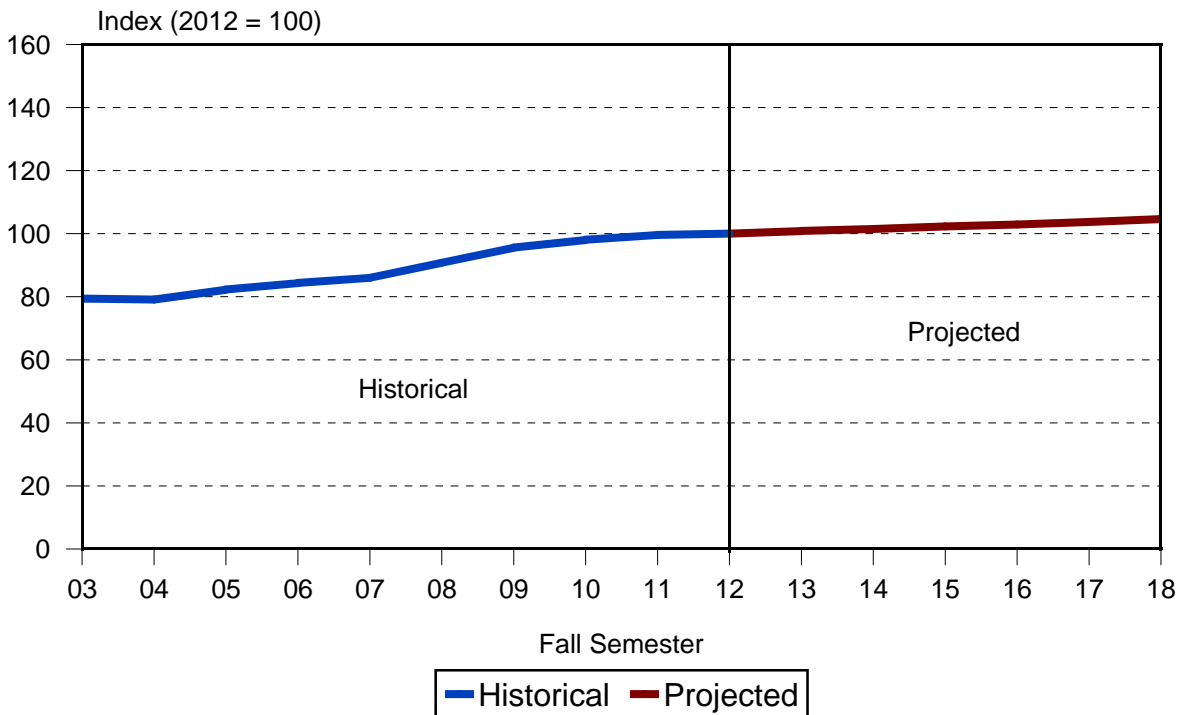


Figure 6
Headcount Enrollment Index - UH Hilo



University of Hawai'i
Credit Students

Figure 7
Headcount Enrollment Index - UH-West O'ahu

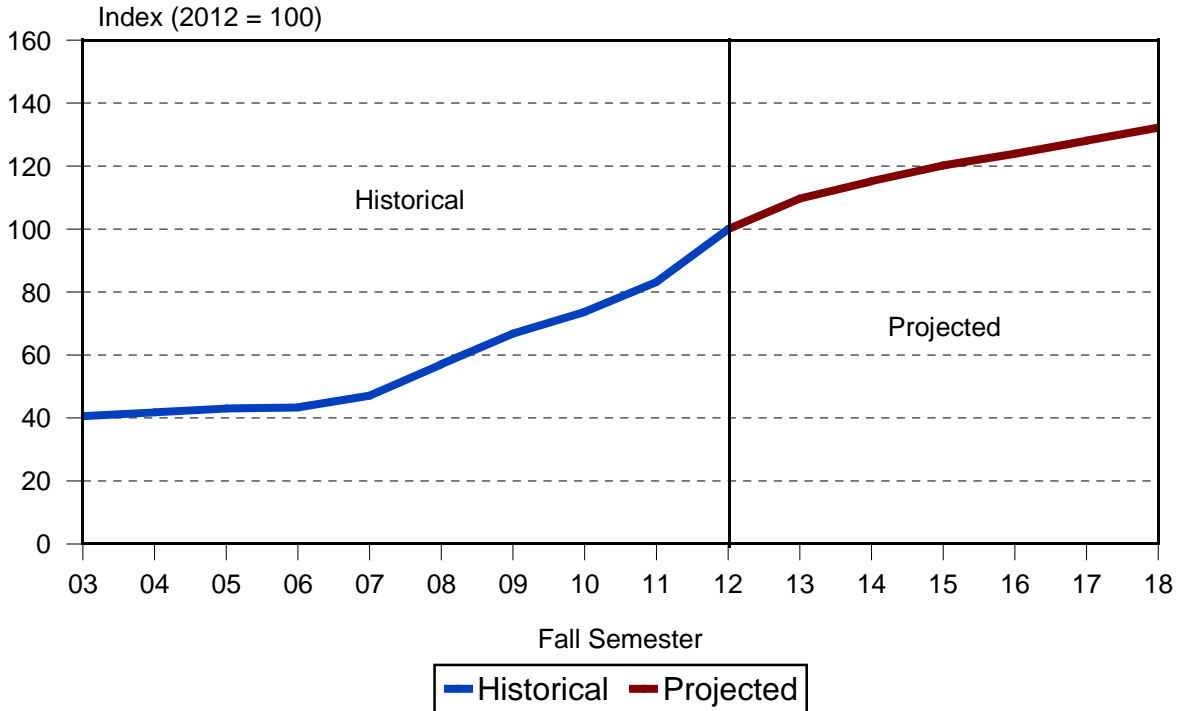


Figure 8
Headcount Enrollment Index - UH Community Colleges

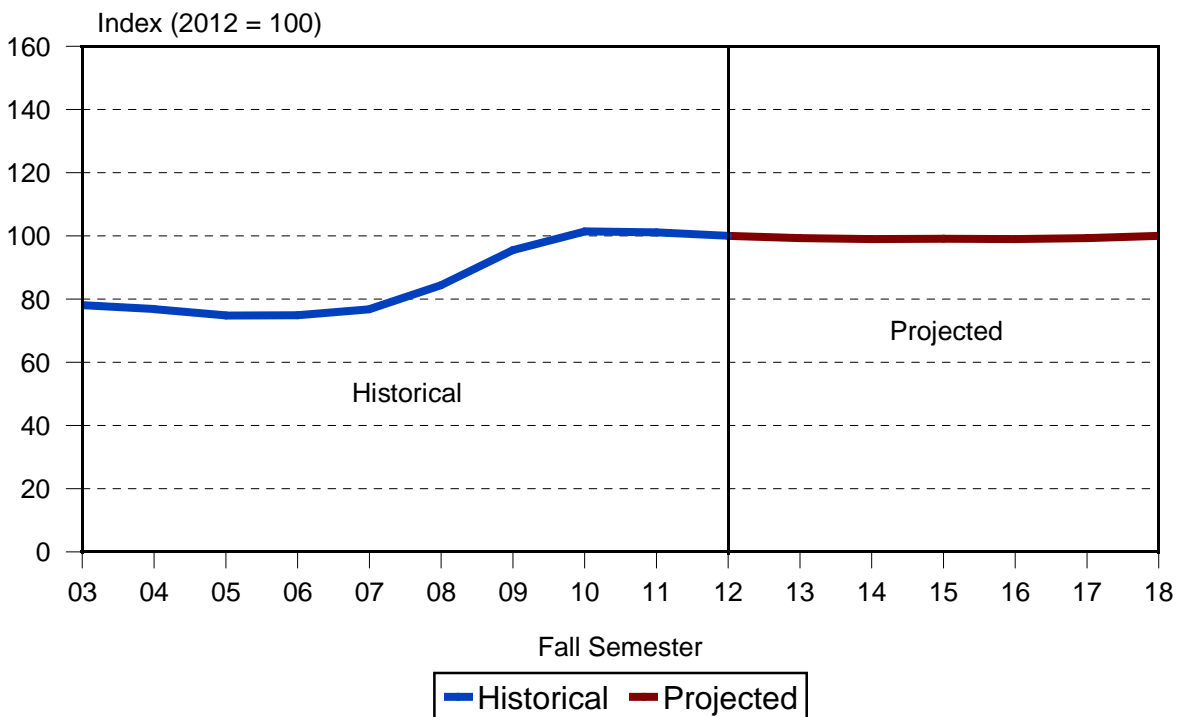


TABLE 1
HEADCOUNT ENROLLMENT OF CREDIT STUDENTS BY CAMPUS
UNIVERSITY OF HAWAI'I
FALL 2007 TO FALL 2018

CAMPUS	HISTORICAL						PROJECTED					
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
UH SYSTEM TOTAL	50,454	53,526	57,945	60,090	60,330	60,295	60,292	60,357	60,593	60,679	61,028	61,588
UH AT MĀNOA	20,051	20,169	20,435	20,337	20,429	20,426	20,437	20,472	20,522	20,562	20,691	20,888
UH AT HILO	3,573	3,773	3,974	4,079	4,139	4,157	4,195	4,221	4,254	4,277	4,312	4,352
UH - WEST O'AHU	940	1,140	1,333	1,471	1,662	1,997	2,190	2,301	2,400	2,475	2,559	2,643
UH COMMUNITY COLLEGES	25,890	28,444	32,203	34,203	34,100	33,715	33,470	33,363	33,417	33,365	33,466	33,705
Hawai'i Community College	2,603	2,884	3,275	3,815	3,917	3,663	3,573	3,539	3,533	3,518	3,522	3,526
Honolulu Community College	4,027	4,218	4,567	4,725	4,600	4,582	4,571	4,569	4,575	4,565	4,564	4,587
Kapi'olani Community College ..	7,517	8,221	9,102	9,301	9,023	8,892	8,806	8,759	8,738	8,693	8,685	8,741
Kaua'i Community College	1,051	1,104	1,345	1,428	1,433	1,495	1,520	1,535	1,548	1,566	1,578	1,585
Leeward Community College	5,887	6,771	7,484	7,942	7,895	7,960	7,918	7,905	7,917	7,909	7,949	8,017
UH Maui College	2,981	3,287	4,114	4,367	4,527	4,382	4,336	4,306	4,340	4,350	4,399	4,461
Windward Community College ..	1,824	1,959	2,316	2,625	2,705	2,741	2,746	2,750	2,766	2,764	2,769	2,788

Note: Headcounts include specials (early admits and concurrent students) for all years.

Source: UH Institutional Research and Analysis Office; July 2013.

TABLE 2
HEADCOUNT ENROLLMENT OF CREDIT STUDENTS BY REGISTRATION STATUS
UNIVERSITY OF HAWAI'I
FALL 2007 TO FALL 2018

EDUCATION LEVEL AND REGISTRATION STATUS	HISTORICAL						PROJECTED					
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
UH SYSTEM TOTAL	50,454	53,526	57,945	60,090	60,330	60,295	60,292	60,357	60,593	60,679	61,028	61,588
Classified	42,431	44,910	48,531	50,717	51,172	51,477	51,609	51,740	51,980	52,076	52,393	52,897
Undergraduates	36,838	38,988	42,322	44,409	44,943	45,544	45,766	45,957	46,244	46,364	46,673	47,142
First-Time Students 1/	7,125	8,136	8,563	8,737	8,579	8,580	8,559	8,534	8,633	8,528	8,711	8,932
Transfer	4,555	4,976	5,738	5,605	5,741	6,105	6,117	6,203	6,289	6,372	6,457	6,534
Returning	2,172	2,211	2,529	2,203	2,296	2,342	2,342	2,344	2,346	2,346	2,348	2,350
Continuing	22,986	23,665	25,492	27,864	28,327	28,517	28,748	28,876	28,976	29,118	29,157	29,326
Graduates	5,593	5,922	6,209	6,308	6,229	5,933	5,843	5,783	5,736	5,712	5,720	5,755
Unclassified & No Data	8,023	8,616	9,414	9,373	9,158	8,818	8,683	8,617	8,613	8,603	8,635	8,691
Undergraduates 2/	3,111	3,082	3,032	2,674	2,564	2,428	2,402	2,391	2,402	2,395	2,407	2,426
Graduates	939	856	804	734	582	547	530	518	511	509	512	520
Home-Based at Other UH 3/ .	3,973	4,678	5,578	5,965	6,012	5,843	5,751	5,708	5,700	5,699	5,716	5,745

Note: Headcounts include specials (early admits and concurrent students) for all years; include continuing education credit enrollments, beginning Fall 1999.

1/ Includes first-time freshmen at UH Manoa and UH Hilo, Includes all first-time classified students at the UH Community Colleges.

2/ Includes records with invalid data on education level.

3/ Students whose home-campus, as defined in Banner / ODS, is not the campus at which they are registered for classes.

TABLE 3
HEADCOUNT ENROLLMENT OF CREDIT STUDENTS BY CAMPUS
ANNUAL PERCENTAGE CHANGE
UNIVERSITY OF HAWAI'I
FALL 2007 TO FALL 2018

CAMPUS	HISTORICAL						PROJECTED					
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
UH SYSTEM TOTAL	0.9	6.1	8.3	3.7	0.4	-0.1	-0.1	0.1	0.4	0.1	0.6	0.9
UH AT MĀNOA	-1.5	0.6	1.3	-0.5	0.5	0.0	0.0	0.2	0.2	0.2	0.6	1.0
UH AT HILO	1.9	5.6	5.3	2.6	1.5	0.4	1.4	0.6	0.8	0.5	0.8	0.9
UH - WEST O'AHU	8.5	21.3	16.9	10.4	13.0	20.2	31.8	5.1	4.3	3.1	3.4	3.3
UH COMMUNITY COLLEGES	2.5	9.9	13.2	6.2	-0.3	-1.1	-1.8	-0.3	0.2	-0.2	0.3	0.7
Hawai'i Community College	10.4	10.8	13.6	16.5	2.7	-6.5	-8.8	-1.0	-0.2	-0.4	0.1	0.1
Honolulu Community College	-2.8	4.7	8.3	3.5	-2.6	-0.4	-0.6	0.0	0.1	-0.2	0.0	0.5
Kapi'olani Community College	3.4	9.4	10.7	2.2	-3.0	-1.5	-2.4	-0.5	-0.2	-0.5	-0.1	0.6
Kaua'i Community College	-6.1	5.0	21.8	6.2	0.4	4.3	6.1	1.0	0.8	1.2	0.8	0.4
Leeward Community College	2.5	15.0	10.5	6.1	-0.6	0.8	0.3	-0.2	0.2	-0.1	0.5	0.9
UH Maui College	4.9	10.3	25.2	6.1	3.7	-3.2	-4.2	-0.7	0.8	0.2	1.1	1.4
Windward Community College	2.4	7.4	18.2	13.3	3.0	1.3	1.5	0.1	0.6	-0.1	0.2	0.7

TABLE 4
HEADCOUNT ENROLLMENT OF CREDIT STUDENTS BY CAMPUS
ENROLLMENT INDEX
UNIVERSITY OF HAWAI'I
FALL 2007 TO FALL 2018

CAMPUS	HISTORICAL						PROJECTED					
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
UH SYSTEM TOTAL	84	89	96	100	100	100	100	100	100	101	101	102
UH AT MĀNOA	98	99	100	100	100	100	100	100	100	101	101	102
UH AT HILO	86	91	96	98	100	100	101	102	102	103	104	105
UH - WEST O'AHU	47	57	67	74	83	100	110	115	120	124	128	132
UH COMMUNITY COLLEGES	77	84	96	101	101	100	99	99	99	99	99	100
Hawai'i Community College	71	79	89	104	107	100	98	97	96	96	96	96
Honolulu Community College	88	92	100	103	100	100	100	100	100	100	100	100
Kapi'olani Community College	85	92	102	105	101	100	99	99	98	98	98	98
Kaua'i Community College	70	74	90	96	96	100	102	103	104	105	106	106
Leeward Community College	74	85	94	100	99	100	99	99	99	99	100	101
UH Maui College	68	75	94	100	103	100	99	98	99	99	100	102
Windward Community College	67	71	84	96	99	100	100	100	101	101	101	102

Note: Fall 2012 = 100.

TABLE 5
STUDENT SEMESTER HOURS OFFERED BY CAMPUS
UNIVERSITY OF HAWAI'I
FALL 2012 TO FALL 2018

	ACTUAL	PROJECTED					
	2012	2013	2014	2015	2016	2017	2018
UH SYSTEM TOTAL	600,890	602,345	603,794	606,623	607,828	611,594	617,473
UH AT MĀNOA	239,675	240,613	241,466	242,428	243,104	244,760	247,208
UH AT HILO	52,834	53,258	53,562	53,956	54,234	54,662	55,160
UH - WEST O'AHU	18,332	20,161	21,198	22,129	22,815	23,617	24,425
UH COMMUNITY COLLEGES	290,049	288,313	287,568	288,110	287,675	288,555	290,680
Hawai'i Community College	34,317	33,500	33,173	33,116	32,969	33,008	33,042
Honolulu Community College	39,187	39,116	39,106	39,145	39,048	39,039	39,247
Kapi'olani Community College	74,228	73,608	73,263	73,119	72,734	72,671	73,184
Kaua'i Community College	12,975	13,252	13,409	13,534	13,696	13,809	13,868
Leeward Community College	68,784	68,790	68,853	69,039	68,999	69,346	69,947
UH Maui College	38,512	38,019	37,734	38,007	38,103	38,521	39,074
Windward Community College	22,047	22,028	22,030	22,150	22,126	22,161	22,318

TABLE 6
FULL-TIME EQUIVALENT COURSE ENROLLMENT SERVED BY CAMPUS
UNIVERSITY OF HAWAI'I
FALL 2012 TO FALL 2018

	ACTUAL	PROJECTED					
	2012	2013	2014	2015	2016	2017	2018
UH SYSTEM TOTAL	40,907	41,002	41,092	41,265	41,343	41,597	41,997
UH AT MĀNOA	16,704	16,754	16,805	16,857	16,901	17,012	17,184
UH AT HILO	3,644	3,680	3,701	3,727	3,746	3,774	3,809
UH - WEST O'AHU	1,221	1,345	1,414	1,476	1,521	1,575	1,628
UH COMMUNITY COLLEGES	19,338	19,223	19,172	19,205	19,175	19,236	19,376
Hawai'i Community College	2,288	2,234	2,211	2,209	2,197	2,200	2,201
Honolulu Community College	2,610	2,608	2,607	2,609	2,602	2,602	2,617
Kapi'olani Community College	4,950	4,908	4,884	4,874	4,848	4,844	4,879
Kaua'i Community College	865	884	893	902	913	920	925
Leeward Community College	4,586	4,586	4,591	4,602	4,600	4,624	4,662
UH Maui College	2,571	2,534	2,517	2,534	2,541	2,569	2,604
Windward Community College	1,468	1,469	1,469	1,475	1,474	1,477	1,488

TABLE 7
HEADCOUNT ENROLLMENT OF CREDIT STUDENTS BY ATTENDANCE STATUS
UNIVERSITY OF HAWAI'I
FALL 2012 TO FALL 2018

	ACTUAL	PROJECTED					
	2012	2013	2014	2015	2016	2017	2018
UH SYSTEM TOTAL 1/	60,295	60,292	60,357	60,593	60,679	61,028	61,588
Full-Time	31,870	31,816	31,869	31,994	32,052	32,252	32,552
Part-Time	28,425	28,476	28,488	28,599	28,627	28,776	29,036
UH AT MĀNOA	20,426	20,437	20,472	20,522	20,562	20,691	20,888
Full-Time	14,927	14,936	14,961	14,997	15,026	15,121	15,264
Part-Time	5,499	5,501	5,511	5,525	5,536	5,570	5,624
UH AT HILO	4,157	4,195	4,221	4,254	4,277	4,312	4,352
Full-Time	3,273	3,315	3,335	3,361	3,379	3,407	3,439
Part-Time	884	880	886	893	898	905	913
UH - WEST O'AHU	1,997	2,190	2,301	2,400	2,475	2,559	2,643
Full-Time	830	915	964	1,006	1,037	1,073	1,111
Part-Time	1,167	1,275	1,337	1,394	1,438	1,486	1,532
UH COMMUNITY COLLEGES	33,715	33,470	33,363	33,417	33,365	33,466	33,705
Full-Time	12,840	12,650	12,609	12,630	12,610	12,651	12,738
Part-Time	20,875	20,820	20,754	20,787	20,755	20,815	20,967
Hawai'i Community College	3,663	3,573	3,539	3,533	3,518	3,522	3,526
Full-Time	1,695	1,675	1,660	1,657	1,650	1,652	1,653
Part-Time	1,968	1,898	1,879	1,876	1,868	1,870	1,873
Honolulu Community College	4,582	4,571	4,569	4,575	4,565	4,564	4,587
Full-Time	1,633	1,650	1,650	1,652	1,648	1,648	1,656
Part-Time	2,949	2,921	2,919	2,923	2,917	2,916	2,931

TABLE 7
HEADCOUNT ENROLLMENT OF CREDIT STUDENTS BY ATTENDANCE STATUS
UNIVERSITY OF HAWAI'I
FALL 2012 TO FALL 2018

	ACTUAL	PROJECTED					
	2012	2013	2014	2015	2016	2017	2018
Kapi'olani Community College	8,892	8,806	8,759	8,738	8,693	8,685	8,741
Full-Time	3,150	3,001	2,985	2,978	2,962	2,960	2,979
Part-Time	5,742	5,805	5,774	5,760	5,731	5,725	5,762
Kaua'i Community College	1,495	1,520	1,535	1,548	1,566	1,578	1,585
Full-Time	571	591	597	602	609	614	617
Part-Time	924	929	938	946	957	964	968
Leeward Community College	7,960	7,918	7,905	7,917	7,909	7,949	8,017
Full-Time	3,233	3,188	3,182	3,187	3,184	3,200	3,227
Part-Time	4,727	4,730	4,723	4,730	4,725	4,749	4,790
UH Maui College	4,382	4,336	4,306	4,340	4,350	4,399	4,461
Full-Time	1,644	1,618	1,607	1,620	1,624	1,642	1,665
Part-Time	2,738	2,718	2,699	2,720	2,726	2,757	2,796
Windward Community College	2,741	2,746	2,750	2,766	2,764	2,769	2,788
Full-Time	914	927	928	934	933	935	941
Part-Time	1,827	1,819	1,822	1,832	1,831	1,834	1,847

1/ Headcounts include specials (early admits and concurrent students) for all years.

Note: records with invalid data on attendance status are included with part-time.

**APPENDIX A
HAWAII PUBLIC HIGH SCHOOL SENIORS BY SCHOOL DISTRICT
ACADEMIC YEARS 2007-08 TO 2018-19**

SCHOOL DISTRICT	HISTORICAL						PROJECTED					
	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19
TOTAL	9,819	9,990	9,400	9,602	9,897	9,588	9,408	9,566	9,111	9,271	9,630	9,226
O'ahu Districts	6,370	6,370	6,032	6,232	6,568	6,224	6,097	6,107	5,787	5,869	6,205	5,882
Honolulu District	1,664	1,726	1,566	1,668	1,710	1,666	1,654	1,627	1,505	1,484	1,636	1,530
Central District	1,699	1,753	1,697	1,784	1,964	1,803	1,800	1,822	1,724	1,747	1,811	1,719
Leeward District	2,157	2,091	2,039	2,002	2,075	2,044	1,963	1,957	1,922	2,019	2,097	2,011
Windward District	850	800	730	778	819	711	680	701	636	619	661	622
Neighbor Island Districts	3,225	3,372	3,134	3,133	3,065	3,102	2,962	3,000	2,845	2,898	2,911	2,805
Hawai'i District	1,474	1,565	1,520	1,382	1,384	1,348	1,327	1,314	1,245	1,264	1,268	1,270
Maui District	1,159	1,179	1,091	1,156	1,087	1,182	1,089	1,154	1,052	1,104	1,132	1,032
Kaua'i District	592	628	523	595	594	572	546	532	548	530	511	503
Other Schools	224	248	234	237	264	262	349	459	479	504	514	539
Charter Schools 1/	224	248	234	237	264	262	349	459	479	504	514	539

1/ Includes all districts.

Source: Department of Education for the State of Hawai'i. Regular Education seniors only.

APPENDIX B
HAWAI'I HIGH SCHOOL GRADUATES
WICHE HISTORICAL AND PROJECTED - 2012 SERIES

Academic Year	Total	Pct Chnge	Public	Pct Chnge	Private	Pct Chnge
1996-97	11,547		8,929		2,618	
1997-98	12,246	6.1	9,670	8.3	2,576	-1.6
1998-99	12,247	0.0	9,714	0.5	2,533	-1.7
1999-00	13,398	9.4	10,437	7.4	2,961	16.9
2000-01	13,490	0.7	10,102	-3.2	3,388	14.4
2001-02	13,536	0.3	10,452	3.5	3,084	-9.0
2002-03	12,793	-5.5	10,013	-4.2	2,780	-9.9
2003-04	12,953	1.3	10,324	3.1	2,629	-5.4
2004-05	13,396	3.4	10,813	4.7	2,583	-1.7
2005-06	13,080	-2.4	10,922	1.0	2,158	-16.5
2006-07	13,448	2.8	11,063	1.3	2,385	10.5
2007-08	14,137	5.1	11,613	5.0	2,524	5.8
2008-09	14,167	0.2	11,508	-0.9	2,659	5.3
2009-10	13,535	-4.5	10,807	-6.1	2,728	2.6
2010-11	13,745	1.6	11,037	2.1	2,708	-0.7
2011-12	13,738	-0.1	10,990	-0.4	2,748	1.5
2012-13	13,502	-1.7	10,647	-3.1	2,855	3.9
2013-14	13,125	-2.8	10,347	-2.8	2,778	-2.7
2014-15	12,852	-2.1	10,168	-1.7	2,684	-3.4
2015-16	12,997	1.1	10,259	0.9	2,738	2.0
2016-17	13,252	2.0	10,278	0.2	2,974	8.6
2017-18	13,654	3.0	10,628	3.4	3,026	1.7
2018-19	12,895	-5.6	10,020	-5.7	2,875	-5.0
2019-20	13,354	3.6	10,532	5.1	2,822	-1.8
2020-01	13,772	3.1	10,738	2.0	3,034	7.5
2021-22	13,910	1.0	10,823	0.8	3,087	1.7
2022-23	13,681	-1.6	10,666	-1.5	3,015	-2.3
2023-24	14,456	5.7	11,281	5.8	3,175	5.3
2024-25	14,581	0.9	11,388	0.9	3,193	0.6
2025-26	14,844	1.8	11,579	1.7	3,265	2.3
2026-27	14,391	-3.1	11,223	-3.1	3,168	-3.0
2027-28	14,470	0.5	11,288	0.6	3,182	0.4

Note: Horizontal line delimits actual from projected numbers.

Note: WICHE "Historical" data may differ from UH IRO compiled data shown in the MAPS reports on the High School Background of First-Time Students.

SOURCE: "Knocking at the Door, Projections of High School Graduates," December 2012; WICHE.

Appendix C

University of Hawai'i Enrollment Projection Model, 2013

Introduction

Student enrollment directly influences the University budget, program planning and decision making, as well as the human capital development and labor market for the State of Hawai'i. A set of transfer function models, which incorporate both longitudinal change over time and cross-sectional economic and demographic factors, has been created to project student enrollment at the University of Hawai'i units: UH Mānoa, UH Hilo, UH West Oahu and the UH Community Colleges.

Major Factors Affecting Student Enrollment

The following economic and demographic variables were included in the initial specifications for each model.

Dependent variable:

- Enrollment headcount (1977-2012), with associated time lags.

Independent variables (economic and demographic factors):

- Number of Hawaii high school graduates, one-year time lag;
- Hawai'i unemployment rate, one-year time lag;
- Hawai'i real gross national product, one-year time lag (in millions of 2005 dollars);
- Hawai'i real per capita personal income, one-year time lag (in 2005 dollars);
- Hawai'i Consumer Price Index (CPI-U), one-year time lag (in 2005 dollars).

Data Sources:

- University of Hawai'i ODS (Operational Data Store) student data warehouse;
- University of Hawai'i Institutional Research and Analysis Office: Enrollment Projections, University of Hawai'i, Fall 2012 to Fall 2017;
- U.S. Bureau of Economic Analysis (BEA);
- U.S. Bureau of Labor Statistics (BLS);
- Hawai'i State Department of Labor, Monthly Local Area Unemployment Statistics (LAUS);
- Hawai'i State Department of Business, Economic Development and Tourism (DBEDT): Hawai'i Databook & Quarterly Statistical & Economic Report (QSER);
- Hawai'i State Department of Education, Hawai'i Public School Official Enrollment Count.
- Western Interstate Commission for Higher Education, Hawai'i Public and Private High School Graduates.

Transfer Function (Multivariate ARIMA) Model and Projection for the University of Hawai'i System

After several rounds of goodness-of-fit selection, we identified an ARIMA (1,0,0) model for UH System student enrollment, with independent variables being real gross national product, unemployment rate and high school graduates. The estimated model coefficients were all statistically significant at the $p < 0.001$ level.

Model Description			
			Model Type
Model ID	UHENroll	Model_1	ARIMA(1,0,0)

ARIMA Model Parameters					Estimate	SE	t	Sig.
UHENroll-Model_1	UHENroll	No Transformation	AR	Lag 1	.932	.061	15.190	.000
	GDP	No Transformation	Numerator	Lag 0	.468	.091	5.146	.000
	Unemrate	No Transformation	Numerator	Lag 0	1791618	333.211	5.377	.000
	Hsgrad	No Transformation	Numerator	Lag 0	1.461	.357	4.091	.000

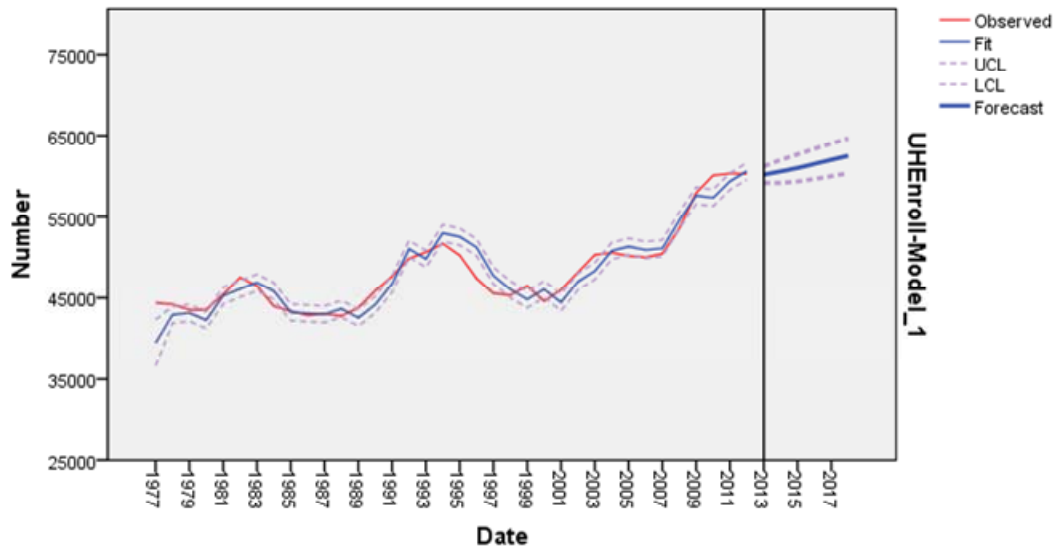
Model Fit statistics							
Stationary R-squared	R-squared	RMSE	MAPE	MAE	MaxAPE	MaxAE	Normalized BIC
.893	.893	1711.061	2.648	1265.093	11.071	4911.763	15.288

The definition and selection criteria for the tables shown above, model goodness-of-fit measures, are listed in the Appendix. They include: stationary r-square, r-square, root mean square error, mean absolute percentage error, mean absolute error, maximum absolute percentage error, maximum absolute error, and normalized BIC (Bayesian Information Criterion).

Model Findings:

- The University of Hawai'i student enrollment was strongly correlated with Hawai'i real gross national product, unemployment rate, number of high school graduates and prior year student enrollment.
- Hawai'i real gross national product showed a strong and positive effect on student enrollment. After controlling for other factors, an increase of \$1 million in Hawai'i real gross national product contributes a 0.47 unit increase in student enrollment.
- The model showed that the higher the unemployment rate, the more likely that students would enroll in college. Conversely, an improving labor market (lower unemployment rate) may allow more students to opt for work, resulting in lower the post-secondary enrollment.
- The model also showed that the higher the number of high school graduates, the higher the post-secondary enrollment. Conversely, declining numbers of high school graduates can lower the enrollment.
- The prior year student enrollment also had a strong and positive effect on the current year student enrollment.
- After a period of rapid growth from 2000 to 2010, the enrollment numbers have been stable at around 60,000 for the last three years. The model predicts that University of Hawai'i student enrollment will be growing at a relatively slow pace over the next five years.

The following chart and table show the enrollment forecast and corresponding 95% upper and lower critical level intervals.



Transfer Function (Multivariate ARIMA) Model and Projection for the UH Community Colleges

After several rounds of goodness-of-fit selection, we identified an ARIMA (1,0,0) model for the UH Community College student enrollment, with independent variables of real gross national product, unemployment rate and high school graduates. The estimated model coefficients were all statistically significant at the $p < 0.001$ level.

Model Description			
			Model Type
Model ID	CC	Model_1	ARIMA(1,0,0)

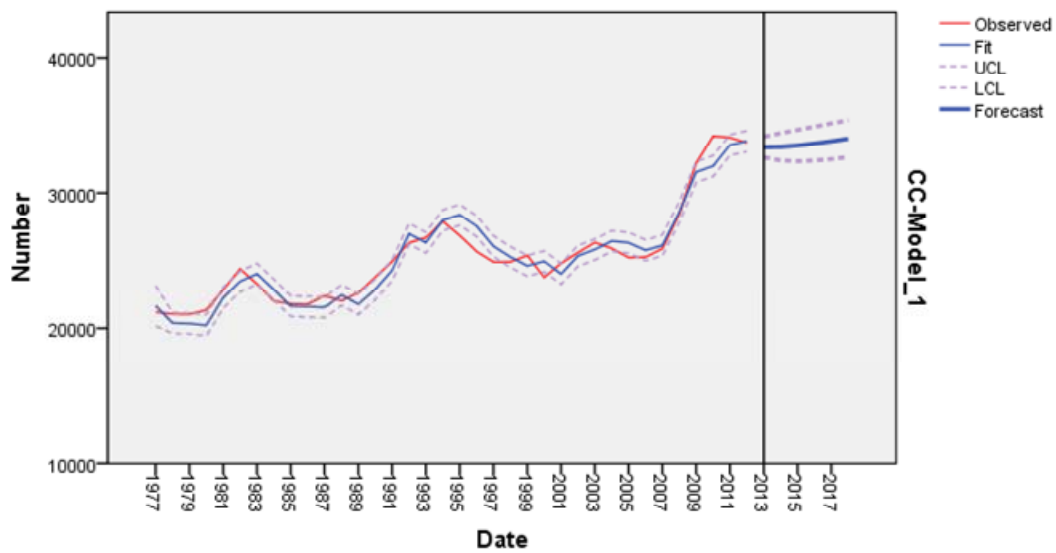
ARIMA Model Parameters					Estimate	SE	t	Sig.
CC-Model_1	CC	No Transformation	AR	Lag 1	.858	.088	9.762	.000
	GDP	No Transformation	Numerator	Lag 0	.262	.042	6.273	.000
	Unemrate	No Transformation	Numerator	Lag 0	1251.099	200.691	6.234	.000
	Hsgrad	No Transformation	Numerator	Lag 0	.649	.169	3.841	.001

Model Fit statistics							
Stationary R-squared	R-squared	RMSE	MAPE	MAE	MaxAPE	MaxAE	Normalized BIC
.942	.942	902.491	2.847	73.066	7.288	2211.636	14.008

Model Findings:

- University of Hawai'i Community College student enrollment was strongly correlated with Hawai'i real gross national product, unemployment rate, number of high school graduates and the prior year UHCC student enrollment.

- Hawai'i real gross national product showed a strong and positive effect on student enrollment. After controlling for other factors, an increase of \$1 million in Hawai'i real gross national product contributes a 0.26 unit increase in UH Community College enrollment.
- The model showed that the higher the unemployment rate, the more likely students would enroll at a UH Community College. Conversely, an improving labor market (lower unemployment rate) may allow more students to opt for work and lower the enrollment.
- The model also showed that the higher the number of high school graduates, the higher would be the UH Community College student enrollment. Conversely, declining numbers of high school graduates can lower the enrollment.
- The prior year student enrollment also had a strong and positive effect on the current year student enrollment.
- The model predicts that University of Hawai'i Community College student enrollment will be growing at a relatively stable and slow pace. The following chart and table show the enrollment forecasts and the corresponding 95% upper and lower critical level intervals.



Transfer Function (Multivariate ARIMA) Model and Projection for the UH Four-Year Colleges

We identified an ARIMA (1,0,0) model with independent variables of Hawai'i real per capita personal income, unemployment rate and number of high school graduates for the University of Hawai'i four-year campuses taken as a whole. The estimated model coefficients were all statistically significant at $p < 0.005$ level. The model estimates and projection charts are listed below.

Model Description			
			Model Type
Model ID	Fouryear	Model_1	ARIMA(1,0,0)

ARIMA Model Parameters								
					Estimate	SE	t	Sig.
Fouryear-Model_1	Fouryear	No Transformation	AR	Lag 1	.849	.094	9.018	.000
	PI	No Transformation	Numerator	Lag 0	.561	.100	5.588	.000
	Unemrate	No Transformation	Numerator	Lag 0	519.092	159.813	3.248	.003
	Hsgrad	No Transformation	Numerator	Lag 0	.242	.245	.986	.032

Model Fit statistics							
Stationary R-squared	R-squared	RMSE	MAPE	MAE	MaxAPE	MaxAE	Normalized BIC
.845	.845	720.865	2.391	540.899	7.270	1577.486	13.559

Model Findings:

- Enrollment at the University of Hawai'i four-year campuses was strongly correlated with Hawai'i real per capita personal income, unemployment rate, number of high school graduates and prior year four-year campus student enrollment.
- Hawai'i real per capita personal income showed a strong and positive effect on student enrollment. After controlling for other factors, an increase of \$1 million in Hawai'i real per capita personal income contributes a 0.56 unit increase in four-year campus enrollment.
- The model showed that the higher the unemployment rate, the more likely students would enroll in college. Conversely, an improving labor market (lower unemployment rate) may allow more students to opt for work, resulting in lower enrollment.
- The model also showed that the higher the number of high school graduates, the higher the four-year campus student enrollment. Conversely, declining numbers of high school graduates can lower the enrollment.
- Prior four-year campus student enrollment also had a strong and positive effect on current year student enrollment.
- The model predicts that University of Hawai'i four-year campus student enrollment will be growing at a relatively stable and slow pace. The following chart and table show the enrollment forecasts and corresponding 95% upper and lower critical level intervals.

