

Analyzing student outcomes of ASNS, AA, and pre-degree transfer students in STEM pathways

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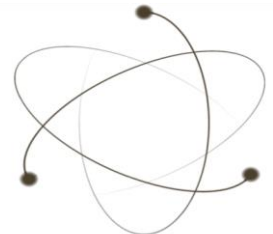
Academic Advising & Transfer Networking Conference

Friday, Oct 14, 2016

Honolulu, HI



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Improving STEM Education in Hawai'i



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Office of STEM Education

The new UH System Office of STEM Education (OSE) services all 10 campuses to provide leadership in support of STEM activities and to increase student enrollment and academic success that leads to employment in STEM fields. OSE reports to the Office of UP for Academic Planning and Policy and support the UH Hawai'i Graduation Initiative (HGI) and Hawai'i Innovation Initiative (HII) Strategic Directives.



Projects and Initiatives



- **STEM Pathways**

- Design and develop clear, comprehensive, articulated and purposeful academic pathways to promote STEM success from K-12 to higher education to workforce

- **Hawai'i STEM Network**

- The Network actively seeks to blend UH research with education and outreach initiatives throughout Hawai'i and enables researchers to include strong Broader Impact statements and activities in their research proposals

- **SEARCH – STEM Education Assets and Resources Clearinghouse**

- Inventory of projects, personnel, and assets related to STEM education

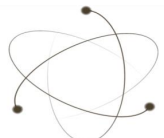
- **Diversity and Inclusion**

- Broaden participation to prepare a diverse, globally-engaged STEM workforce through coordinated UH grants and initiatives

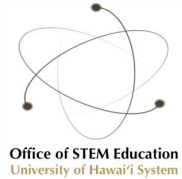
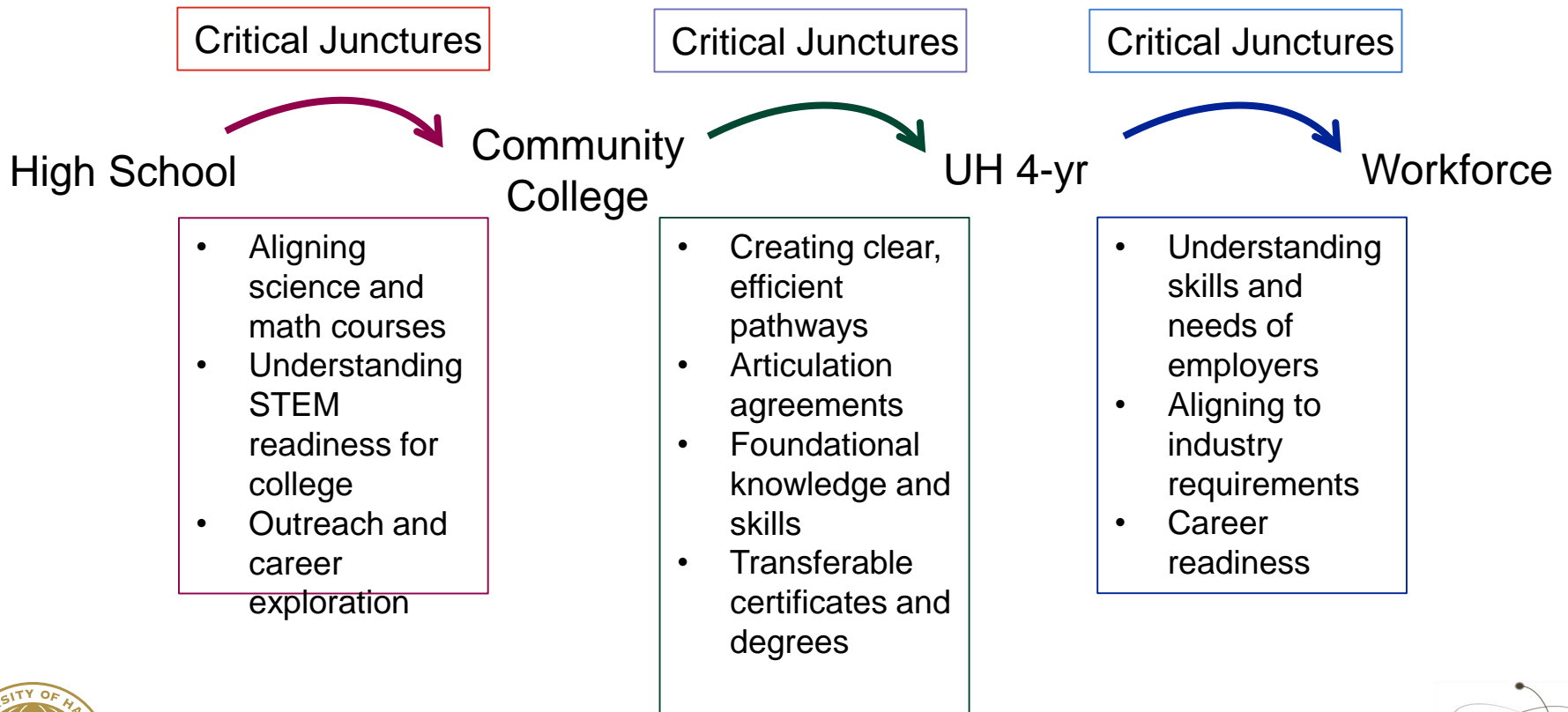


- **Workforce Development**

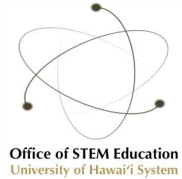
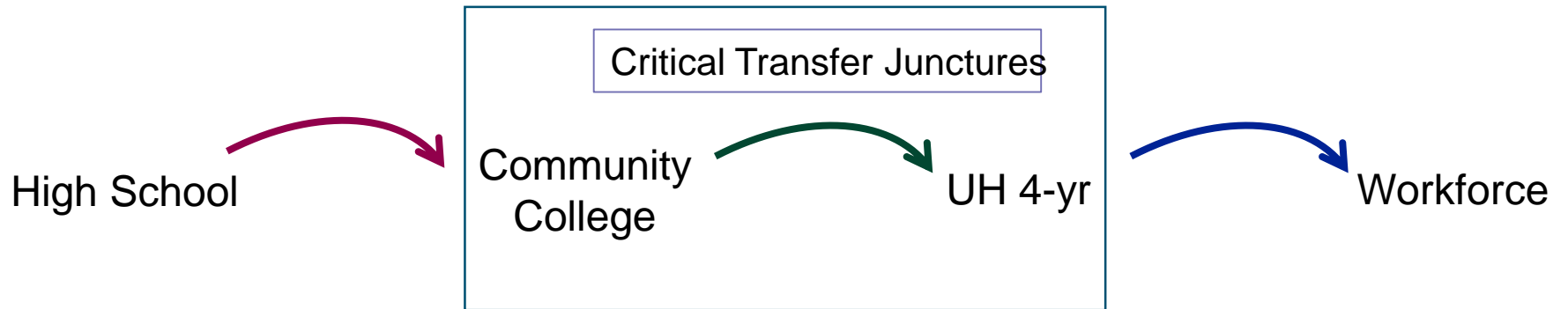
- Engaging business and industry and using labor market information to drive education and training to build Hawai'i's STEM talent pipeline



STEM Pathways

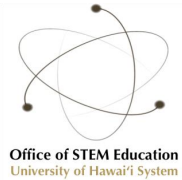


STEM Pathways



Associate of Science in Natural Science (ASNS)

- Began in 2008 at KapCC
- Transfer degree designed to efficiently transition students into STEM fields at four-year institutions as 2+2
- Limited general education credits
- ASNS was the first transfer-oriented AS degree
- Focus on STEM pathway to a four-year campus
- AS degrees are designed to prepare students for employment in career and technical fields
- Adopted by all 7 UH Community Colleges



ASNS: Filling a gap

Associate in Arts

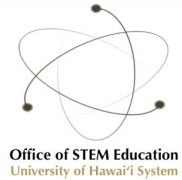
- AA Degree in Liberal Arts
- Designed for students who are preparing to transfer to a four-year college or university.

Associate in Science, Natural Science

- ASNS Degree in Natural Science
- Designed for students who transfer to STEM major
- Coursework provides scientific and technical experience

Associate in Science

- AS Degree in specialized or technical area
- Designed for students who are preparing to enter the workforce



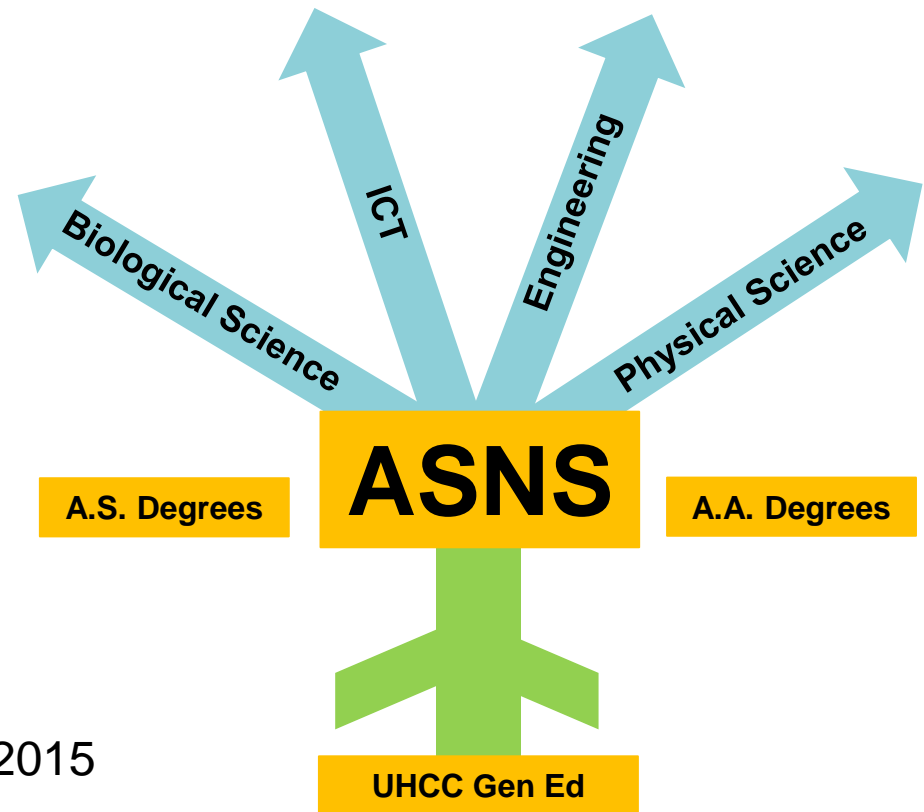
Benefits of ASNS degree:

- Efficiency
 - Lower time to degree
- Complete STEM courses early
 - More STEM courses prior to transfer
- Identify as a STEM student
 - More invested in STEM
- Preparation for transfer
 - All courses articulate to STEM major at 4-year institution
- Participate in Undergraduate Research Experiences
 - Have rigorous entry level science courses
- Balance
 - Spread core requirements throughout 4 years
 - Reduces density of STEM courses at transfer



UHCC ASNS Degree Concentrations

- Biological Science
- Information and Communication Technology (ICT)
- Engineering
- Physical Science



Officially adopted by all 7 UHCC by 2015



ASNS Curriculum

- All courses will fulfill STEM degree requirements at a UH four-year institution
- 60 credits
- Requires Calculus I, at minimum
- Fulfills a portion of general education core requirements
- Campuses agreed on four concentrations
- Most courses articular to other UH campuses



ASNS Course Requirements

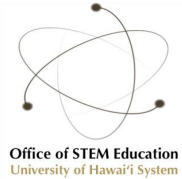
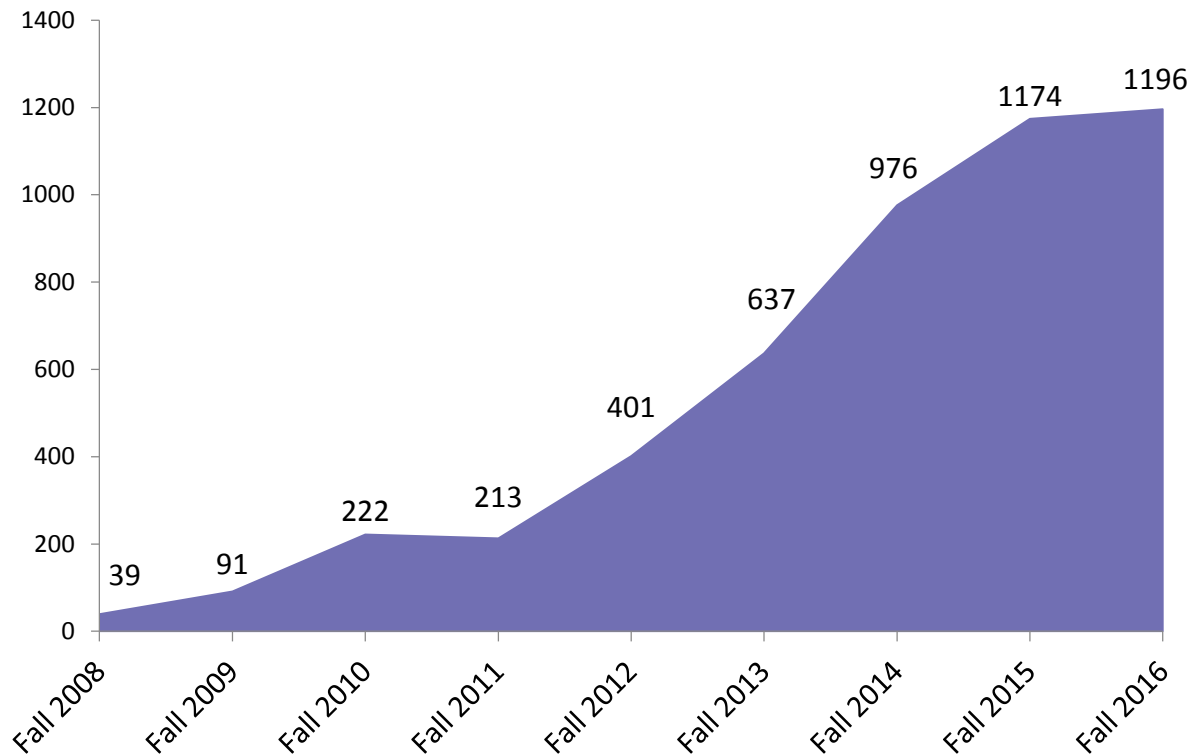
by Concentration

	General Education					STEM		Major					
UHCC ASNS													
Credits	3	3	3	3	3	4	8	8	4	21	60	COMMENTS	
BIOLOGICAL SCIENCE	ENG 100 (FW)	FG1 (WI)	FG2 (WI)	DH (HAP)	DS (WI)	MATH 205 (FS)	CHEM 161/L CHEM 162/L (DP, DY)	BIOL 171/L BIOL 172/L (DB)	BIO 265/L OR BIOL 275/L	BIOLOGICAL SCIENCE ELECTIVES	TOTAL	REQUIRED COURSES FOR TRANSFER: NONE GRADUATION REQUIREMENTS: (2) WI AND (1) HAP AND 2.0 GPA	
Credits	3	3	3	3	3	4	8	3	4	26	60	COMMENTS	
INFORMATION AND COMMUNICATION TECHNOLOGY	ENG 100 (FW)	FG1 (WI)	FG2 (WI)	DH (HAP)	DS (WI)	MATH 205 (FS)	TBD	DB	TBD	ICT ELECTIVES	TOTAL	TBD	
Credits	3	3	3	3	3	4	8	3	9	21	60	COMMENTS	
ENGINEERING	ENG 100 (FW)	FG1 (WI)	FG2 (WI)	DH (HAP)	DS (ECON 130) (WI)	MATH 205 (FS)	CHEM 161/L CHEM 162/L (DP,DY)	DB	PHYS 170/L PHYS 272/L	ENGINEERING ELECTIVES	TOTAL	REQUIRED COURSES FOR TRANSFER: MATH 206, 231, 232; EE 160; CE 270 OR EE 211 GRADUATION REQUIREMENTS: (2) WI AND (1) HAP AND 2.0 GPA	
Credits	3	3	3	3	3	4	8	3	9	21	60	COMMENTS	
PHYSICAL SCIENCE	ENG 100 (FW)	FG1 (WI)	FG2 (WI)	DH (HAP)	DS (WI)	MATH 205 (FS)	CHEM 161/L CHEM 162/L (DP,DY)	DB	PHYS 170/L PHYS 272/L	PHYSICAL SCIENCE ELECTIVES	TOTAL	REQUIRED COURSES FOR TRANSFER: MATH 206 GRADUATION REQUIREMENTS: (2) WI AND (1) HAP AND 2.0 GPA	



ASNS enrollment has increased over time

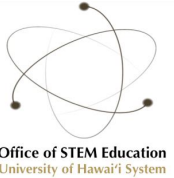
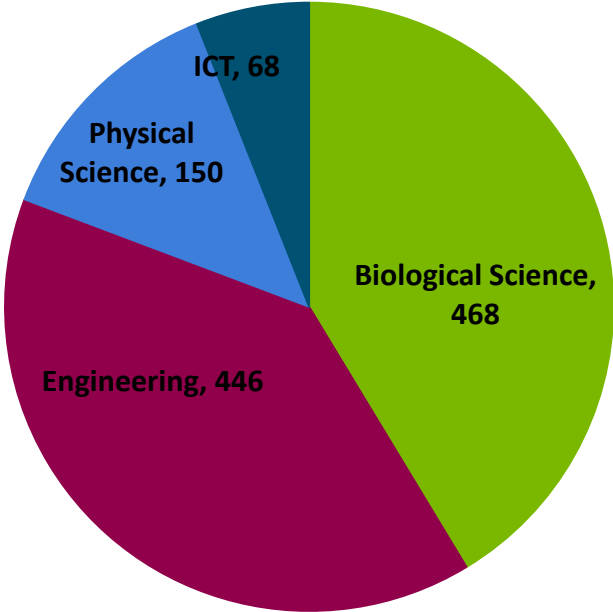
- Enrollment of all concentrations at all UH Community Colleges



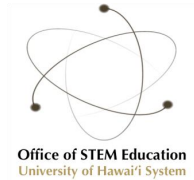
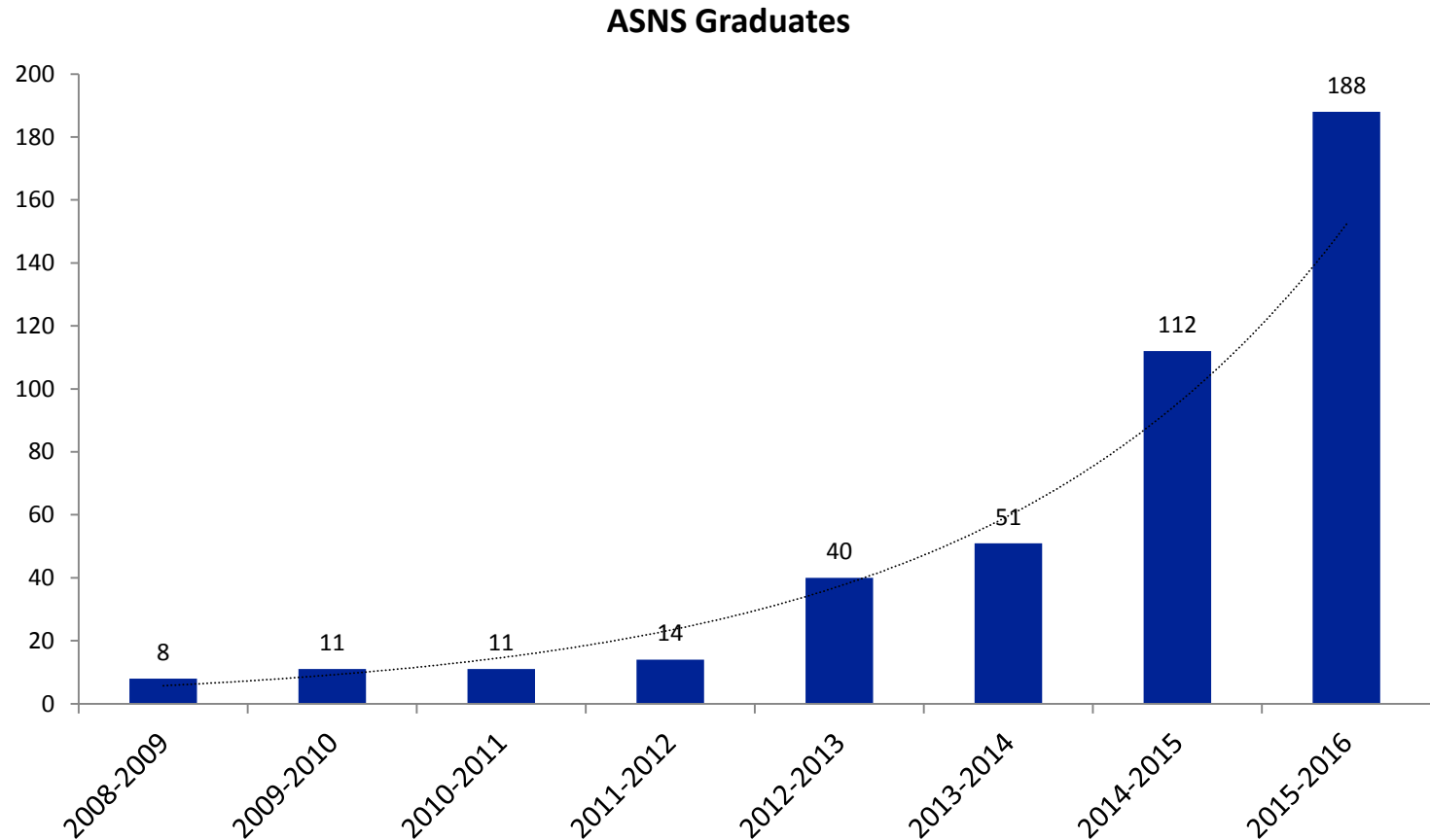
Biological and Engineering are the largest concentrations

Current ASNS enrollment by concentration

Breakdown of Concentrations (Fall 2016)



Number of Graduates have also increased significantly



Reverse Credit Transfer Initiative

- Students who transfer to a UH four-year campus from a UH community college without an AA degree are evaluated for the AA degree after earning at least 75 credits
- Students can opt-out, no cost to the student
- Almost 2,200 AA degrees have been awarded through Reverse Credit Transfer in the last two years
- In Fall 2015, ASNS degrees have been added
 - 68 ASNS degrees awarded 2015-2016



Analysis of the ASNS Degree and Outcomes

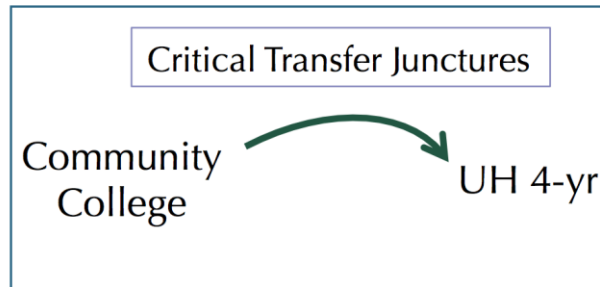
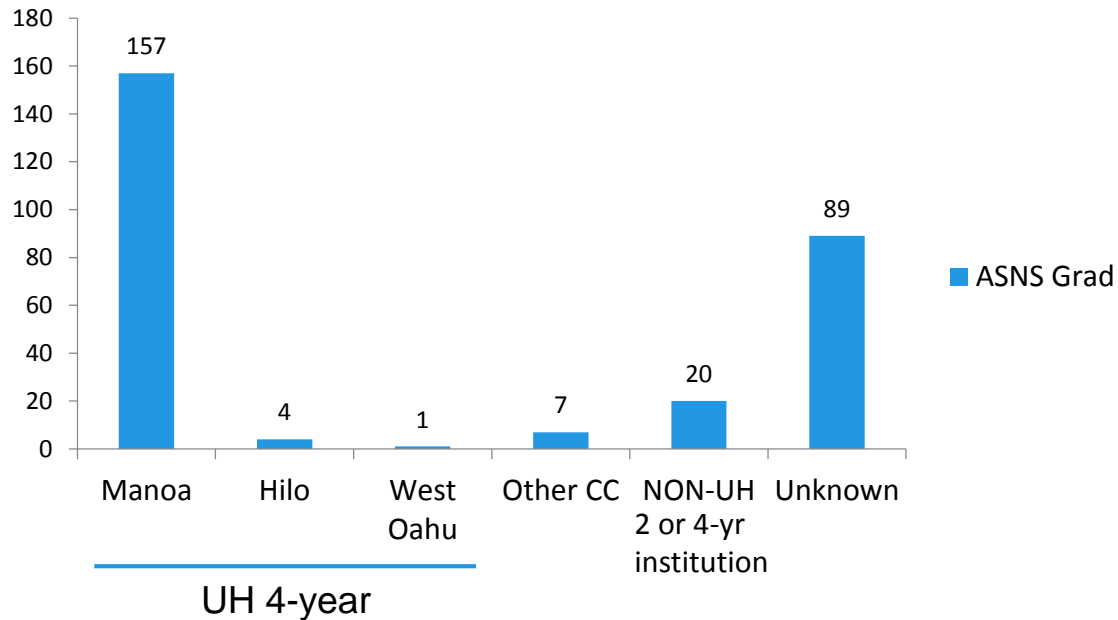
- ASNS program started in 2008
- Student population:
 - Every student enrolled at a UHCC in Fall 2008 to Spring 2016
 - Excludes students who entered prior to Fall 2008
 - Unduplicated population (some minor exceptions)
- 3 Groups:
 - ASNS Graduates (N = 278)
 - ASNS Majors (N = 2675) – Declared but did not finish (yet)
 - AA Graduate (N = 8006)



Most ASNS Graduates Transfer to UH Mānoa

All ASNS Grads that started since 2008-2016; N=278

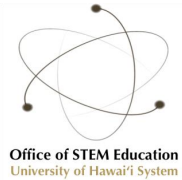
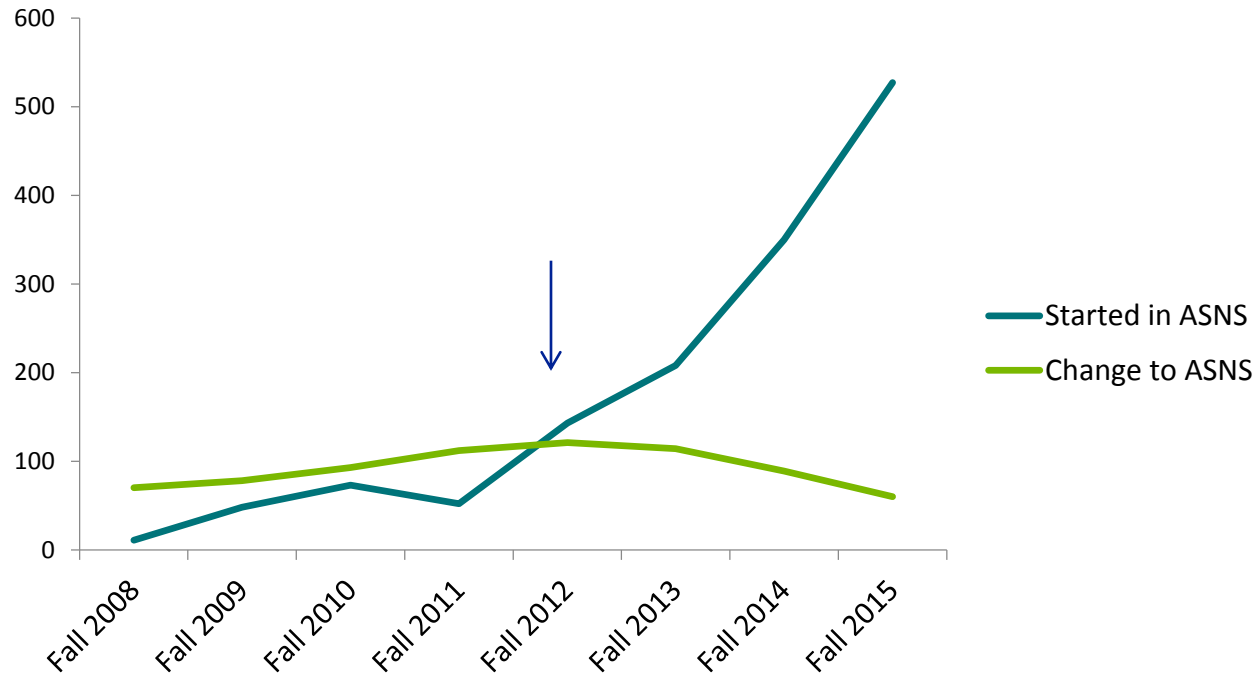
ASNS Post-Degree Matriculation



Students are getting the message about ASNS

Based on both ASNS Grads and ASNS Majors who start in Fall Semesters; N = 737

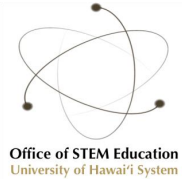
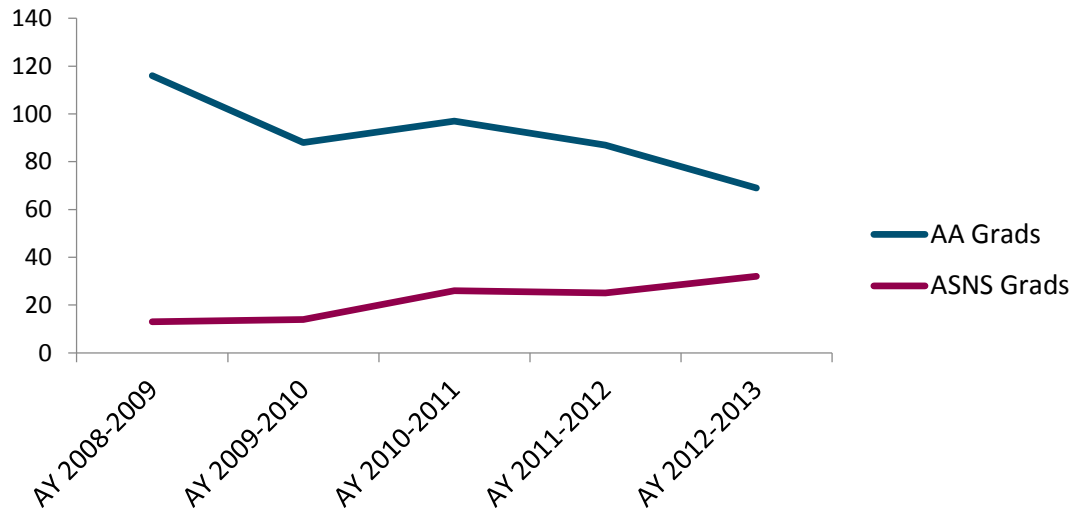
Interest at Point of Entry for ASNS Students



STEM Students are shifting away from AA Degree

Based on AA Grads started in Fall Semesters and transfer within UH System; AA Grads N = 457; ASNS N = 110

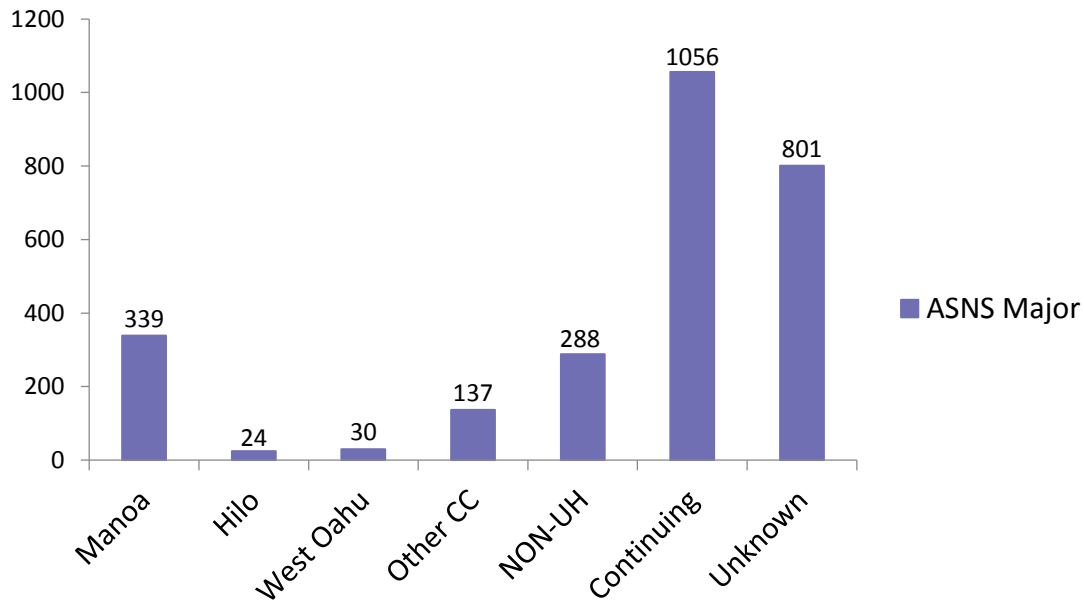
ASNS Grads and AA Grads transferring to STEM Major



Many of the ASNS Majors are Transferring or Continuing

All students who declared Natural Science as a major at any time during 2008-2016

Matriculation and Persistence of ASNS Majors



N = 2675

Continuing: Still enrolled Spring 2016

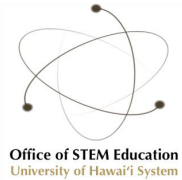


Success of ASNS Students

Entry to Spring 2016

Based on all combined ASNS Grads and ASNS Majors sorted for year of entry

	Declared ASNS	Transfer anywhere w/o ASNS		Transfer anywhere w/ ASNS		ASNS Degree No Transfer		Success	
AY 2008-2009	108	61	56%	16	15%	4	4%	81	75%
AY 2009-2010	171	91	53%	19	11%	6	4%	116	68%
AY 2010-2011	208	105	50%	30	14%	4	2%	139	67%
AY 2011-2012	227	93	41%	28	12%	11	5%	132	58%
AY 2012-2013	365	136	37%	34	9%	8	2%	178	49%
AY 2013-2014	456	148	32%	26	6%	15	3%	189	41%



All ASNS students who did not graduate or transfer

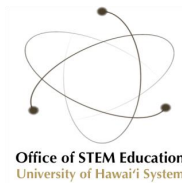
	Declared ASNS	Still Enrolled		Stop-out	
AY 2008-2009	108	16	15%	11	10%
AY 2009-2010	171	25	15%	30	18%
AY 2010-2011	208	19	9%	50	24%
AY 2011-2012	227	49	22%	46	20%
AY 2012-2013	365	66	18%	121	33%
AY 2013-2014	456	123	27%	144	32%
AY 2014-2015	667	278	42%	198	30%
AY 2015-2016	751	600	80%	81	11%

Why are students staying longer or leaving?

- More support at the CC level?
- Cost of transferring?
- New courses that interest students?

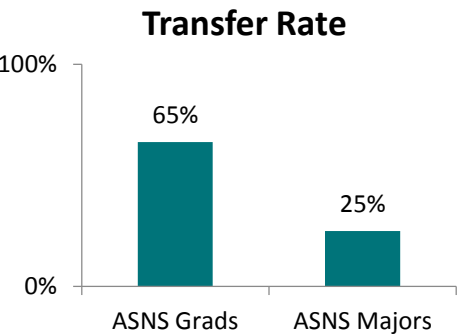
New initiatives to support students in transition:

- PAGE
- PEEC

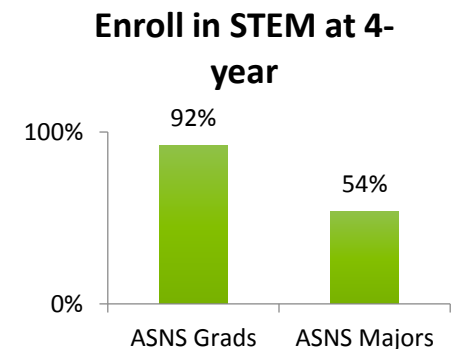


ASNS Grads transfer and enroll in STEM majors more than ASNS Majors

- ASNS Grads Transfer more than ASNS Majors
 - Transfer to UH 4-yr or external institution
 - ASNS Grads (N = 278): 65% transfer
 - ASNS Major (N = 2675): 25% transfer



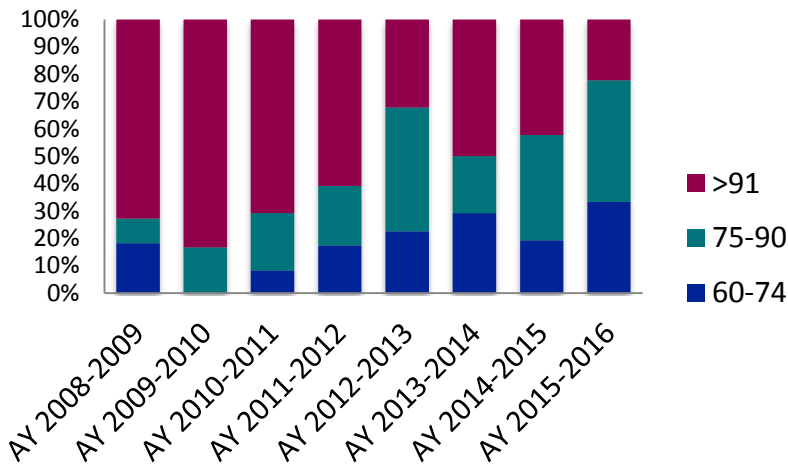
- ASNS Grads enroll in STEM majors more than ASNS Majors
 - Transfer to STEM majors at UH institution
 - ASNS Grad (N = 278): 92%
 - ASNS Major (N = 2675): 54%



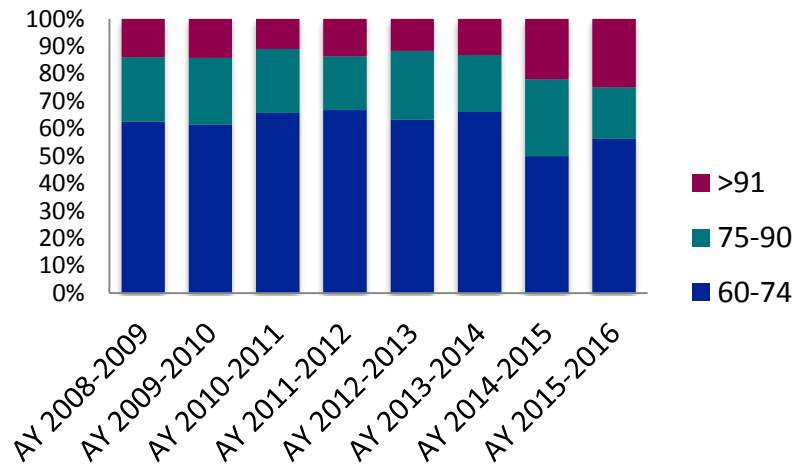
ASNS Grads transfer credit pattern closely resembles the trend of AA Grads

Based on the ASNS or AA Grads that transfer to UH sorted by entry academic year

Accepted Credits at Transfer for ASNS Grads



Accepted Credits at Transfer for AA Grads

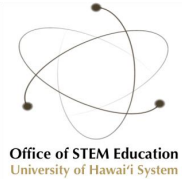
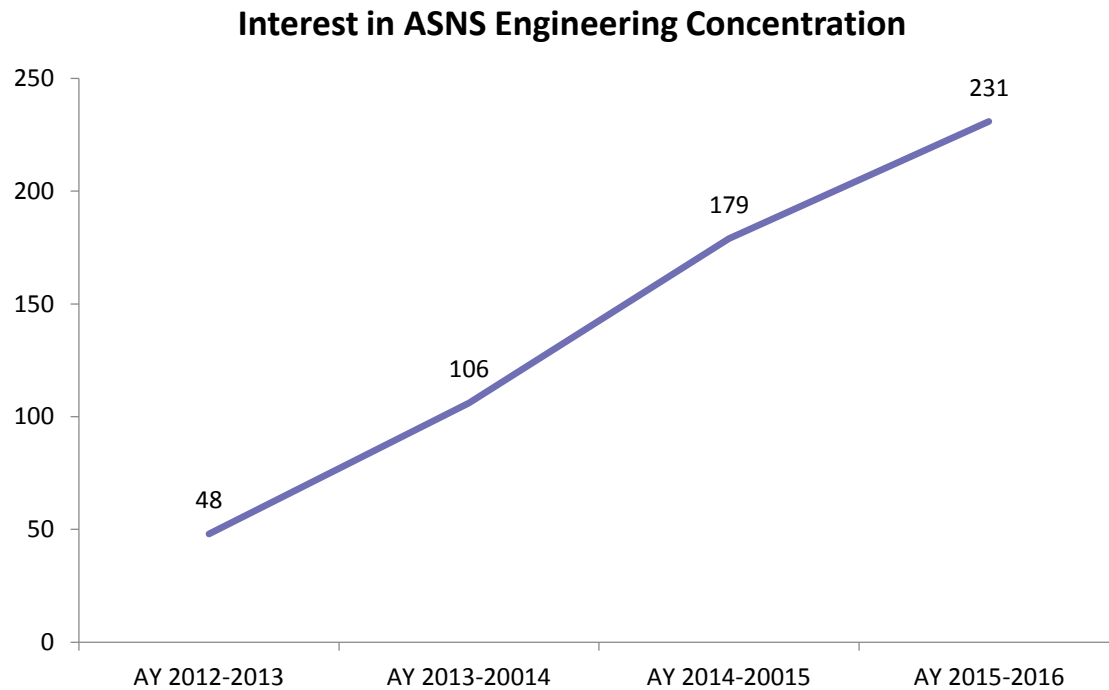


Credit count is based on credits accepted by Mānoa at time of transfer
 ASNS Grads N = 169; AA Grads N = 3996



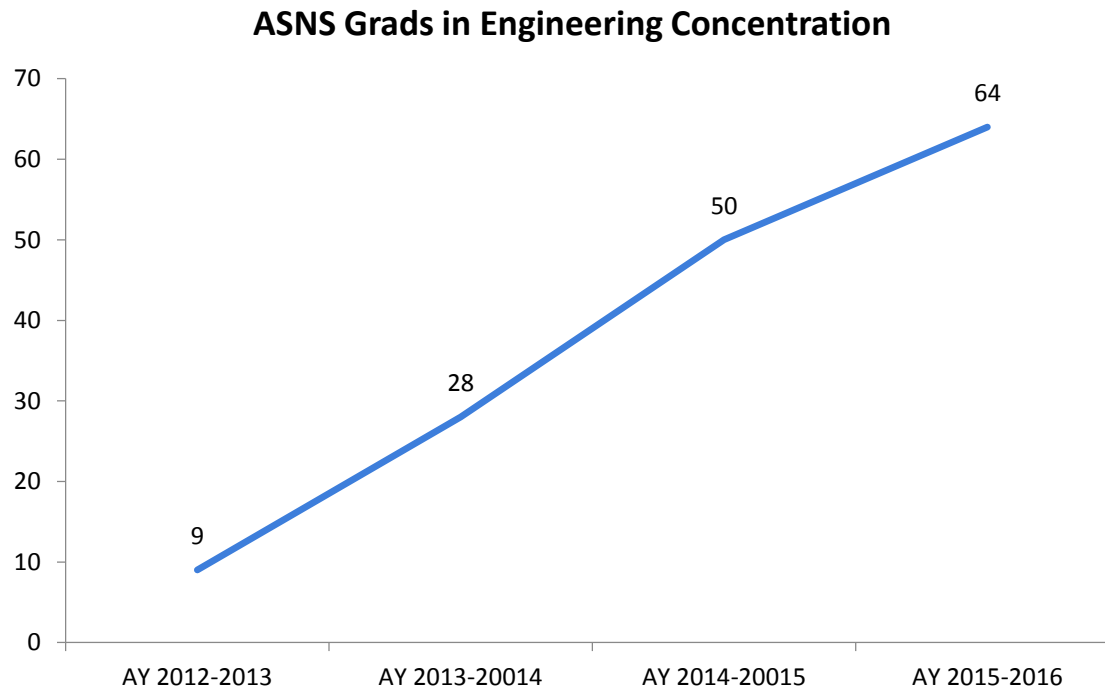
Case study: Engineering

- MOA signed for students who complete the ASNS Engineering degree are automatically admitted to UH Mānoa College of Engineering



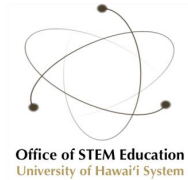
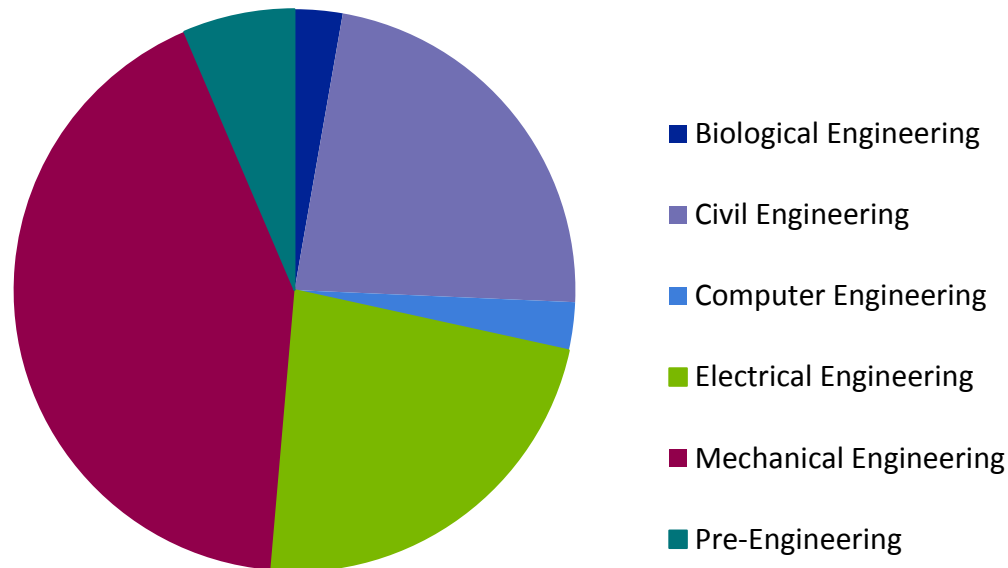
ASNS Graduates in Engineering Concentration has increased

Number of ASNS Grads



ASNS Grads going into Engineering Majors

Engineering Majors at UHM College of Engineering



Time to Degree

- UH Mānoa College of Engineering Grads (2008-2016)

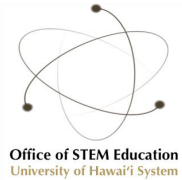
Time to Degree (Years)

Type of Student	Average TTD	No. of Grads	Avg No. of Credits Earned at Time of Degree
Mānoa College of Engineering Freshmen	4.64	671	144.24
Transfers	3.82	875	164.44
ASNS Grad ^{2/}	2.47	17	157.68
ASNS Major ^{3/}	2.94	34	164.26
Reverse Transfer ^{4/}	3.12	25	163.1
Other ^{5/} (AA Grads, AA Majors, or other)	3.91	799	164.64
Total	4.18	1,546	155.67

- 1/ Time to degree from first entry at Mānoa. One semester equals 0.33 years.
e.g., Fall 2008 to Fall 2009 = 1.33 years (Fall 2008, Spring 2009, Summer 2009, Fall 2009).
- 2/ Transfers with an ASNS degree.
- 3/ Transfers with an ASNS major but no ASNS degree.
- 4/ Transfers who earned an ASNS degree after transferring (Reverse Transfer Degree).
- 5/ Transfers other than 2/, 3/, or 4/.

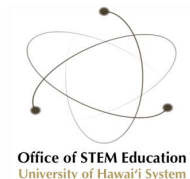
Why do UHCC students take 6 more courses?

- Take courses twice?
- Community College drift?



ASNS Grad vs ASNS Majors since 2008

	ASNS Majors	ASNS Grad
Total	2675	278
Total Transfer Number	818	189
Total Transfer Rate	25%	65%
Continuation in STEM	54%	92%
Bachelors Graduation Rate	134 (5% of all ASNS majors)	25 (9% of all ASNS grads)
	(34% of all that transferred)	(15% of all that transferred)
Time to degree	2.94	2.47



Conclusions

- The ASNS program has grown since inception in 2008
 - Enrollment
 - Graduates
 - More students select ASNS as their first major
- ASNS Grads have positive outcomes
 - More likely to transfer and stay in STEM majors
 - Faster time to degree and transfer with less credits
- Students are staying at Community Colleges longer
- Support needed to move students through pathway efficiently towards graduation



Link to workforce



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High Demand Occupations

High Demand STEM Occupations

High Earning Occupations

Industry Lead Curriculum Design

One of the University's initiatives is to engage with industry partners to develop industry-led curriculum that will imbue graduating students with the marketable skills for which businesses are looking. To further this initiative, we are developing online tools that looks not only at occupational data within individual sectors, but at data across all sectors, thus creating a holistic snapshot of industry demands and the current spread of occupations.

Development will focus on a user-friendly interface to access data-rich content, allowing readers to parse endless sources of statistics in a myriad of different equations, accessing answers for a vast range of unique and specific questions regarding academics, programming, careers, job availability and trends.



HAWAII INDUSTRIES BY SECTORS

Industry data for companies, state agencies, and institutions.



OCCUPATION PROFILES

For all individuals looking for detailed information about careers: economic data, demographics, who's hiring, and training.



EDUCATION ATTAINMENT

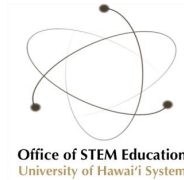
Research college programs that align to high demand occupations.



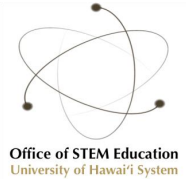
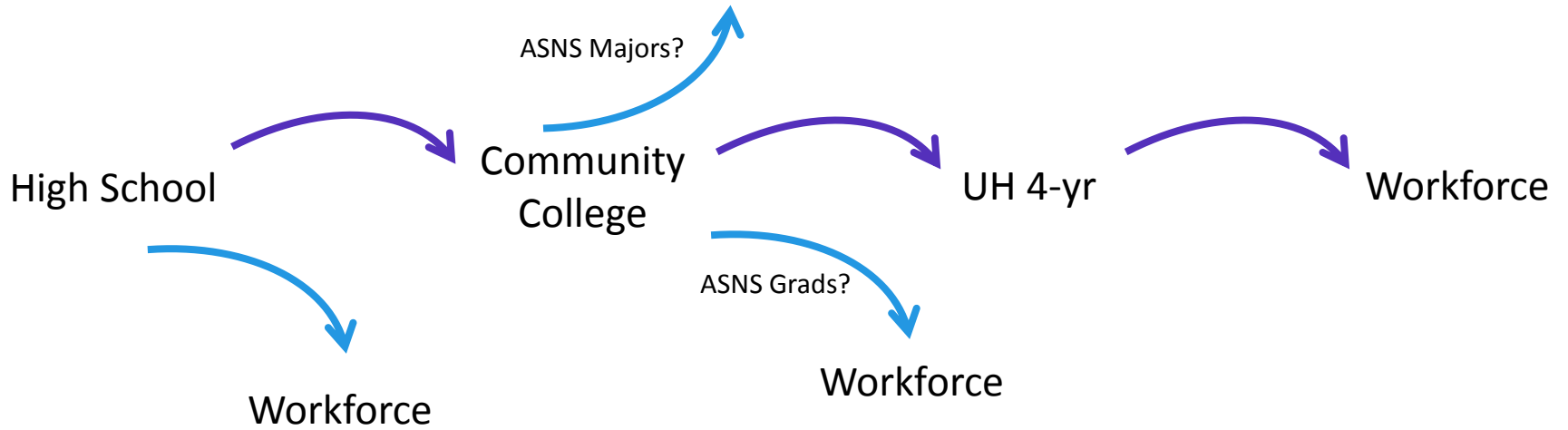
STEM

Science, technology, engineering and mathematics related occupations and college disciplines are identified by this icon.

Civil Engineers	852
Computer Systems Analysts	409
Computer User Support Specialists	387
Software Developers, Applications	385
Architectural and Engineering Managers	304
Network and Computer Systems Administrators	269
Mechanical Engineers	265
Electrical Engineers	246
Computer and Information Systems Managers	223
Environmental Scientists and Specialists, Including Health	221
Software Developers, Systems Software	213
Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products	176
Biological Technicians	170
Electrical and Electronics Engineering Technicians	162
Engineering Technicians, Except Drafters, All Other	147
Operations Research Analysts	138
Architects, Except Landscape and Naval	133

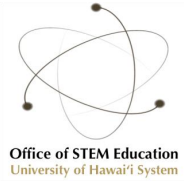


STEM Pathways



Thank you!

- Joanna Itano
- Susan Nishida
- Stanford Beppu
- Josh Kaakua
- Jean Schneider



Mahalo!

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