

Graduation & Research Report Prepared for the Washington State Opportunity Scholarship Board Meeting September 10, 2013

1. WSOS Cohort 1 Final Graduation Numbers

[Need to set up StudentTracker account with NSC and prepare list of WSOS C1 students to provide to NSC by August 10th to receive data back by August 15th for graduation analysis.]

2. UW Computer Science Majors by Gender (Comparison Data)

In order to estimate the gender distribution of computer science majors attending the University of Washington-Seattle, TIP Strategies used survey data on degrees conferred provided by colleges and universities through the National Center for Education Statistics' (NCES) Integrated Postsecondary Education Data System (IPEDS).

By looking at the number of total degrees conferred (i.e., bachelor's and advanced degrees) in Computer and Information Sciences and Support Services (i.e., CIP code 11), we find the following gender distribution at the University of Washington-Seattle:

Computer Science Bachelor's and Advanced Degrees Earned at University of Washington-Seattle, By Gender, 2009-11

Graduation Year	Total # Computer Science Degrees	# Earned by Males	% Earned by Males	# Earned by Females	% Earned by Females
2009	305	227	74%	78	26%
2010	394	294	75%	100	25%
2011	320	232	73%	88	28%
2009-2011	1,019	753	74%	266	26%

Over the 2009, 2010 and 2011 graduation years, 74% of all Computer and Information Sciences and Support Services degrees at the University of Washington-Seattle were earned by males, while 26% were earned by females.

3. STEM and Health Care Majors by Gender (Comparison Data)

In order to estimate the gender distribution of STEM and health care majors in general, we used IPEDS data to calculate the number of all degree types and bachelor's degrees conferred in WSOS Board approved CIP codes in Washington State colleges and universities over the last three available years. Based on major description, we categorized these CIP codes into one of five fields of study: Science, Technology, Engineering, Mathematics or Health Care (see Appendix).

We find that males and females earned Science and Mathematics degrees in relative proportion to each other (51% males to 49% females and 60% males to 40% females, respectively), while Technology and Engineering degrees were earned disproportionately more by males (79% males to 21% females and 81% males to 19% females, respectively), and Health Care degrees were earned disproportionately more by females (18% males to 82% females). Overall, males earned 57% of STEM and health care degrees, while females earned 43%.

All Degrees Earned in WA Colleges and Universities, By Gender, 2009-11

Field of Study	Total # Degrees	Total # Degrees Earned by Males	Total % Degrees Earned by Males	Total # Degrees Earned by Females	Total % Degrees Earned by Females
Science	11,996	6,155	51%	5,841	49%
Technology	11,410	8,981	79%	2,429	21%
Engineering	6,794	5,534	81%	1,260	19%
Mathematics	1,807	1,080	60%	727	40%
Health Care	8,553	1,527	18%	7,026	82%
Grand Total	40,560	23,277	57%	17,283	43%

Looking at bachelor's degrees only, we find similar patterns: Males and females earned bachelor's degrees in Science and Mathematics fields in relative proportion to each other (47% males to 53% females and 60% males to 40% females, respectively), while Technology and Engineering bachelor's degrees were earned even more disproportionately by males (84% males to 16% females and 84% males to 16% females, respectively), and Health Care bachelor's degrees were earned even more disproportionately by females (15% males to 85% females). As with all degrees in Washington State, males earned 57% of STEM and Health Care bachelor's degrees, while females earned 43%.

Bachelor's Degrees Earned in WA Colleges and Universities, By Gender, 2009-11

Field of Study	Total # Bachelor's Degrees	Total # Bachelor's Degrees Earned by Males	Total % Bachelor's Degrees Earned by Males	Total # Bachelor's Degrees Earned by Females	Total % Bachelor's Degrees Earned by Females
Science	9,098	4,293	47%	4,805	53%
Technology	2,426	2,046	84%	380	16%
Engineering	4,343	3,641	84%	702	16%
Mathematics	1,369	826	60%	543	40%
Health Care	2,462	368	15%	2,094	85%
Grand Total	19,698	11,174	57%	8,524	43%

4. High-Demand Jobs in Washington State

Overview

- According to the March 2013 Boston Consulting Group study commissioned by the Washington Roundtable, there are currently 25,000 unfilled jobs in Washington as a result of the job skills gap (growing to 50,000 by 2017), 80 percent of which are in high-skill STEM and Health Care fields (BCG & WR, 2013).
- A joint report by the Higher Education Coordinating Board [Washington Student Achievement Council], State Board for Community and Technical Colleges and Workforce Training and Education Coordinating Board (2011) concludes that STEM fields dominate the list of high demand fields at the baccalaureate and graduate levels in Washington State: computer science, engineering, health professions, life sciences and agriculture and physical science occupations. (HECB, SBCTC & WTECB, 2011).
- Washington State's Office of Financial Management defines "high demand fields" as the following: agriculture and natural resources, biology and biomedical sciences, computer and information sciences, education, engineering, health professions and clinical sciences, management sciences and quantitative methods, math and statistics and physical sciences and technology (OFM, 2012).
- By 2019, it is predicted that Washington State employers will demand over 10,000 workers with bachelor's degrees in STEM and healthcare and 9,000 with graduate degrees annually (HECB, SBCTC & WTECB, 2011).

- The analysis shows a need for nearly 1,200 additional baccalaureate graduates prepared to work in computer science, nearly 700 in engineering, nearly 400 in health occupations, and 250 in physical and life sciences (HECB, SBCTC & WTECB, 2011).
- According to the Washington State Workforce Training and Education Coordinating Board, approximately 3,400 jobs in healthcare; installation, maintenance and repair; manufacturing and production; and science technology will be left unfilled in WA annually (WTECB, 2012).
- The predicted annual supply gap or shortage of STEM and health care bachelor's degrees in Washington averages 33% for all available STEM and healthcare positions (HECB, SBCTC & WTECB, 2011):
 - Physical Sciences: 57% supply gap
 - Engineering, Software & Architecture: 42% supply gap
 - Computer Science: 41% supply gap
 - Life Science & Agriculture: 32% supply gap
 - Healthcare: 16% supply gap
- In 2010, Washington employed 17,800 H1-B visa holders, and the majority of new visa activity (approximately 75 percent) was to meet demand for computer and mathematical occupations (WTECB, 2011).
- Health care represents 10% of Washington state employment and is projected to grow to 29% between 2010 and 2020 compared to 16% for all other state jobs (Carnevale et al., 2012).
- Of the projected 111,930 job openings between 2010 and 2020, the breakdown of need in health care fields is: 10% doctors, 31% nurses, 26% allied, and 34% Support (Carnevale et al., 2012).

Specific High-Demand Fields

According to the Higher Education Coordinating Board's [Washington Student Achievement Council's] Regional Needs Analysis Report (2011), the following occupations represent the top STEM and Health Care high-demand fields that require a mid-level credential, bachelor's degree or advanced degree based on number of Washington State job openings projected in 2020. (Please see Appendix for complete tables.)

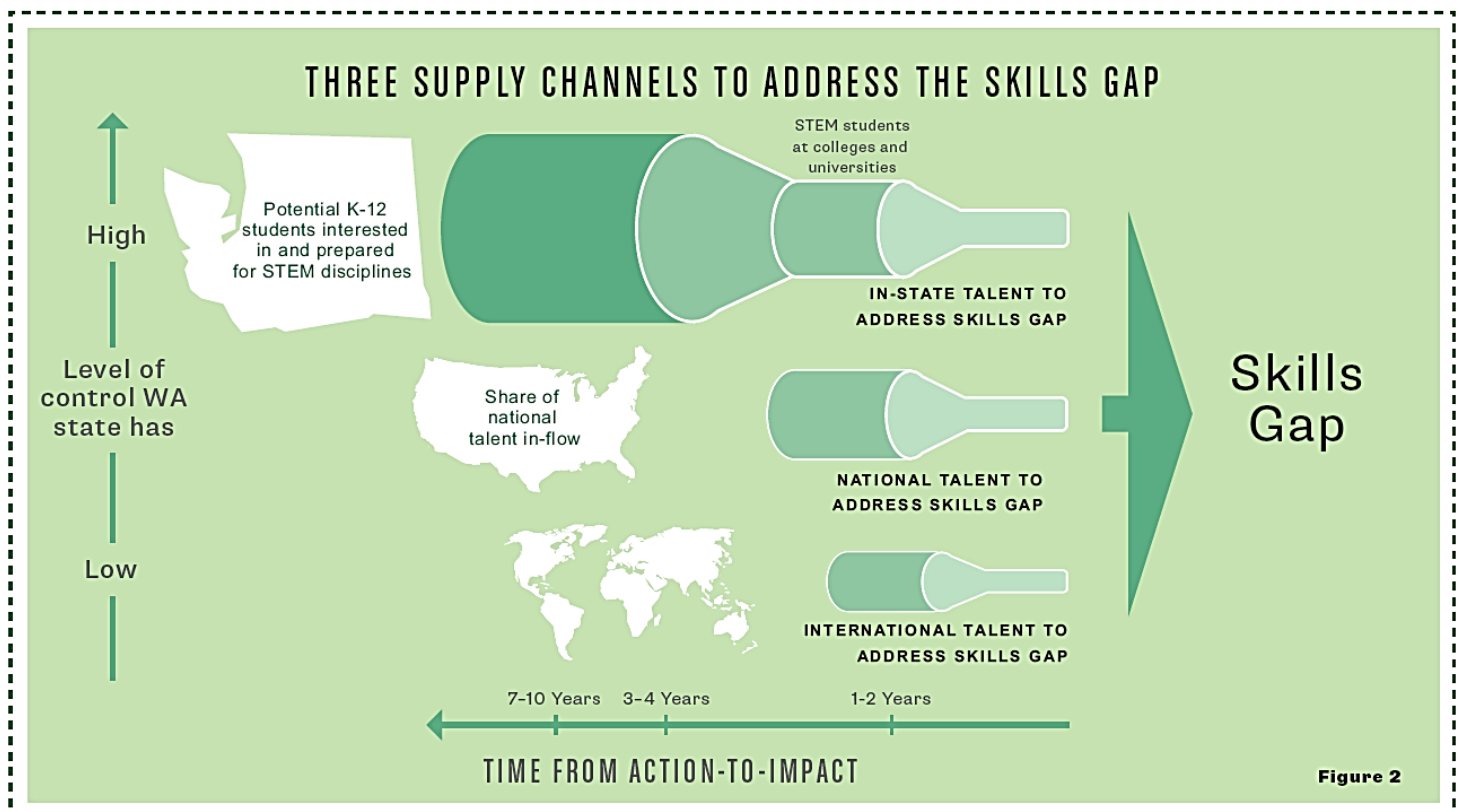
High-Demand STEM and Health Care Fields in Washington State

Field of Study	Occupation Description	Job Openings by 2020
Requiring a Mid-Level Credential		
Health Care	Registered Nurses	23,249
Health Care	Nursing Aides, Orderlies, and Attendants	7,154
Health Care	Medical Secretaries	7,139
Technology	Computer Support Specialists	5,313
Health Care	Licensed Practical and Licensed Vocational Nurses	5,011
Technology	Automotive Service Technicians and Mechanics	3,323
Technology	Computer Specialists, All Others	2,963
Health Care	Dental Hygienists	2,349
Technology	Welders, Cutters, Solderers, and Brazers	2,243
Technology	Aircraft Structure, Surfaces, Rigging and Systems Assemblers	2,093
Science	Biological Technicians	1,851
Health Care	Medical Records and Health Information Technicians	1,777
Technology	Bus and Truck Mechanics and Diesel Engine Specialists	1,774
Technology	Industrial Machinery Mechanics	1,774
Health Care	Radiological Technologists and Technicians	1,426
Health Care	Emergency Medical Technicians and Paramedics	1,252
Health Care	Healthcare Technologists and Technicians, All Other	1,151
Science	Veterinary Technologists and Technicians	1,074
Requiring a Bachelor's Degree		
Technology	Computer Software Engineers, Applications	7,452
Technology	Network Systems and Data Communications Analysts	7,061
Technology	Computer Systems Analysts	5,232
Engineering	Computer Software Engineers, Systems Software	5,221
Science	Farm, Ranch and Other Agricultural Managers	5,113
Engineering	Civil Engineers	4,310
Technology	Network and Computer Systems Administrators	4,279
Technology	Computer and Information Systems Managers	2,765
Technology	Computer Programmers	2,733
Technology	Graphic Designers	2,541
Engineering	Industrial Engineers	1,867
Engineering	Engineers, All Other	1,837
Health Care	Medical and Health Services Managers	1,828
Technology	Multi-Media Artists and Animators	1,786
Engineering	Mechanical Engineers	1,755
Health Care	Medical and Public Health Social Workers	1,401
Engineering	Aerospace Engineers	1,389
Requiring an Advanced Degree		
Health Care	Medical Scientists, Except Epidemiologists	2,433
Health Care	Pharmacists	2,194
Health Care	Clinical, Counseling and School Psychologists	2,176
Health Care	Physical Therapists	1,904
Science	Environmental Scientists and Specialists, Including Health	1,675
Health Care	Mental Health Counselors	1,668
Health Care	Psychologists, All Other	1,572
Health Care	Speech-Language Pathologists	1,184
Technology	Computer and Information Scientists, Research	1,159
Health Care	Mental Health and Substance Abuse Social Workers	1,144
Science	Veterinarians	1,074
Health Care	Dentists, General	893
Health Care	Chiropractors	814
Science	Geoscientists, Except Hydrologists and Geographers	546
Health Care	Optometrists	515
Health Care	Health Educators	450
Health Care	Podiatrists	409
Science	Biochemists and Biophysicists	272
Science	Hydrologists	265
Health Care	Audiologists	250
Mathematics	Statisticians	239
Science	Physicists	214
Science	Microbiologists	193
Health Care	Orthodontists	157
Health Care	Oral and Maxillofacial Surgeons	148
Health Care	Dentists, All Other Specialists	130
Science	Epidemiologist	106
Health Care	Prosthodontists	90

Policy Recommendations

According to the Boston Consulting Group and Washington Roundtable study (2013, pp. 7-9), the following policy recommendations are proposed to address Washington State's job skills gap:

- 1) **Increase computer science, engineering and health care capacity and throughout at colleges and universities in Washington.**
 - a) Taking this step has the potential to increase the supply of qualified employees in highly skilled STEM positions by 1,200 to 3,600 per year.
 - b) It could also increase the supply of qualified employees in high-demand health care occupations by 400 to 1,400 per year.
- 2) **Foster STEM interest and performance among K-12 students.**
 - a) Even if all qualified applicants had access to their desired degree programs in computer science and engineering, the demand for STEM-related job candidates will continue to exceed the supply.
- 3) **Improve alignment of technical degree and certificate curricula with employer demands.**
 - a) Community and technical colleges need additional public-private cooperative programs that combine classroom instruction with practical experiences.
 - b) Better alignment could increase the supply of qualified employees by 800 annually if 25 percent of students currently enrolled in low-demand programs shifted to high-demand programs.
- 4) **Promote and enable in-bound migration of skilled workers from other states.**
- 5) **Support expansion of international immigration opportunities.**



Appendix B

State-Level High Employer Demand Occupations, by Education and Training Requirements

Table 68
Mid-Level Analysis

Top 50 Growth Occupations Requiring a Mid-Level Credential in Washington by Number of Jobs										Exceeds Average Area Standard		
Description	SOC Code	2010 Jobs	2020 Jobs	Change	% Change	Job Openings	% New & Rep.	Current Median Hourly Earnings	BLS Entry Education Level	1 Adult, 1 Preschooler	1 Adult, 1 Preschooler, 1 Schoolage	2 Adults, 1 Preschooler, 1 Schoolage (each adult)
1 Real estate sales agents	41-9022	46,274	63,246	16,972	37%	24,551	53%	\$8.98	Postsecondary vocational award			
2 Registered nurses	29-1111	55,129	68,742	13,613	25%	23,249	42%	\$34.31	Associate's degree	✓	✓	✓
3 Photographers	27-4021	21,492	25,785	4,293	20%	8,597	40%	\$12.70	Long-term on-the-job training			✓
4 Cooks, restaurant	35-2014	21,815	24,001	2,186	10%	7,913	36%	\$12.11	Long-term on-the-job training			✓
5 Nursing aides, orderlies, and attendants	31-1012	23,037	27,876	4,839	21%	7,154	31%	\$12.80	Postsecondary vocational award			✓
6 Medical secretaries	43-6013	19,187	23,740	4,553	24%	7,139	37%	\$16.88	Postsecondary vocational award	✓		✓
7 Carpenters	47-2031	38,179	37,282	-897	-2%	6,768	18%	\$22.91	Long-term on-the-job training	✓	✓	✓
8 Appraisers and assessors of real estate	13-2021	10,354	13,842	3,488	34%	5,371	52%	\$11.36	Postsecondary vocational award			✓
9 Computer support specialists	15-1041	12,907	14,608	1,701	13%	5,313	41%	\$22.05	Associate's degree	✓	✓	✓
10 Licensed practical and licensed vocational nurses	29-2061	9,938	11,834	1,896	19%	5,011	50%	\$20.98	Postsecondary vocational award	✓	✓	✓
11 Electricians	47-2111	15,777	15,201	-576	-4%	4,578	29%	\$28.16	Long-term on-the-job training	✓	✓	✓
12 Fire fighters	33-2011	9,295	10,836	1,541	17%	4,397	47%	\$30.46	Long-term on-the-job training	✓	✓	✓
13 Gaming dealers	39-3011	5,894	6,936	1,042	18%	3,563	60%	\$12.12	Postsecondary vocational award			✓
14 Preschool teachers, except special education	25-2011	9,092	10,791	1,699	19%	3,528	39%	\$11.54	Postsecondary vocational award			
15 Fitness trainers and aerobics instructors	39-9031	7,425	9,438	2,013	27%	3,351	45%	\$15.36	Postsecondary vocational award			✓
16 Automotive service technicians and mechanics	49-3023	14,033	14,591	558	4%	3,323	24%	\$20.06	Postsecondary vocational award	✓	✓	✓
17 Farmers and ranchers	11-9012	28,298	29,019	721	3%	3,173	11%	\$9.21	Long-term on-the-job training			
18 Coaches and scouts	27-2022	7,641	9,335	1,694	22%	3,157	41%	\$17.86	Long-term on-the-job training	✓		✓
19 Computer specialists, all other	15-1099	9,191	10,160	969	11%	2,963	32%	\$35.80	Associate's degree	✓	✓	✓
20 Police and sheriff's patrol officers	33-3051	8,640	9,187	547	6%	2,832	33%	\$31.06	Long-term on-the-job training	✓	✓	✓
21 Plumbers, pipefitters, and steamfitters	47-2152	10,553	9,925	-628	-6%	2,630	25%	\$26.33	Long-term on-the-job training	✓	✓	✓
22 Hairdressers, hairstylists, and cosmetologists	39-5012	12,895	13,065	170	1%	2,350	18%	\$17.97	Postsecondary vocational award	✓		✓
23 Dental hygienists	29-2021	4,653	6,052	1,399	30%	2,349	50%	\$43.86	Associate's degree		✓	✓
24 Welders, cutters, solderers, and brazers	51-4121	6,782	6,515	-267	-4%	2,243	33%	\$20.55	Long-term on-the-job training	✓	✓	✓
25 Compliance officers, except agriculture, construction, health and safety, and transportation	13-1041	6,177	7,707	1,530	25%	2,188	35%	\$25.56	Long-term on-the-job training	✓	✓	✓

Table 68 (Continued)

Top 50 Growth Occupations Requiring a Mid-Level Credential in Washington by Number of Jobs											Exceeds Average Area Standard		
Description	SOC Code	2010 Jobs	2020 Jobs	Change	% Change	Job Openings	% New & Rep.	Current Median Hourly Earnings	BLS Entry Education Level	1 Adult, 1 Preschooler	1 Adult, 1 Preschooler, 1 Schoolage	2 Adults, 1 Preschooler, 1 Schoolage (each adult)	
26 Musicians and singers	27-2042	5,797	6,720	923	16%	2,093	36%	\$10.80	Long-term on-the-job training				
27 Aircraft structure, surfaces, rigging, and systems assemblers	51-2011	8,474	8,138	-336	-4%	2,071	24%	\$23.57	Long-term on-the-job training	✓	✓	✓	
28 Paralegals and legal assistants	23-2011	6,203	7,494	1,291	21%	1,999	32%	\$22.52	Associate's degree	✓	✓	✓	
29 Biological technicians	19-4021	3,804	4,322	518	14%	1,851	49%	\$18.37	Associate's degree	✓		✓	
30 Media and communication workers, all other	27-3099	4,614	5,357	743	16%	1,834	40%	\$17.33	Long-term on-the-job training	✓		✓	
31 Interpreters and translators	27-3091	4,101	4,956	855	21%	1,830	45%	\$15.69	Long-term on-the-job training			✓	
32 Legal secretaries	43-6012	6,314	7,262	948	15%	1,801	29%	\$19.03	Postsecondary vocational award	✓	✓	✓	
33 Medical records and health information technicians	29-2071	4,464	5,329	865	19%	1,777	40%	\$16.55	Associate's degree	✓		✓	
34 Bus and truck mechanics and diesel engine specialists	49-3031	6,381	6,657	276	4%	1,774	28%	\$22.59	Postsecondary vocational award	✓	✓	✓	
35 Industrial machinery mechanics	49-9041	5,486	6,347	861	16%	1,672	30%	\$25.06	Long-term on-the-job training	✓	✓	✓	
36 Claims adjusters, examiners, and investigators	13-1031	5,648	5,564	-84	-1%	1,615	29%	\$26.38	Long-term on-the-job training	✓	✓	✓	
37 Heating, air conditioning, and refrigeration mechanics and installers	49-9021	5,774	6,137	363	6%	1,520	26%	\$24.34	Long-term on-the-job training	✓	✓	✓	
38 Radiologic technologists and technicians	29-2034	4,256	5,066	810	19%	1,426	34%	\$28.97	Associate's degree	✓	✓	✓	
39 Travel agents	41-3041	2,483	3,658	1,175	47%	1,392	56%	\$15.76	Postsecondary vocational award			✓	
40 Library technicians	25-4031	2,468	2,606	138	6%	1,269	51%	\$16.42	Postsecondary vocational award	✓		✓	
41 Emergency medical technicians and paramedics	29-2041	3,084	3,696	612	20%	1,252	41%	\$16.19	Postsecondary vocational award	✓		✓	
42 Massage therapists	31-9011	3,549	4,267	718	20%	1,195	34%	\$24.17	Postsecondary vocational award	✓	✓	✓	
43 Fine artists, including painters, sculptors, and illustrators	27-1013	2,715	3,271	556	20%	1,167	43%	\$9.54	Long-term on-the-job training				
44 Healthcare technologists and technicians, all other	29-2099	2,811	3,388	577	21%	1,151	41%	\$20.84	Postsecondary vocational award	✓	✓	✓	
45 Artists and related workers, all other	27-1019	2,673	3,220	547	20%	1,143	43%	\$9.08	Long-term on-the-job training				
46 Electrical power-line installers and repairers	49-9051	2,062	2,464	402	19%	1,141	55%	\$33.35	Long-term on-the-job training	✓	✓	✓	
47 Craft artists	27-1012	2,672	3,215	543	20%	1,133	42%	\$8.85	Long-term on-the-job training				
48 Telecommunications equipment installers and repairers, except line installers	49-2022	3,966	4,307	341	9%	1,102	28%	\$28.51	Long-term on-the-job training	✓	✓	✓	
49 Interior designers	27-1025	2,277	2,665	388	17%	1,087	48%	\$16.23	Associate's degree	✓		✓	
50 Veterinary technologists and technicians	29-2056	1,693	2,336	643	38%	1,074	63%	\$13.91	Associate's degree			✓	

Source: EMSI Complete Employment - 3rd Quarter 2010

Note: The statewide Self-Sufficiency Wages are derived by averaging the county/area standards, based on calculations found in Pearce, Diana (2009), "The Self-Sufficiency Standard for Washington State," UW School of Social Work.

Table 69
Baccalaureate Level Analysis

Top 50 Growth Occupations Requiring a Baccalaureate Degree in Washington by Number of Jobs											Exceeds Average Area Standard		
Description	SOC Code	2010 Jobs	2020 Jobs	Change	% Change	Job Openings	% New & Rep.	Current Median Hourly Earnings	BLS Entry Education Level	2 Adults, 1 Preschooler, 1 Schoolage (each adult)			
										1 Adult, 1 Preschooler	1 Adult, 1 Schoolage	1 Preschooler, 1 Schoolage	
1 Property, real estate, and community association managers	11-9141	28,995	38,875	9,880	34%	14,876	51%	\$10.82	Bachelor's degree				
2 Management analysts	13-1111	28,029	35,107	7,078	25%	11,889	42%	\$23.97	Degree plus work experience	✓	✓	✓	
3 Accountants and auditors	13-2011	33,304	39,437	6,133	18%	11,764	35%	\$22.72	Bachelor's degree	✓	✓	✓	
4 Chief executives and sole proprietors	11-1011	23,508	28,021	4,513	19%	11,117	47%	\$24.27	Degree plus work experience	✓	✓	✓	
5 Elementary school teachers, except special education	25-2021	28,497	32,148	3,651	13%	10,169	36%	\$32.96	Bachelor's degree	✓	✓	✓	
6 Securities, commodities, and financial services sales agents	41-3031	15,292	19,791	4,499	29%	9,186	60%	\$20.62	Bachelor's degree	✓	✓	✓	
7 Personal financial advisors	13-2052	17,102	23,994	6,892	40%	8,739	51%	\$14.68	Bachelor's degree			✓	
8 Business operation specialists, all other	13-1199	26,424	28,412	1,988	8%	7,892	30%	\$30.49	Bachelor's degree	✓	✓	✓	
9 General and operations managers	11-1021	24,179	24,535	356	1%	7,800	32%	\$47.63	Degree plus work experience	✓	✓	✓	
10 Computer software engineers, applications	15-1031	25,105	30,445	5,340	21%	7,452	30%	\$42.38	Bachelor's degree	✓	✓	✓	
11 Network systems and data communications analysts	15-1081	12,254	17,112	4,858	40%	7,061	58%	\$32.32	Bachelor's degree	✓	✓	✓	
12 Teachers and instructors, all other	25-3099	22,714	26,048	3,334	15%	6,845	30%	\$19.49	Bachelor's degree	✓	✓	✓	
13 Secondary school teachers, except special and vocational education	25-2031	16,167	17,218	1,051	7%	5,866	36%	\$33.71	Bachelor's degree	✓	✓	✓	
14 Computer systems analysts	15-1051	14,063	16,264	2,201	16%	5,232	37%	\$36.52	Bachelor's degree	✓	✓	✓	
15 Computer software engineers, systems software	15-1032	18,757	22,400	3,643	19%	5,221	28%	\$43.98	Bachelor's degree	✓	✓	✓	
16 Farm, ranch, and other agricultural managers	11-9011	16,629	18,255	1,626	10%	5,113	31%	\$21.18	Degree plus work experience	✓	✓	✓	
17 Market research analysts	19-3021	9,690	12,186	2,496	26%	5,103	53%	\$37.87	Bachelor's degree	✓	✓	✓	
18 Financial managers	11-3031	15,701	17,914	2,213	14%	5,038	32%	\$40.01	Degree plus work experience	✓	✓	✓	
19 Middle school teachers, except special and vocational education	25-2022	13,400	15,088	1,688	13%	4,750	35%	\$33.14	Bachelor's degree	✓	✓	✓	
20 Insurance sales agents	41-3021	12,676	13,989	1,313	10%	4,345	34%	\$18.49	Bachelor's degree	✓	✓	✓	
21 Civil engineers	17-2051	13,586	15,588	2,002	15%	4,310	32%	\$35.30	Bachelor's degree	✓	✓	✓	
22 Network and computer systems administrators	15-1071	11,838	14,143	2,305	19%	4,279	36%	\$34.46	Bachelor's degree	✓	✓	✓	
23 Writers and authors	27-3043	9,269	11,168	1,899	20%	3,844	41%	\$10.42	Bachelor's degree				
24 Human resources, training, and labor relations specialists, all other	13-1079	8,396	9,881	1,485	18%	3,687	44%	\$27.76	Bachelor's degree	✓	✓	✓	
25 Financial analysts	13-2051	7,099	9,316	2,217	31%	3,506	49%	\$22.21	Bachelor's degree	✓	✓	✓	

Table 69 (Continued)

Top 50 Growth Occupations Requiring a Baccalaureate Degree in Washington by Number of Jobs											Exceeds Average Area Standard		
Description	SOC Code	2010 Jobs	2020 Jobs	Change	% Change	Job Openings	% New & Rep.	Current Median Hourly Earnings	BLS Entry Education Level	1 Adult, 1 Preschooler, 1 Schoolage (each adult)			
										1 Adult, 1 Preschooler	1 Schoolage	2 Adults, 1 Preschooler, 1 Schoolage	
26 Sales managers	11-2022	8,441	9,919	1,478	18%	3,296	39%	\$45.74	Degree plus work experience	✓	✓	✓	
27 Public relations specialists	27-3031	6,664	7,945	1,281	19%	2,860	43%	\$25.07	Bachelor's degree	✓	✓	✓	
28 Construction managers	11-9021	13,864	15,336	1,472	11%	2,767	20%	\$28.13	Bachelor's degree	✓	✓	✓	
29 Computer and information systems managers	11-3021	9,284	10,539	1,255	14%	2,765	30%	\$53.43	Degree plus work experience	✓	✓	✓	
30 Computer programmers	15-1021	12,773	12,366	-407	-3%	2,733	21%	\$38.01	Bachelor's degree	✓	✓	✓	
31 Employment, recruitment, and placement specialists	13-1071	4,420	5,925	1,505	34%	2,659	60%	\$24.34	Bachelor's degree	✓	✓	✓	
32 Graphic designers	27-1024	5,774	6,541	767	13%	2,541	44%	\$19.56	Bachelor's degree	✓	✓	✓	
33 Adult literacy, remedial education, and GED teachers and instructors	25-3011	7,380	8,656	1,276	17%	2,417	33%	\$14.46	Bachelor's degree			✓	
34 Marketing managers	11-2021	5,645	6,405	760	13%	1,975	35%	\$45.32	Degree plus work experience	✓	✓	✓	
35 Training and development specialists	13-1073	3,902	4,787	885	23%	1,903	49%	\$28.51	Bachelor's degree	✓	✓	✓	
36 Industrial engineers	17-2112	4,890	5,500	610	12%	1,867	38%	\$38.26	Bachelor's degree	✓	✓	✓	
37 Music directors and composers	27-2041	4,870	5,726	856	18%	1,839	38%	\$8.92	Degree plus work experience	✓	✓	✓	
38 Engineers, all other	17-2199	7,648	7,571	-77	-1%	1,837	24%	\$42.41	Bachelor's degree	✓	✓	✓	
39 Medical and health services managers	11-9111	4,961	5,844	883	18%	1,828	37%	\$41.96	Degree plus work experience	✓	✓	✓	
40 Multi-media artists and animators	27-1014	3,994	4,886	892	22%	1,786	45%	\$16.02	Bachelor's degree	✓	✓	✓	
41 Education administrators, elementary and secondary school	11-9032	4,794	5,100	306	6%	1,776	37%	\$53.55	Degree plus work experience	✓	✓	✓	
42 Mechanical engineers	17-2141	5,857	6,029	172	3%	1,755	30%	\$38.72	Bachelor's degree	✓	✓	✓	
43 Tax examiners, collectors, and revenue agents	13-2081	3,366	3,650	284	8%	1,498	45%	\$21.37	Bachelor's degree	✓	✓	✓	
44 Probation officers and correctional treatment specialists	21-1092	3,817	4,432	615	16%	1,428	37%	\$25.78	Bachelor's degree	✓	✓	✓	
45 Medical and public health social workers	21-1022	3,062	3,694	632	21%	1,401	46%	\$24.31	Bachelor's degree	✓	✓	✓	
46 Administrative services managers	11-3011	4,274	4,773	499	12%	1,394	33%	\$40.41	Degree plus work experience	✓	✓	✓	
47 Aerospace engineers	17-2011	6,137	5,782	-355	-6%	1,389	23%	\$42.70	Bachelor's degree	✓	✓	✓	
48 Loan officers	13-2072	7,919	8,258	339	4%	1,360	17%	\$33.25	Bachelor's degree	✓	✓	✓	
49 Art directors	27-1011	3,211	3,848	637	20%	1,354	42%	\$14.75	Degree plus work experience	✓	✓	✓	
50 Social and community service managers	11-9151	3,672	4,165	493	13%	1,344	37%	\$26.08	Bachelor's degree	✓	✓	✓	

Source: EMSI Complete Employment - 3rd Quarter 2010

Note: The statewide Self-Sufficiency Wages are derived by averaging the county/area standards, based on calculations found in Pearce, Diana (2009), "The Self-Sufficiency Standard for Washington State," UW School of Social Work.

Table 70
Graduate/Professional Level Analysis

Top 50 Growth Occupations Requiring a Graduate/Professional Degree in Washington by Number of Jobs											Exceeds Average Area Standard		
Description	SOC Code	2010 Jobs	2020 Jobs	Change	% Change	Job Openings	% New & Rep.	Current Median Hourly Earnings	BLS Entry Education Level	1 Adult, 1 Preschooler	1 Adult, 1 Preschooler, 1 Schoolage	2 Adults, 1 Preschooler, 1 Schoolage (each adult)	
1 Postsecondary teachers	25-1099	29,304	33,022	3,718	13%	8,840	30%	\$32.53	Doctoral degree	✓	✓	✓	
2 Physicians and surgeons	29-1069	17,117	20,636	3,519	21%	6,538	38%	\$74.44	First professional degree	✓	✓	✓	
3 Lawyers	23-1011	16,834	19,252	2,418	14%	5,567	33%	\$37.12	First professional degree	✓	✓	✓	
4 Rehabilitation counselors	21-1015	7,611	8,970	1,359	18%	2,918	38%	\$17.54	Master's degree	✓		✓	
5 Medical scientists, except epidemiologists	19-1042	4,475	6,004	1,529	34%	2,433	54%	\$30.00	Doctoral degree	✓	✓	✓	
6 Pharmacists	29-1051	6,038	6,882	844	14%	2,194	36%	\$51.83	First professional degree	✓	✓	✓	
7 Clinical, counseling, and school psychologists	19-3031	4,772	5,595	823	17%	2,176	46%	\$25.31	Doctoral degree	✓	✓	✓	
8 Clergy	21-2011	6,618	7,181	563	9%	1,950	29%	\$10.15	Master's degree				
9 Physical therapists	29-1123	4,951	6,257	1,306	26%	1,904	38%	\$32.38	Master's degree	✓	✓	✓	
10 Educational, vocational, and school counselors	21-1012	5,375	6,049	674	13%	1,767	33%	\$23.62	Master's degree	✓	✓	✓	
11 Environmental scientists and specialists, including health	19-2041	4,013	4,539	526	13%	1,675	42%	\$30.03	Master's degree	✓	✓	✓	
12 Mental health counselors	21-1014	4,552	5,298	746	16%	1,668	37%	\$19.07	Master's degree	✓	✓	✓	
13 Psychologists, all other	19-3039	3,124	3,812	688	22%	1,572	50%	\$23.97	Master's degree	✓	✓	✓	
14 Industrial-organizational psychologists	19-3032	2,869	3,537	668	23%	1,541	54%	\$20.17	Master's degree	✓	✓	✓	
15 Librarians	25-4021	3,801	3,975	174	5%	1,210	32%	\$27.80	Master's degree	✓	✓	✓	
16 Speech-language pathologists	29-1127	3,204	3,805	601	19%	1,184	37%	\$26.92	Master's degree	✓	✓	✓	
17 Computer and information scientists, research	15-1011	2,868	3,411	543	19%	1,159	40%	\$36.24	Doctoral degree	✓	✓	✓	
18 Mental health and substance abuse social workers	21-1023	2,795	3,236	441	16%	1,144	41%	\$18.33	Master's degree	✓		✓	
19 Instructional coordinators	25-9031	2,599	3,125	526	20%	1,099	42%	\$26.75	Master's degree	✓	✓	✓	
20 Veterinarians	29-1131	2,042	2,753	711	35%	1,074	53%	\$29.70	First professional degree	✓	✓	✓	
21 Substance abuse and behavioral disorder counselors	21-1011	2,615	3,110	495	19%	1,024	39%	\$15.69	Master's degree			✓	
22 Urban and regional planners	19-3051	2,963	3,345	382	13%	957	32%	\$31.90	Master's degree	✓	✓	✓	
23 Occupational therapists	29-1122	2,224	2,747	523	24%	927	42%	\$30.42	Master's degree	✓	✓	✓	
24 Dentists, general	29-1021	2,054	2,372	318	15%	893	43%	\$80.70	First professional degree	✓	✓	✓	
25 Chiropractors	29-1011	1,601	2,133	532	33%	814	51%	\$30.91	First professional degree	✓	✓	✓	

Table 70 (Continued)

Top 50 Growth Occupations Requiring a Graduate/Professional Degree in Washington by Number of Jobs										Exceeds Average Area Standard		
Description	SOC Code	2010 Jobs	2020 Jobs	Change	% Change	Job Openings	% New & Rep.	Current Median Hourly Earnings	BLS Entry Education Level	1 Adult, 1 Preschooler	1 Adult, 1 Preschooler, 1 Schoolage	2 Adults, 1 Preschooler, 1 Schoolage (each adult)
26 Social scientists and related workers, all other	19-3099	936	1,099	163	17%	632	68%	\$30.48	Master's degree	✓	✓	✓
27 Geoscientists, except hydrologists and geographers	19-2042	1,220	1,416	196	16%	546	45%	\$30.30	Master's degree	✓	✓	✓
28 Optometrists	29-1041	962	1,153	191	20%	515	54%	\$37.05	First professional degree	✓	✓	✓
29 Health educators	21-1091	1,373	1,530	157	11%	450	33%	\$21.10	Master's degree	✓	✓	✓
30 Operations research analysts	15-2031	918	1,066	148	16%	415	45%	\$35.43	Master's degree	✓	✓	✓
31 Podiatrists	29-1081	1,070	1,295	225	21%	409	38%	\$25.27	First professional degree	✓	✓	✓
32 Marriage and family therapists	21-1013	813	957	144	18%	308	38%	\$14.45	Master's degree			✓
33 Counselors, all other	21-1019	751	903	152	20%	305	41%	\$14.69	Master's degree			✓
34 Biochemists and biophysicists	19-1021	406	547	141	35%	272	67%	\$25.39	Doctoral degree	✓	✓	✓
35 Hydrologists	19-2043	612	703	91	15%	265	43%	\$30.09	Master's degree	✓	✓	✓
36 Audiologists	29-1121	594	723	129	22%	250	42%	\$26.14	First professional degree	✓	✓	✓
37 Statisticians	15-2041	647	693	46	7%	239	37%	\$32.66	Master's degree	✓	✓	✓
38 Physicists	19-2012	493	567	74	15%	214	43%	\$37.54	Doctoral degree	✓	✓	✓
39 Microbiologists	19-1022	461	505	44	10%	193	42%	\$26.77	Doctoral degree	✓	✓	✓
40 Anthropologists and archeologists	19-3091	230	282	52	23%	168	73%	\$23.97	Master's degree	✓	✓	✓
41 Orthodontists	29-1023	330	395	65	20%	157	48%	\$54.94	First professional degree	✓	✓	✓
42 Museum Technicians and Conservators	25-4013	348	400	52	15%	156	45%	\$18.15	Master's degree	✓		✓
43 Economists	19-3011	455	475	20	4%	153	34%	\$31.56	Master's degree	✓	✓	✓
44 Oral and maxillofacial surgeons	29-1022	308	370	62	20%	148	48%	\$62.97	First professional degree	✓	✓	✓
45 Dentists, all other specialists	29-1029	263	318	55	21%	130	49%	\$46.32	First professional degree	✓	✓	✓
46 Political scientists	19-3094	166	191	25	15%	107	64%	\$28.35	Master's degree	✓	✓	✓
47 Epidemiologists	19-1041	319	359	40	13%	106	33%	\$28.11	Master's degree	✓	✓	✓
48 Curators	25-4012	257	285	28	11%	106	41%	\$24.21	Master's degree	✓	✓	✓
49 Prosthodontists	29-1024	198	245	47	24%	90	45%	\$37.69	First professional degree	✓	✓	✓
50 Sociologists	19-3041	169	211	42	25%	76	45%	\$24.09	Master's degree	✓	✓	✓

Source: EMSI Complete Employment - 3rd Quarter 2010

Note: The statewide Self-Sufficiency Wages are derived by averaging the county/area standards, based on calculations found in Pearce, Diana (2009), "The Self-Sufficiency Standard for Washington State," UW School of Social Work.

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Appendix: WSOS Board-Approved Majors by Field of Study*

**Field of Study is categorized based on CSF R&E estimations given major descriptions. While STEM and health care field designations are available from federal sources, majors categorized by an individual field of study (e.g., Science, Technology, Engineering, Mathematics OR Health Care) are not available.*

Science

Agricultural and Horticultural Plant Breeding
Agronomy and Crop Science
Animal Sciences, General
Astronomy
Astrophysics
Atmospheric Sciences and Meteorology, General
Biochemistry
Biochemistry and Molecular Biology
Biochemistry/Biophysics and Molecular Biology
Biological and Biomedical Sciences, Other
Biological and Physical Sciences
Biology/Biological Sciences, General
Biomedical Sciences, General
Biophysics
Botany/Plant Biology
Cell/Cellular and Molecular Biology
Cell/Cellular Biology and Histology
Chemistry, General
Chemistry, Other
Ecology
Ecology, Evolution, Systematics and Population Biology, Other
Entomology
Environmental Biology
Environmental Science
Environmental Studies
Evolutionary Biology
Genetics, General
Genetics, Other
Geochemistry
Geological and Earth Sciences/Geosciences, Other
Geology/Earth Science, General
Geophysics and Seismology
Horticultural Science
Marine Biology and Biological Oceanography
Materials Science
Microbiology, General
Molecular Biology
Natural Resources Conservation and Research, Other
Natural Resources/Conservation, General
Natural Sciences
Neurobiology and Anatomy

Appendix: WSOS Board-Approved Majors by Field of Study (cont'd)

Science (cont'd)

Neurobiology and Neurosciences, Other
Neuroscience
Oceanography, Chemical and Physical
Optics/Optical Sciences
Physical Sciences
Physics, General
Physics, Other
Physiology, General
Physiology, Pathology, and Related Sciences, Other
Plant Molecular Biology
Plant Pathology/Phytopathology
Plant Physiology
Plant Protection and Integrated Pest Management
Plant Sciences, General
Reproductive Biology
Science Teacher Education/General Science Teacher Education
Soil Science and Agronomy, General
Structural Biology
Urban Forestry
Water, Wetlands, and Marine Resources Management
Wildlife and Wildlands Science and Management
Wildlife, Fish and Wildlands Science and Management
Zoology/Animal Biology

Technology

Architectural Drafting and Architectural CAD/CADD
Biology Technician/Biotechnology Laboratory Technician
Biomedical Technology/Technician
Biotechnology
CAD/CADD Drafting and/or Design Technology/Technician
Chemical Technology/Technician
Computer and Information Sciences, General
Computer and Information Sciences, Other
Computer Programming, Other
Computer Programming, Specific Applications
Computer Programming, Vendor/Product Certification
Computer Programming/Programmer, General
Computer Science
Computer Software and Media Applications, Other
Computer Systems Analysis/Analyst
Computer Systems Networking and Telecommunications
Data Modeling/Warehousing and Database Administration
Drafting and Design Technology/Technician, General
Energy Management and Systems Technology/Technician

Appendix: WSOS Board-Approved Majors by Field of Study (cont'd)

Technology (cont'd)

Hydraulics and Fluid Power Technology/Technician
Industrial Production Technologies/Technicians, Other
Industrial Safety Technology/Technician
Industrial Technology/Technician
Information Technology
Instrumentation Technology/Technician
Manufacturing Technology/Technician
Mechanical Drafting and Mechanical Drafting CAD/CADD
Modeling, Virtual Environments and Simulation
Nanotechnology
Occupational Safety and Health Technology/Technician
Quality Control and Safety Technologies/Technicians, Other
Radiologic Technology/Science - Radiographer
Robotics Technology/Technician
Solar Energy Technology/Technician
Surveying Technology/Surveying
Telecommunications Technology/Technician
Water Quality & Wastewater Treatment Mgmt & Recycling Tech
Water Quality and Wastewater Treatment Management and Recycling Technology/Techn
Water Quality and Wastewater Treatment Management and Recycling Technology/Technician
Web Page, Digital/Multimedia and Information Resources Design
Wood Science and Wood Products/Pulp and Paper Technology

Engineering

Aerospace, Aeronautical and Astronautical Engineering
Aerospace, Aeronautical and Astronautical/Space Engineering
Agricultural Engineering
Agricultural/Biological Engineering and Bioengineering
Architectural Engineering Technology/Technician
Bioengineering and Biomedical Engineering
Biomedical/Medical Engineering
Chemical Engineering
Civil Drafting and Civil Engineering CAD/CADD
Civil Engineering Technology/Technician
Civil Engineering, General
Civil Engineering, Other
Computer Engineering Technology/Technician
Computer Engineering, General
Computer Software Engineering
Construction Engineering Technology/Technician
Electrical and Electronic Engineering Technologies/Technicians, Other
Electrical and Electronics Engineerin
Electrical and Electronics Engineering
Electrical, Electronics and Communications Engineering
Electrical/Electronic Engineering Technologies/Technicians, Other

Appendix: WSOS Board-Approved Majors by Field of Study (cont'd)

Engineering (cont'd)

Electromechanical Technology/Electromechanical Engineering Tech
Electromechanical Technology/Electromechanical Engineering Technology
Engineering Technologies and Engineering-Related Fields, Other
Engineering Technologies/Technicians, Other
Engineering, General
Engineering, Other
Engineering/Industrial Management
Environmental Engineering Technology/Environmental Technology
Environmental/Environmental Health Engineering
Forest Engineering
Industrial Engineering
Manufacturing Engineering
Manufacturing Engineering Technology/Technician
Materials Engineering
Mechanical Engineering
Mechanical Engineering/Mechanical Technology/Technician
Plastics and Polymer Engineering Technology/Technician
Plastics Engineering Technology/Technician

Mathematics

Applied Mathematics
Applied Mathematics, General
Applied Mathematics, Other
Biomathematics and Bioinformatics, Other
Biomathematics, Bioinformatics, and Computational Biology, Other
Biostatistics
Computational Mathematics
Mathematics and Computer Science
Mathematics and Statistics, Other
Mathematics Teacher Education
Mathematics, General
Mathematics, Other
Statistics, General

Health Care

Clinical Nurse Leader
Epidemiology
Exercise Physiology
Family Practice Nurse/Nursing
Geriatric Nurse/Nursing
Health and Wellness, General
Human/Medical Genetics
Immunology
Medical Informatics
Medicinal and Pharmaceutical Chemistry

Appendix: WSOS Board-Approved Majors by Field of Study (cont'd)

Health Care (cont'd)

Medicinal and Pharmaceutical Chemistry (MS, PhD)
Nursing Administration
Nursing Education
Nursing Practice
Nursing Science
Operations Research
Orthotist/Prosthetist
Pathology/Experimental Pathology
Pharmaceutics and Drug Design
Pharmaceutics and Drug Design (MS, PhD)
Pharmacology
Pharmacology and Toxicology
Pharmacy
Pharmacy (PharmD [USA], PharmD or BS/BPharm [Canada])
Pharmacy Administration and Pharmacy Policy and Regulatory Affairs
Physical Therapy/Therapist
Psychiatric/Mental Health Nurse/Nursing
Public Health/Community Nurse/Nursing
Registered Nursing/Registered Nurse
Veterinary Medicine
Veterinary Medicine (DVM)
Veterinary Sciences/Veterinary Clinical Sci, Gen (Cert,MS,PhD)
Veterinary Sciences/Veterinary Clinical Sciences, General