OCCUPATIONAL OUTLOOK FOR VARIOUS PROGRAMS OF STUDY

COMPLETION TRENDS IN SOUTH CAROLINA HIGHER EDUCATION, 2009/10-2013/14

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EXECUTIVE SUMMARY

Students, higher education leaders, and policymakers across South Carolina and across the nation are becoming increasingly concerned about potential mismatches in the labor market between the jobs available and the individuals with the skills to fill them. This report examines the issue from three perspectives for the state of South Carolina:

1. What are the most popular programs of studies for students graduating from the state's public and independent colleges and universities, and what is the occupational outlook for those types of credentials?

2. What are the fastest growing occupations according to projections from the South Carolina Department of Employment and Workforce (DEW), and what have been the trends in the number of individuals graduating with degrees that could fill those types of jobs?

3. What are the current trends in the number of graduates in instructional programs classified as "STEM" fields and what are the likely number of job openings for those individuals in South Carolina through 2022?

All of these approaches can help to identify areas of mismatch resulting in possible shortages or potential surpluses of skilled labor. For institutions required to track the labor market outcomes of their graduates, this information may help them to evaluate whether the current availability and size of their programs is consistent with future market demand.

Based on South Carolina public and independent institution program completion data from 2009/10-2013/14 and the projected growth rates of occupations through 2022 prepared by DEW, the following *potential* imbalances were identified:

- Five very popular areas of study (as measured by total number of completions) are associated with occupations that are expected to experience employment growth of less than 10 percent by 2022. They include:
    - Biology,
    - Social Work,
    - Psychology,
    - English, and
    - History
    - Although this may imply a potential oversupply of these graduates, it is also necessary to take into account potential caveats such as their ability to work in other related fields that may have faster growth rates.
- Programs of study that fall below the top 15 most popular in the state but that have aggressive projected job growth of over 20 percent include:
    - Marketing/Marketing Management, General and
    - Heating, Air, Ventilation, and Refrigerator Maintenance Technicians

Looking from the opposing perspective, amongst the occupations (requiring some form of higher education) that are projected to have the fast or large degree of growth through 2022, there are seven that

appear to have possible mismatches with the supply of graduates from SC's public and independent institutions:

- Physical Therapists,
- Medical and Clinical Laboratory Technicians,
- Dental Hygienists,
- Dental Assistants,
- Medical Assistants,
- Middle School Teachers, and
- Nursing Assistants

Finally, examining trends in completions in STEM fields and the projected job openings for STEM occupations shows potential shortfalls of SC graduates in the following areas:

- Medical and Clinical Laboratory Technologists,
- Medical and Clinical Laboratory Technicians,
- Aerospace Engineers,
- Nuclear Engineers,
- Industrial Engineers,
- Avionic Technicians,
- Nuclear Technicians,
- Environmental Engineers,
- Material Scientists,
- Computer Programmers (Computer Science), and
- Chemical Technicians

While these are the trends seen in current data, it is important to note that there are limitations of the crosswalk between instructional program codes and occupational codes as well as rapid changes in the job market that may not be fully reflected in available employment projections. Thus, these findings should be viewed as a starting point for further investigation into particular programs of study where imbalances may exist.

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SECTION 1: INTRODUCTION

To obtain a stable, high-paying job in the 21st century, it is increasingly necessary to have some level of higher education. Educational requirements vary widely from some high school to associate's degrees through doctoral and professional degrees. The companion study to this piece, "Higher Education Enrollment," provides a sense of the growth in public undergraduate and graduate student enrollment through the year 2023, but it does not address trends in the programs of study that college students are choosing. Higher education is increasingly important to achieve positive job prospects, but it is also important to consider the subject and degree level of education being received.

This report uses completion data from South Carolina's public and independent colleges and universities to facilitate the discussion on whether the state's higher education system is producing individuals trained in fields of study that are likely to remain in high demand throughout the next decade.

Section 2 will provide background information on the top 30 areas of study based on the number of completions between fiscal years 2009-10 and 2013-14. Section 3 will use Bureau of Labor Statistics (BLS) and the National Center for Education Statistics (NCES) information to match these areas of study to their most likely occupations and explore the employment outlook for each of the occupations. Section 4 explores the projected fastest growing occupations through 2022 and what type of education may be necessary to meet that needs. Section 5 explores current workforce and graduation trends in areas designated as part of STEM fields. Section 6 concludes.

SECTION 2: TRENDS IN COMPLETIONS

In the companion report to this piece, South Carolina Higher Education Enrollment Projections 2015-2023, forecasts of the number of students expected to be enrolled in the state's public colleges and universities were presented for four sectors at the undergraduate level and two sectors at the graduate level. While overall enrollment projections may be useful for aggregate level planning for infrastructure and other system-wide budgeting, more detailed information about the types of programs being completed and their employment prospects will help policy makers determine if there are areas for improvement.

Standard Occupational Classification (SOC) codes are a system used by Federal agencies to classify workers into occupational categories. There are 840 detailed occupations available according to their occupational definition which can be combined into 461 broad occupations, 97 minor groups, and 23 major groups. The Classification of Instructional Programs (CIP) was developed by the US Department of

Education's NCES to provide a system for accurate tracking and reporting of fields of study and program completions. The NCES and the BLS have generated a crosswalk between SOC codes and CIP codes.

The number of "completers" in each CIP can be obtained from available South Carolina Commission on Higher Education (CHE) data.[1] Using information on "completers" between fiscal years 2009-2010 and 2013-14, planners and policy makers can begin to form a picture about areas in potential need of adjustments.

Table 1: 30 Most Popular CIPs for Public and Independent Higher Education Completers, 2009/10-2013/14

Completion Popularity	Program of Study (CIP)	Completers	% of Total Completers	Comp. earning Associate's Degree	Comp. earning Bachelor's Degree	Percent Change 2009/10 to 2013/14
1	Business Administration and Management, General (52.0201)	17,696	7.4%	10.2%	68.6%	0.1%
2	Liberal Arts and Sciences/Liberal Studies[2] (24.0101)	16,894	7.1%	78.3%	10.0%	64.0%
3	Nursing – Registered Nurse Training (51.3801)	15,430	6.5%	42.2%	38.0%	-13.3%
4	Biology/Biological Sciences, General (26.0101)	7,035	2.9%	0.0%	96.8%	22.8%
5	Psychology, General (42.0101)	5,516	2.3%	0.0%	97.6%	27.1%
6	Accounting (52.0301)	5,242	2.2%	22.8%	48.8%	11.4%
7	Social Work (44.0701)	3,764	1.6%	14.6%	29.1%	-17.2%
8	Political Science and Government, General (45.1001)	3,574	1.5%	0.0%	98.8%	-6.7%
9	Elementary Education and Teaching (13.1202)	3,222	1.3%	0.0%	83.6%	-16.3%
10	English Language and Literature, General (23.0101)	3,222	1.3%	0.0%	90.2%	-0.9%
11	Early Childhood Education and Teaching (13.1210)	3,220	1.3%	0.7%	88.5%	-22.7%

[1] Completions at proprietary schools are not included in these counts except for South University which reports detailed data on a regular basis to CHE.

[2] This CIP is used extensively in the two-year institutions for those students planning to continue their studies at a four-year institution. Of the 32 institutions with completers in 24.0101, 20 of them were two-year institutions including the technical colleges and regional campuses of the University of South Carolina (USC). Out of the 16,894 completers, only 1,712 (~10%) completed a bachelor's degree or higher in the five year period being studied.

Completion Popularity	Program of Study (CIP)	Completers	% of Total Completers	Comp. earning Associate's Degree	Comp. earning Bachelor's Degree	Percent Change 2009/10 to 2013/14
12	History, General (54.0101)	3,127	1.3%	0.0%	92.9%	-13.5%
13	Licensed Practical/Vocational Nurse Training (51.3901)	2,954	1.2%	0.0%	0.0%	-14.6%
14	Criminal Justice/Law Enforcement Administration (43.0103)	2,882	1.2%	6.5%	89.3%	44.5%
15	Multi-/Interdisciplinary Studies, Other (30.9999)	2,733	1.1%	96.6%	2.3%	60.3%
16	Data Processing & Data Processing Technology/Techn. (11.0301)	2,656	1.1%	62.0%	0.0%	15.9%
17	Business/Commerce, General (52.0101)	2,648	1.1%	68.0%	17.3%	8.0%
18	Marketing/Marketing Management, General (52.1401)	2,601	1.1%	0.0%	98.3%	-2.4%
19	Criminal Justice/Safety Studies (43.0104)	2,592	1.1%	73.9%	7.7%	10.9%
20	Sociology (45.1101)	2,589	1.1%	0.0%	98.9%	9.9%
21	Welding Technology/Welder (48.0508)	2,555	1.1%	0.0%	0.0%	29.6%
22	Speech Communication and Rhetoric (09.0101)	2,500	1.0%	0.0%	99.9%	-1.2%
23	Administrative Assistant and Secretarial Science (52.0401)	2,336	1.0%	65.5%	0.0%	6.4%
24	Finance, General (52.0801)	2,191	0.9%	0.0%	99.4%	-12.4%
25	Automobile/Automotive Mechanics Technology/Techn. (47.0604)	2,183	0.9%	23.1%	0.0%	11.6%
26	Educational Leadership and Administration, General (13.0401)	1,885	0.8%	0.0%	0.0%	-9.8%

Completion Popularity	Program of Study (CIP)	Completers	% of Total Completers	Comp. earning Associate's Degree	Comp. earning Bachelor's Degree	Percent Change 2009/10 to 2013/14
27	Heat, Air Cond., Ventilations & Refrig Maint Technol	1,743	0.7%	13.8%	0.0%	-14.0%
28	Sport and Fitness Administration/Management (31.0504)	1,708	0.7%	0.0%	91.3%	28.4%
29	Business Administration, Management, and Operations (52.0299)	1,661	0.7%	0.0%	100.0%	-44.5%
30	Civil Engineering, General (14.0801)	1,595	0.7%	0.0%	77.7%	15.4%
	All Other CIPs[3]	*108,945*	*45.6%*			
	TOTAL	**238,899**	**100.0%**	**19.5%**	**47.8%**	**14.1%**

Table 1 shows that the total number of completers over the 5 year period is nearly 239,000. Approximately 19.5 percent of all completers received an associate's degree while 47.8 percent received a bachelor's degree. There are significant variations in this distribution depending on the particular CIP. For example, Business Administration, Management, and Operations (52.0299; Table 1, #29) had 100 percent of its completers receiving a Bachelor's degree. Other CIPs with a high concentration in Bachelor's degrees include Speech Communication (99.9%), Finance (99.4%), Sociology (98.9%), Political Science (98.8%), and Marketing (98.3%).

There are also differences in the change in number of completions from 2009/10 through 2013/14 with Business Administration, Management, and Operations[4] dropping by 44.5 percent while Liberal Arts and Sciences increased by 64.0 percent. On average the 30 most popular CIPs grew about 10.7 percent over the past 5 years. This is somewhat slower than the growth for all CIPs, which was 14.1 percent. This may indicate that some programs of study currently in the top 30 will drop out if their declining popularity trends continue.

SECTION 3: MATCHING PROGRAMS TO OCCUPATIONS

Using the programs of study identified in Section 2, it is possible to match those with potential occupations. Appendix A provides the crosswalk for all 30 CIP codes to their associated SOC codes. The crosswalk data was obtained from a joint effort between the NCES and the BLS. There were some CIPs that

[3] Between 2009/10 and 2013/14 there were graduates in 469 unique CIP codes. The remaining 108,945 students graduated in one of the remaining 439 CIP codes not listed in Table 1.

[4] The total number of completes in 52.0299 for 2009 was 407 vs. 226 for 2013. This resulted in a relatively high percent change.

did not have matching occupations or matches that did not seem appropriate. These are included in the charts in this section but have N/A beside them.[5]

This information can be compared to the DEW's employment outlook for these 30 areas of study as well as the education requirements that the BLS associates with each occupation. The data from CHE can also provide the percent of completers during the five year period FY2010-2014 that received a degree meeting at least the minimum education requirement as reported by the BLS. This information is combined in Table 2.

Table 2: Dept. of Employment and Workforce Projected Growth for Top 30 Programs

Completion Popularity	Program of Study (CIP)	Projected Employment Growth (2012-2022)[6]	Typical Education Requirement	% of Completers Meeting Minimum Education Requirement (2009/10-2013/14)
1	Business Administration and Management, General (52.0201)	13.3%	Bachelor's	87.5% (Bachelor's or higher)
2	Liberal Arts and Sciences/Liberal Studies (24.0101)	N/A	N/A	N/A
3	Nursing – Registered Nurse Training (51.3801)	18.9%	Associate's[7]	80.2% (Associate's or higher)
4	Biology/Biological Sciences, General (26.0101)	7.4%	Bachelor's	100% (Bachelor's or higher)
5	Psychology, General (42.0101)	9.9%	Doctoral or Professional	2.4% (Doctoral or Profess.)[8]
6	Accounting (52.0301)	12.2%	Bachelor's	62.0% (Bachelor's or higher)
7	Social Work (44.0701)	9.7%	Bachelor's	69.6% (Bachelor's or higher)
8	Political Science and Government, General (45.1001)	17.3%	Doctoral or Professional	1.2% (Doctoral or Profess.) see footnote 7
9	Elementary Education and Teaching (13.1202)	14.6%	Bachelor's	100% (Bachelor's or higher)
10	English Language and Literature, General (23.0101)	7.5%	Bachelor's	99.6% (Bachelor's or higher)

[5] Liberal Arts and Sciences (24.0101) was linked to SOC 25-1199 which is "post-secondary teachers, all other." This SOC is typically associated with the need for a doctoral or professional degree which did not seem appropriate. For Multi-/Interdisciplinary Studies (30.9999) and Business Administration, Management, and Operations (52.0299), there were no occupation matches in the data set.

[6] Employment projections could include occupations that do not require higher education. For example, for the major "Business Administration and Management, General," there are some associated occupations that do not require a bachelor's degree. The growth in those jobs is included in the aggregate projection since individuals with an associate's degree or bachelor's degree could fill those types of jobs even if that might result in "underemployment."

[7] This field is in the process of changing to a focus on more RNs with a Bachelor's degree. This typical education requirement may change in the coming years.

[8] A bachelor's degree is required prior to pursuing a higher level degree for many occupations. For example, while there are only 2.4% of psychology students completing with a Doctoral degree, about 97.6% are graduating with a bachelor's degree which sets them up to pursue further higher education—possibly at an out-of-state graduate program.

Completion Popularity	Program of Study (CIP)	Projected Employment Growth (2012-2022)[6]	Typical Education Requirement	% of Completers Meeting Minimum Education Requirement (2009/10-2013/14)
11	Early Childhood Education and Teaching (13.1210)	15.9%	Associate's	100% (Associate's or higher)
12	History, General (54.0101)	8.6%	Bachelor's	100% (Bachelor's or higher)
13	Licensed Practical/Vocational Nurse Training (51.3901)	23.6%	Post-secondary, non-degree[9]	100% (Post-secondary or higher)
14	Criminal Justice/Law Enforcement Administration (43.0103)	10.8%	High school diploma or equivalent	100% (High school or higher)
15	Multi-/Interdisciplinary Studies, Other (30.9999)	N/A	N/A	N/A
16	Data Processing & Data Processing Technology/Techn. (11.0301)	0.1%	High school diploma or equivalent	100% (High school or higher)
17	Business/Commerce, General (52.0101)	14.0%	Bachelor's	18.4% (Bachelor's or higher)
18	Marketing/Marketing Management, General (52.1401)	20.1%	Bachelor's	98.3% (Bachelor's or higher)
19	Criminal Justice/Safety Studies (43.0104)	5.6%	High school diploma or equivalent	100% (High school or higher)
20	Sociology (45.1101)	15.0%	Doctoral or Professional	1.1% (Doctoral or Profess.) see footnote 7
21	Welding Technology/Welder (48.0508)	11.0%	High school diploma or equivalent	100% (High school or higher)
22	Speech Communication and Rhetoric (09.0101)	11.5%	Bachelor's	100% (Bachelor's or higher)
23	Administrative Assistant and Secretarial Science (52.0401)	10.2%	High school diploma or equivalent	100% (High school or higher)
24	Finance, General (52.0801)	13.0%	Bachelor's	99.7% (Bachelor's or higher)
25	Automobile/Automotive Mechanics Technology/Techn. (47.0604)	9.9%	Post-secondary, non-degree	100% (Post-secondary or higher)
26	Educational Leadership and Administration, General (13.0401)	11.3%	Master's	100% (Master's or higher)

[9] For this study, the BLS term "post-secondary, non-degree" corresponds to degree levels 1, 2, and 3 in CHE data.

Completion Popularity	Program of Study (CIP)	Projected Employment Growth (2012-2022)[6]	Typical Education Requirement	% of Completers Meeting Minimum Education Requirement (2009/10-2013/14)
27	Heat, Air Cond., Ventilations & Refrig Maint Technol	22.0%	Post-secondary, non-degree	100% (Post-secondary or higher)
28	Sport and Fitness Administration/Management (31.0504)	11.3%	High school diploma or higher	100% (High school or higher)
29	Business Administration, Management, and Operations (52.0299)	N/A	N/A	N/A
30	Civil Engineering, General (14.0801)	18.6%	Bachelor's	100% (Bachelor's or higher)

Among the most popular CIP codes, the four fastest growing occupational sectors are Licensed Practical/Vocational Nurse Training (23.6%); Heat, Air Cond. Maint. Tech. (22.0%); Marketing/Marketing Management (20.1%) and Nursing—Registered Nurse Training (18.9%). While these programs are projected to have significant employment opportunities over the next seven years, they only rank 13th, 27th, 18th, and 3rd, respectively, in terms of popularity of program of study at the state's colleges and universities.

This can be represented visually using something like the diagram found in Figure 1. Areas of study can be broken into three categories based on DEW projections of employment growth by 2022: occupation growth expected be 20%+ by 2022, growth expected to be between 10% and 20%, and expected growth <10%. Areas of study can also be classified based on their popularity—whether they fall in the top 15 in terms of completers or whether they fall below the top 15. Although these category splits are somewhat subjective, they can provide some level of understanding on whether there are certain occupations expected to have significant employment opportunities in the future and how "popular" that area of study has been in recent years.

Figure 1: Conceptual Diagram of Employment Demand vs. Number of Graduates

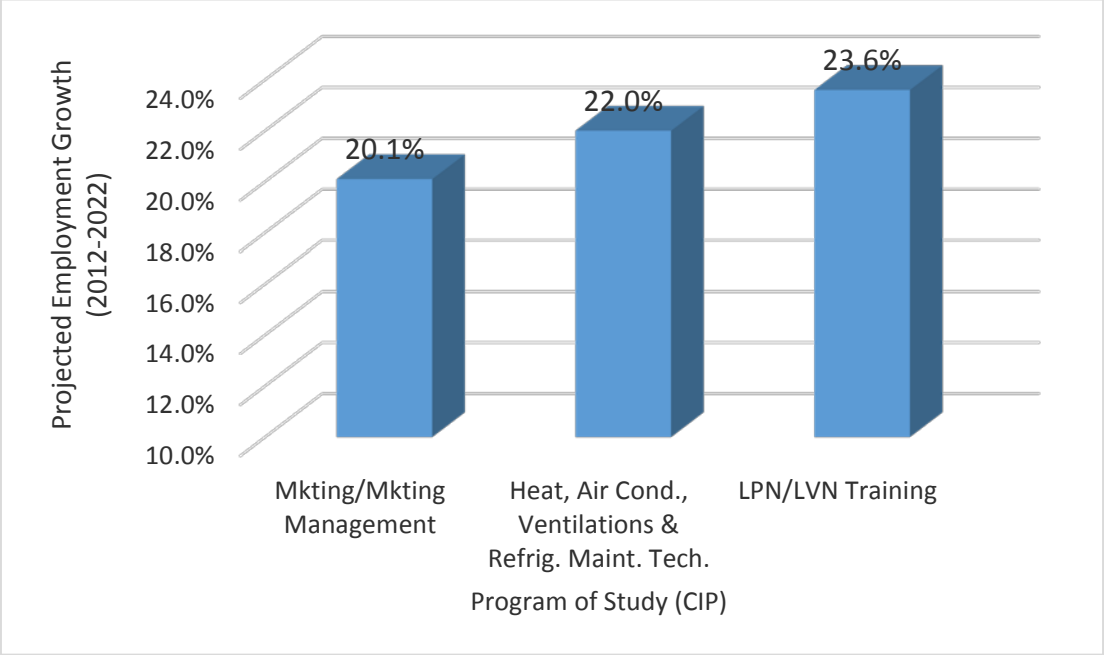
DEW Projected Employment Growth

2009-10 through 2013-14 Graduates	"Slow" <10% growth	"Moderate" 10%-20% growth	"Fast" 20%+ growth
Top 15 most popular degrees (6-digit CIP)	"Potential Oversupply"	"Potential Meeting Demand"	"Potential Shortage"
Top 16-30 most			

popular degrees (6-digit CIP)	"Likely Balanced"	"Possible Shortage"	"Probable Shortage"

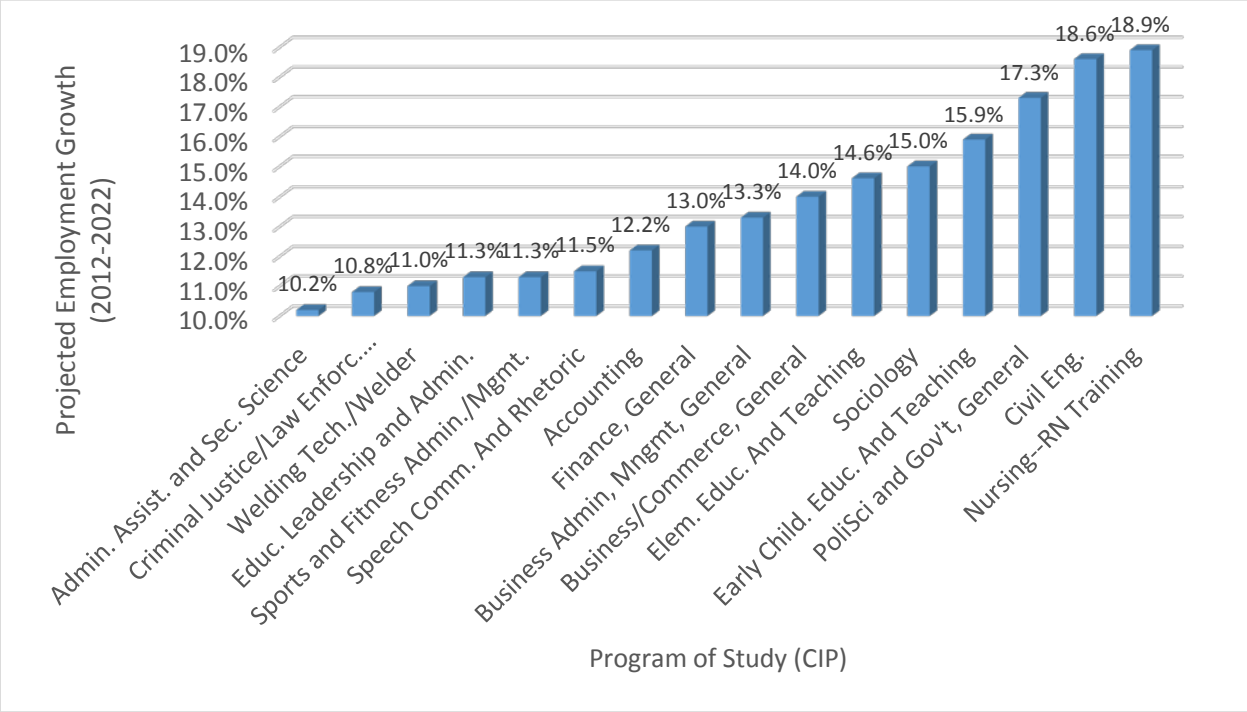
FAST: Those areas that are expected to have the fastest employment growth (20%+) and in the top 15 most popular CIPs could be considered to be in "potential shortage" meaning that although these are popular areas of study, their anticipated growth rate in the job market makes them an even more attractive option for students today and into the future. Those areas that are growing at the fastest rate but not in the top 15 are likely to be areas of "probable shortage." These occupations are growing extremely quickly and need graduates with the skills necessary to take them. If there are an insufficient number of students graduating in those areas, there may be a shortage in future years.

Figure 2: CIPs with Fastest Projected Employment Growth



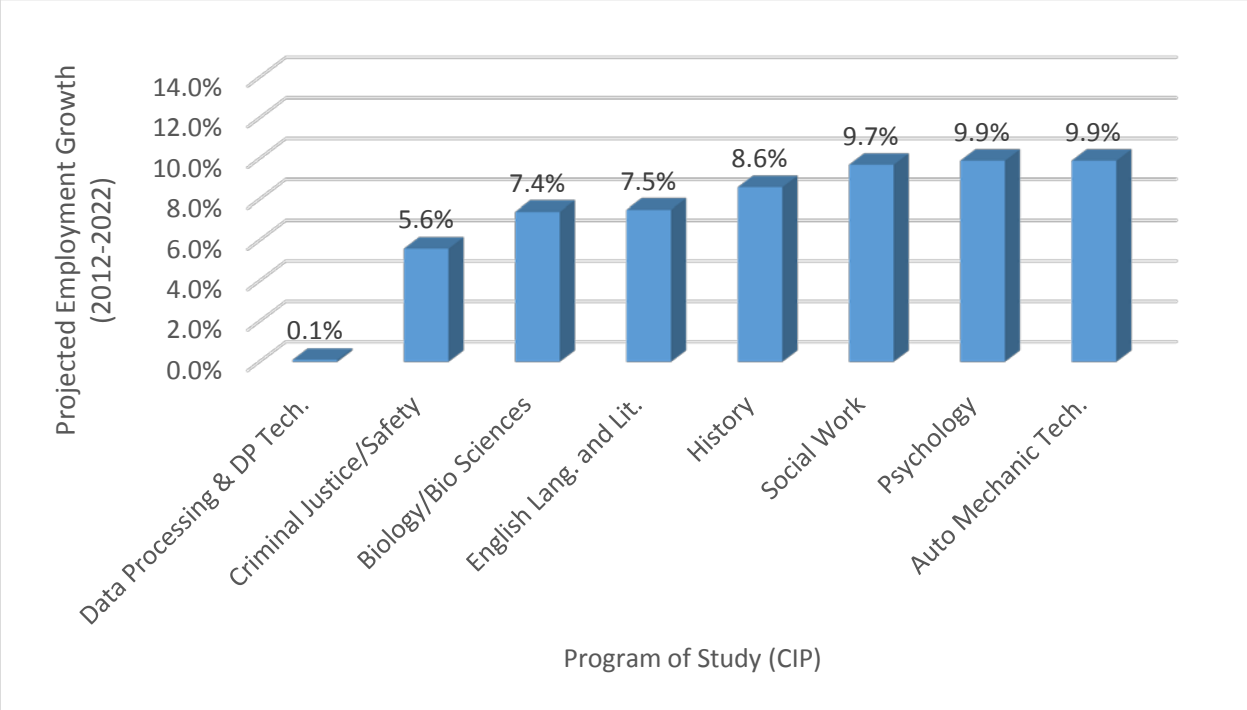
MODERATE: Those occupations expected to grow at a moderate rate (10%-20%) and in the top 15 in popularity can be considered to be "potentially meeting demand." These are common areas of study but they also have strong employment outlooks. Those areas with moderate employment growth projections that are outside of the top 15 could be considered to be in a "possible shortage." These occupations are growing between 10% and 20% by 2022, so if there is insufficient interest by students for concentrating their studies in those areas, a possible shortage may arise over time.

Figure 3: CIPs with Moderate Projected Employment Growth



SLOW: Areas that are slow growing (<10%) and in the top 15 most popular CIPs may be creating a "potential oversupply." This term should be taken with some caveats: first, the designation of fast/medium/slow growth are subjective, second, the designation of popular/not popular is also subjective, finally there are many students who graduate with one degree and are able to find suitable work in occupations that the BLS has not considered. For example, a psychology graduate may work in an occupation that is considered part of the management field. This is not taken into account by the BLS mapping of CIP to SOC codes. Finally, areas that are slow growing and outside of the top 15 might be more "balanced." Similar to the popular, medium employment growth category, it is likely that the number of graduates is adequately meeting the demand for those types of positions.

Figure 4: CIPs with Slow Projected Employment Growth



Using the information from Table 5, we can categorize each of the 30 most popular CIP codes into one of the six boxes. This is done in Figure 5.

Figure 5: Conceptual Diagram of Top 30 CIP Codes[10]

2009-10 through 2013-14 Graduates	DEW Projected Employment Growth 2012-2022: <10% growth	10%-20% growth	20%+ growth
Top 15 most popular degrees (6-digit CIP)	**Potential Oversupply** #4 Biology/Biological Sciences #7 Social Work #9 Psychology #10 English Language and Literature, General #12 History, General	**Potential Meeting Demand** #1 Business Administration and Management, General #3 Nursing—RN Training* #6 Accounting #8 Political Science and Government #9 Elementary Education and Teaching #11 Early Childhood Education and Teaching #14 Criminal Justice/Law Enforcement	**Potential Shortage** #13 LPN/LVN
Top 16-30 most popular degrees (6-digit CIP)	**Likely Balanced** #16 Data Processing #19 Criminal Justice/Safety Studies #25 Automobile Mechanics and Technology	**Possible Shortage** #17 Business/Commerce #20 Sociology #21 Welding Technology #22 Speech Communication/Rhetoric #23 Administrative Assistant #24 Finance, General #26 Educational Leadership and Admin., General #28 Sport and Fitness Admin/Mgmt #30 Civil Engineering	**Probable Shortage** #18 Marketing/Mkting Management #27 Heat, Air, Ventilation & Refrig Maint. Tech.

*Registered Nurse Training is projected to grow 18.9 percent by 2022 keeping it just short of next category of "potential shortage."

Similar to other workforce projection studies, the data appears to show a likely shortage in the number of nurses available to fill jobs in the future. With the aging of the nation's population and the

[10] CIPs not included in diagram include: Liberal Arts and Sciences, Multi-/Interdisciplinary Studies, and Business Admin, Mang. and Operations.

increased access to healthcare, it is likely that many medical professions will continue to experience high levels of growth and thus an increased need for graduates in those areas. However, according to the "Hospital Nursing Workforce in South Carolina: 2015" report from the Office for Healthcare Workforce Analysis and Planning (OHWAP), only about 42 percent of hospitals currently employ any LPN/LVNs. Workers trained with this background more typically find employment in non-hospital settings, particularly retirement communities. The study additionally found that 36 percent of hospitals expect a reduction in the number of LPNs in their employ in 2015. These changes may not be accurately captured in the DEW occupational projections and thus may overstate future demand for this occupation. Similarly, the OHWAP study finds that while there seems to be a sufficient number of new graduates able to fill RN positions, many hospitals are more specifically interested in RNs with years of experience. Simply comparing the number of graduates to the projected RN demand may be insufficient to draw conclusions without also considering the stated needs of the medical community.

The box labeled "potential oversupply" should be considered with some caveats. Biology, for example is often chosen as a major for pre-med, pre-dental, or pre-vet students. These are not career paths taken into account in the NCES/BLS crosswalk between CIPs and SOCs. According to a 2013 article by Jordan Weissman in *The Atlantic*, English and History majors reported rates of unemployment of 9.8 percent and 9.5 percent, respectively, following graduation. This was better than the rates for economics and political science graduates who reported 10.4 percent and 11.1 percent unemployment post-graduation, respectively. However, there is still concern nationwide that many individuals majoring in these fields are likely to become *underemployed* post-graduation—taking jobs for which they are overqualified (Johnson, 2013). Although the economy has been improving since the Great Recession, the Federal Reserve Board still estimates that underemployment for recent college graduates is about 45 percent (Abel et. al, 2014).They find that this can differ substantially by major with the more technical fields typically having lower underemployment rates than those majoring in social sciences or leisure and hospitality.

An area that has the potential for rapid growth is the Heating, Air, Ventilation, and Refrigerator Maintenance. DEW anticipates that occupations associated with this degree will grow by 22.0 percent between 2012 and 2022. Florence-Darlington Technical College announced in early August 2015 that they were breaking ground on a new Automotive and HVAC (Heating and Air Conditioning) Center on their main campus which should be complete in the fall of 2016.

Marketing positions are increasingly focused on digital and content marketing. This may create more opportunity for overlap with some of the information technology graduates as online marketing continues to grow. This will be an additional source of potential workers that could balance out any mismatches in supply and demand.

SECTION 4: FASTEST GROWING AND LARGEST OCCUPATIONS

IS HIGHER EDUCATION MEETING DEMAND IN HIGH PERCENTAGE GROWTH OCCUPATIONS?

Exploring the labor supply and demand from the opposite perspective, it is possible to determine which occupations are likely to be in high demand over the coming years and compare that with the average number of completions at SC's colleges and universities.

According to the Department of Employment and Workforce, the occupations requiring some form of higher education with the fasted projected employment growth (as measured by percentage change) range from 25.7 percent for dental assistants (31-9091) to 34.9 percent for dental hygienists (29-2021).[11] The ten occupations with the highest projected percentage change between 2012 and 2022 are shown in Table 3.

Table 3: Fastest Growing Occupations Requiring Higher Education by Percent Change, 2012-2022

% Change Rank	Standard Occupational Classification	Employment 2012	Employment 2022	Net Change	% Change
1	Dental hygienists (29-2021)	2,515	3,393	878	34.9%
2	Market research analysts and marketing specialist (13-1161)	3,846	5,180	1,334	34.7%
3	Physical therapists (29-1123)	2,854	3,792	938	32.9%
4	Surgical technologists (29-2055)	1,836	2,386	550	30.0%
5	Cost estimators (13-1051)	2,486	3,219	733	29.5%
6	Medical and clinical laboratory technicians (29-2012)	2,454	3,175	721	29.4%
7	Healthcare social workers (21-1022)	2,438	3,133	695	28.5%
8	Computer systems analysts (15-1121)	5,187	6,631	1,444	27.8%
9	Medical assistants (31-9092)	8,141	10,394	2,253	27.7%
10	Dental assistants (31-9091)	3,337	4,194	857	25.7%

Appendix B provides a crosswalk between these ten occupations and their associated CIP codes. Using these CIP codes it is possible to determine the number of completions from the state's public and independent colleges who might possibly be able to fill those roles. Table 4 shows the total number of completers for each high demand occupation between 2009/10 and 2013/14 as well as the average number per year. Only completions at the minimum education level are included. For example, individuals completing a degree related to healthcare social work were only included if the degree was at a master's degree level or higher.

[11] Occupations were considered if the anticipated employment growth was at least 500 between 2012 and 2022. For example, the occupation audiologists is expected to grow 47.7 percent but that only represents a net change of 41 jobs. Thus, it is not included in this analysis but could be a part of future studies.

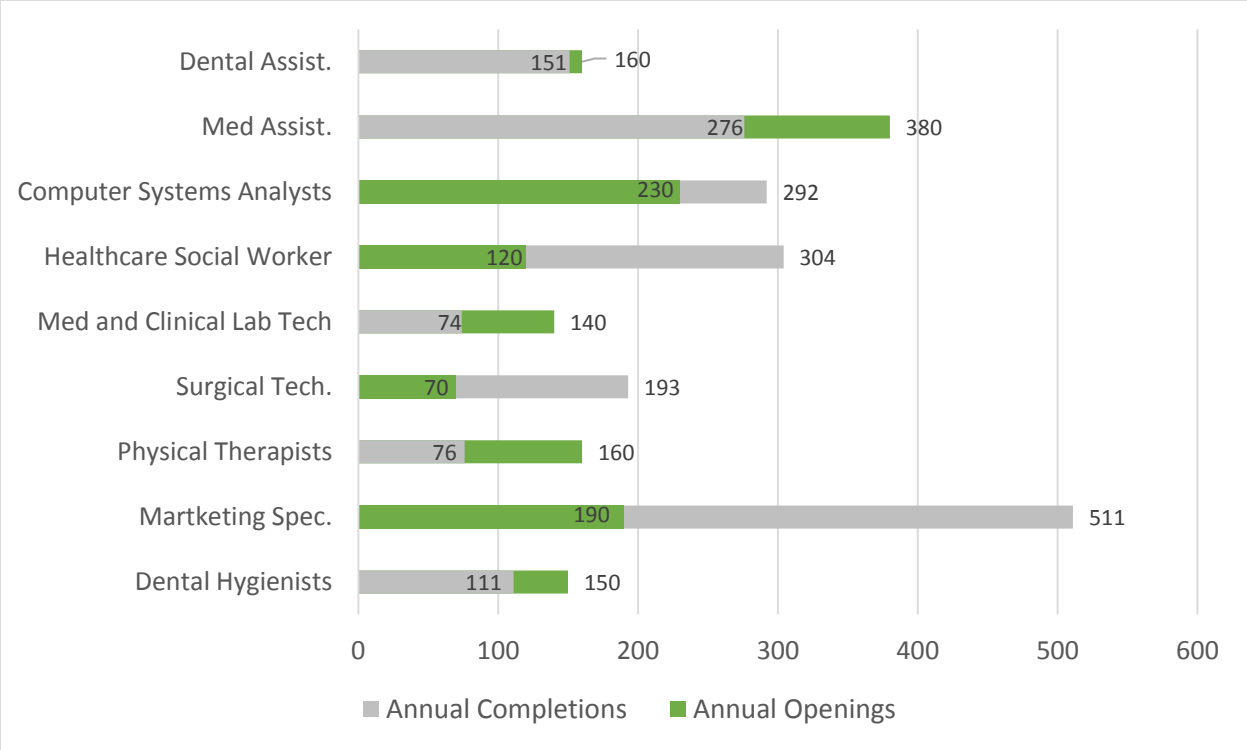
Table 4: Annual Completers and Projected Job Openings for Fastest Growing Occupations, 2009/10-2013/14

% Change Rank	Standard Occupational Classification	Total Completers (2010-2013)	Average Annual Completers	Estimated New Jobs between 2012 and 2022	Projected Annual SC Job Openings[12]
1	Dental hygienists (29-2021)	620	111	878	150
2	Market research analysts and marketing specialist (13-1161)	2,601	511	1,334	190
3	Physical therapists (29-1123)	380	76	938	160
4	Surgical technologists (29-2055)	963	193	550	70
5	Cost estimators (13-1051)	22,483	3,529	733	150
6	Medical and clinical laboratory technicians (29-2012)	575	74	721	140
7	Healthcare social workers (21-1022)	3,764	304	695	120
8	Computer systems analysts (15-1121)	1,505	292	1,444	230
9	Medical assistants (31-9092)	1,380	276	2,253	380
10	Dental assistants (31-9091)	754	151	857	160

Based on the information contained in Table 4 policy makers can begin to form a picture of whether there are any high demand occupations that may not have a sufficient number of workers qualified for these future positions. Figure 6 compares the average annual completions at South Carolina institutions along with the projected number of annual SC job openings through 2022. These are compared to provide an idea of whether the occupation may be facing a potential annual shortage or surplus over the next several years based on the past history of higher education completions.

[12] O*Net Online with information from the SC Department of Employment and Workforce. May be higher due to factoring in attrition of current workers.

Figure 6: Potential Annual Shortage/Surplus for High Demand Occupations



Cost Estimators were excluded from the figure due to being associated with the Business/Commerce, General (52.0101) and Business Administration and Management, General (52.0201) CIP codes which would inflate the number of completions as many of these graduates find work in a multitude of other occupations.

The finding that there may be more Marketing Research Analysts and Specialists than job openings seems contrary to the findings from Figure 2. However, this demonstrates how the subjective nature of the "cut points" in Figure 2 can lead to differing conclusions. The information presented in Figure 2 should be used as a starting point with more detailed analysis on individual CIP codes to determine more accurately the balance between labor supply and demand. Marketing/Marketing Management (52.1401) is the 18th most popular CIP code in the state and it is expected to be a growing industry. However, Figure 6 demonstrates that currently there are likely enough graduates in that field to satisfy current and future demand.

In general, it appears that the higher education system in South Carolina is meeting the needs of Surgical Technologist, Computer Systems Analysts, and Dental Assistants. There are four areas that appear to have imbalances that might require additional consideration for filling future jobs: Physical Therapists, Medical and Clinical Laboratory Technicians, Dental Hygienists, and Medical Assistants. It may not be surprising that all are in the healthcare sector. According to the American Hospital Association, "The U.S. healthcare system faces growing challenges. The U.S. population is aging at a rapid rate; healthcare reform is expected to bring millions more patients into the system; and there are anticipated shortages in numbers of trained healthcare professionals to care for these patients" (Drake et. al, 2013). The CIPs associated with the four potential shortage occupations include:

- 51.2308 Physical Therapy/Therapist
- 51.2311 Kinesiotherapy/Kinesiotherapist

- 51.0710 Medical Office Assistant/Specialist
- 51.0712 Medical Reception/Receptionist
- 51.0713 Medical Insurance Coding Specialists/Coder
- 51.0716 Medical Admin/Executive Assist. and Medical Secretary
- 51.0801 Medical/Clinical Assistant
- 51.0809 Anesthesiologist Assistant
- 51.0813 Chiropractic Assistant/Technician

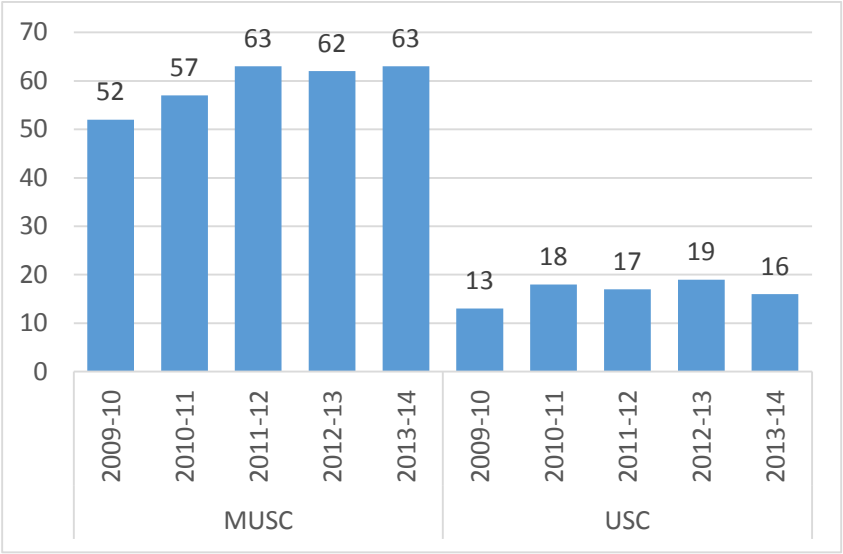
- 51.0602 Dental Hygiene/Dental Hygienist

- 51.0802 Clinical/Medical Laboratory Assistant
- 51.1001 Blood Bank Technology Specialist
- 51.1003 Hematology
- 51.1004 Clinical/Medical Laboratory Technician
- 51.1008 Histologic Technician
- 51.1099 Clinical/Medical Laboratory Science and Allied Professions, Other

For Physical Therapists[13], the only doctorate level programs in physical therapy (51.2308) available in the state are through the University of South Carolina-Columbia and the Medical University of South Carolina. According to the MUSC website, up to 64 students are admitted into their doctoral physical therapy program each year. According to the USC-Columbia website, their class sizes are approximately 18 per year. This leaves little room to increase the number of graduates beyond 82 per year unless the class sizes are increased or new programs are brought on line. Another possibility to fill the potential shortage is by attracting licensed physical therapists educated outside of the state.

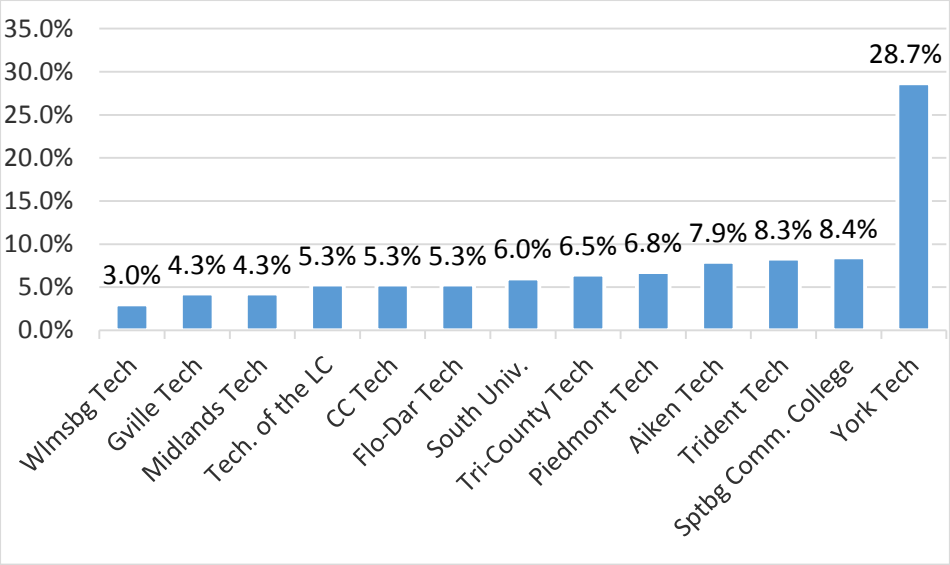
[13] According to the American Physical Therapy Association the Master of Physical Therapy and Master of Science in Physical Therapy degrees are no longer offered to any new students in the US. Only MUSC and USC-Columbia are accredited PT programs in South Carolina. They only had doctoral graduates in PT between 2009 and 2013.

Figure 7: Physical Therapy Completions by Year by Institution, 2009/10-2013/14



Currently only 12 Technical Colleges and South University[14] are graduating students in the area of Medical Assistant. The graduates are concentrated in CIP 51.0801 (Medical/Clinical Assistant) and 51.0716 (Medical Admin./Exec. Assistant and Medical Secretary). Another potential source of qualified job applicants for this field may come from other for-profit or proprietary institutions. York Technical College had the highest concentration of completers for this area, over one-quarter.

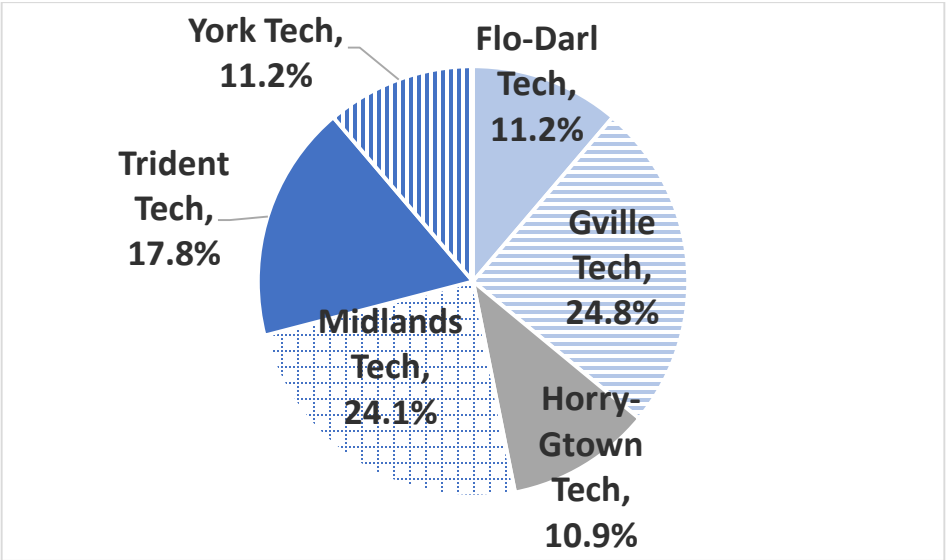
Figure 8: Distribution of Medical Assistant Completions, 2009/10-2013/14



[14] South University is a for-profit, degree-granting institution.

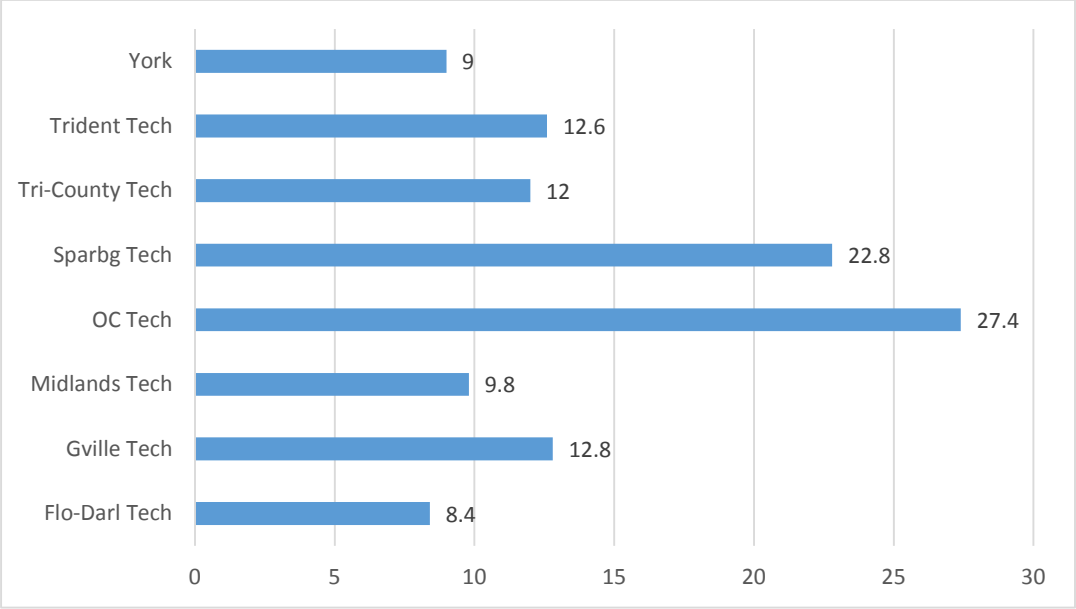
There were 6 technical colleges that have had a significant number of completions in Dental Hygiene/Hygienist (51.0602) between 2009/10 and 2013/14.

Figure 9: Distribution of Dental Hygiene/Hygienist Completions, 2009/10-2013/14



The majority of the completions for Medical and Clinical Laboratory Technicians occurred in the fields Clinical/Medical Laboratory Assistant (51.0802) and Clinical/Medical Laboratory Technician (51.1004). There are eight technical colleges currently offering degrees in these programs. Figure 10 shows the average number of annual completions in these two programs at the technical colleges.

Figure 10: Average Annual Completions for Medical and Clinical Lab Techs by Institution, 2009/10-2013/14



IS HIGHER EDUCATION MEETING DEMAND IN HIGH NUMERICAL GROWTH OCCUPATIONS?

In terms of absolute number of new jobs that will be available by 2022 in South Carolina, there is some overlap with the occupations outlined above. However, there are some that have anticipated large number of new openings by virtue of the existing size of their fields. The ten occupations that require some form of higher education that are expected to experience the largest numerical job openings per year between 2012 and 2022 are shown in Table 5.

Table 5: Fastest Growing Occupations in South Carolina[15] by Average Annual Openings, 2012-2022

Net Change Rank	Standard Occupational Classification	Employment 2012	Employment 2022	Net Change	% Change
1	Registered nurses (29-1141)	43,687	51,936	8,249	18.9%
2	General and operations managers (11-1021)	24,701	28,080	3,379	13.7%
3	Heavy and tractor-trailer truck drivers (53-3032)	22,962	27,277	4,315	18.8%
4	Nursing assistant (31-1014)	19,028	23,213	4,185	22.0%
5	Elementary school teachers, except special education (25-2021)	19,162	21,952	2,790	14.6%
6	Accountants and auditors (13-2011)	14,703	16,589	1,886	12.8%
7	Licensed practical and licensed vocational nurses (29-2061)	9,778	12,088	2,310	23.6%
8	Secondary school teachers, except special and career/technical (25-2031)	12,734	13,688	954	7.5%
9	Medical assistants (31-9092)	8,141	10,394	2,253	27.7%
10	Middle school teachers, except special and career/technical (25-2022)	9,862	11,297	1,435	14.6%

Appendix C provides a crosswalk between these ten occupations and their associated CIP codes. Using these CIP codes it is possible to determine the number of completers from the state's public and independent colleges who might possibly be available to fill those roles.

There is a significant limitation of this study's methodology when analyzing an occupation such as teaching that has multiple sub-occupations contained within it. While assumptions can be made about to draw

[15] Requiring some form of higher education.

conclusions about the occupation at an aggregate level, there may be imbalances within the sub-groups that will be difficult to identify.

From the supply side, it is possible to distribute the graduates from various teaching programs into the elementary, middle, and secondary levels and even to do so at the subject level (See Appendix D), but there is currently no distinction made in the employment projections regarding particular areas of study or education level (i.e., Elementary, Middle, or Secondary). For instance, CIP 13.1323 is "Chemistry Teacher Education" and is one of the CIPs matched to both Middle School Teachers (25-2022) and Secondary School Teachers (25-2031), but there is no indication of how many of the 802 annual job openings in these two occupations will be for Chemistry and of those, how many are needed in Middle Schools vs. Secondary Schools.

Table 6 shows the total number of completers for each occupation between 2009/10 and 2013/14 as well as the average number per year.

Table 6: Annual Completers and Projected Job Openings for Numerically Large Occupations, 2009/10-2013/14

Net Change Rank	Standard Occupational Classification	Total Completers (09/10-13/14)	Average Annual Completers	Projected Annual SC Job Openings[16]	Potential Annual Shortage/Surplus
1	Registered nurses (29-1141)[17]	12,378	2,634 (Asso+) 1,331 (Bach+)	1,670	+964[18]
2	General and operations managers (11-1021)	20,580	4,010	800	+3,210[19]
3	Heavy and tractor trailer truck drivers (53-3032)	639	128	800	-672
4	Nursing assistant (31-1014)	178	36	780	-744
5	Elementary school teachers, except special education (25-2021)	4,561	912	700	+212
6	Accountants and auditors (13-2011)[20]	3,249	650	620	+30

[16] O*Net Online with information from the SC Department of Employment and Workforce. May be higher due to factoring in attrition of current workers.
[17] Includes graduates with an associate's degree or bachelor's degree in CIP 51.3801.
[18] There are about 1,331 completions per year at the bachelor's degree level. If the goal for SC is to increase the number of RNs with a bachelor's degree, we will need to increase this. If all 1,670 job openings were for bachelor's degree recipients, we would be about 330 short per year. If 80% of the job openings were for bachelor's degree holders, we would be fairly balanced. If 50% of the job openings were for those with a bachelor's degree, we would be over producing by about 500 per year.
[19] Includes popular CIP codes Business/Commerce and Business Administration and Management which have job opportunities outside just General and Operations Managers.
[20] Includes only those completing with a Bachelor's degree or higher.

Net Change Rank	Standard Occupational Classification	Total Completers (09/10-13/14)	Average Annual Completers	Projected Annual SC Job Openings[16]	Potential Annual Shortage/Surplus
7	Licensed practical and licensed vocational nurses (29-2061)[21]	2,954	591	470	+121
8	Secondary school teachers, except special and career/technical (25-2031)	2,484	497	440	+57
9	Medical assistants (31-9092)	1,380	276	380	-104
10	Middle school teachers, except special and career/technical (25-2022)	1,726	345	360	-15

This methodology indicates that there may be some level of shortage among teachers at the middle school level. Although there appears to be an adequate number of elementary and secondary teachers according to the data, another important factor that should be considered is the number of individuals who take jobs out-of-state and the retention rates of teachers. This occupation has higher levels of individuals leaving the profession in the first five years than many others. Additional work specifically on the teaching profession may be able to take into account some of these unique features of the occupation regarding both the subject areas and grade levels.

Assuming that current graduation trends continue, based on the number of completions between 2009-10 and 2013-14, there will be a sufficient number of graduates to fill Registered Nursing positions through 2022. For the LPN/LVN occupation, DEW projects more than 23 percent growth in employment between 2012 and 2022. However, according to research conducted by the Office of Healthcare Workforce Research for Nursing (OHWRN) and the Office for Healthcare Workforce Analysis and Planning (OHWAP), many hospitals are shifting away from the use of LPNs in favor of additional RNs. In their May 2015 report, only 42 percent of responding hospitals indicated that they employed any LPNs and 35 percent of those expected to see the number of LPNs decline from their 2015 employment levels next year. Some of the comments from the report regarding the reason for this decline included:

"Converting to an all RN staff"
"Converting LPN positions to RN with new hires"
"Use of LPNs is decreasing in the acute care environment"
"Limiting our use of LPNs as we move toward more BSN prepared nurses"
"Tring to decrease labor costs by meeting productivity goals at the 50th percentile"
"Staff mix changes are required to decrease labor costs and facilitate maximum licensure"

[21] The only completions for these CIPs were at the certificate and diploma level.

This shift in nursing staff distribution may not be properly accounted for in the employment projections. There are several options for those within the LPN/LVN occupation to find other employment opportunities including: working in a non-hospital setting, returning for additional schooling to become an RN, or accepting some of the projected openings for Nursing Assistants.

Nursing assistants is an occupation that appears to be potentially facing a shortage of qualified workers. For nursing assistants, there will be an estimated 780 new annual openings through 2022 with only 36 completers per year, on average, from SC public and independent institutions. This mismatch may be somewhat alleviated by the high number of individuals completing degrees associated with Registered Nursing and LPN/LVN. Additionally, the number of completers for CIP code 51.3902 (Nursing Aides and Assistants) has been increasing steadily between 2009-10 and 2013-14. Among the hospitals responding to the OHWRN/OHWAP survey, they also expect to experience increases in the number of their staff who are aides/assistants compared to 2015. Reasons cited include:

"More CNAs are needed to ensure good patient experience"
"More nurse aides are needed for companion/sitter positions"
"Opening more beds/patient volumes are increasing"
"We are expecting high occupancy rates"
"Converting to a different care model that includes CNAs"

There are a large number of entities outside of the state's public and independent institutions that offer the truck driver training required to obtain a Commercial Driver's License (CDL). Thus, the projected shortage of truck drivers shown in Table 6 may overstate the disparity. Similar to the findings in the previous section, it appears that medical assisting is also an area of potential shortage.

SECTION 5: EMPLOYMENT OUTLOOK FOR "STEM" FIELDS AND GRADUATION TRENDS

There has been extensive discussion statewide and across the nation about the value and need for additional graduates in the STEM fields (i.e., Science, Technology, Engineering, and Math). According to the South Carolina Science and Technology Task Force[22], "(a) skilled workforce educated in the sciences, technology, engineering, and mathematics disciplines is critical for building innovative products, services, and firms, which in turn drives economic growth." That task force also set the goal of expanding the number of students with Ph.D., MS, and BA/BS degrees in STEM fields by 25 percent by 2025.

The occupations and programs of study that qualify as a STEM field has been the subject of some debate and differing definitions do exist. However, most organizations use the definition adopted by the National Science Foundation (NSF). It should be noted that the NSF definition does not include one of the largest and fastest growing sectors of the US economy, health care. Other organizations, such as the Bureau of Labor Statistics (BLS), do consider some health care occupations to be STEM.

In this section, using the NSF definitions of STEM, we compare the number of graduates in a selection of STEM fields with the projected employment growth for those related STEM occupations and identify areas

[22] A committee composed of representatives from academia, industry, and government led by Dr. Prakash Nagarkatti, Vice President for Research at USC.

of potential mismatch. Some factors to consider when analyzing these numbers include the availability of STEM field jobs for non-college graduates and the percentage of STEM majors that ultimately go on to hold jobs in non-STEM occupations. For instance, in computer science related occupations there is a sizeable percentage of the current workforce that does not have a college (particularly 4-year) degree associated with computer science (Costa, 2012). Wesley Robinson in *The Washington Post* cites a US Census Bureau report that shows that "people with bachelor's degrees in science, technology, engineering, and math are more likely than other college graduates to have a job, but most of them don't work in STEM occupations…"

LIFE AND BIOLOGICAL SCIENCES

Life and Biological sciences are popular fields of study for many students in South Carolina's colleges and universities. In fact, Biology has been the 4th most popular field of study over the past 5 years while Psychology has been the 9th most common. While each of these sectors is considered to be a part of STEM, there are reasons to believe that there are more of these types of majors than will be able to find jobs in the state in the same field.

DEW projects that there will be about 50 new annual job openings for occupations associated with biology including: Biochemists and Biophysicists (19-1021), Microbiologists (19-1022), Zoologists and Wildlife Biologists (19-1023), Biological Scientists, All Other (19-1099), and Biological Science Teachers, Post-Secondary (25-1042). The cross walk between SOC codes and CIP codes does not consider the portion of biology majors that may end up going on to receive further education through a medical, dental, or veterinary school. This may be one outlet for potential surplus graduates while teaching in the Middle and Secondary Schools might also provide additional job openings. Still, the large number of completions annually in this major has the potential to create underemployment for graduates who are not able to find a job in their field of study.

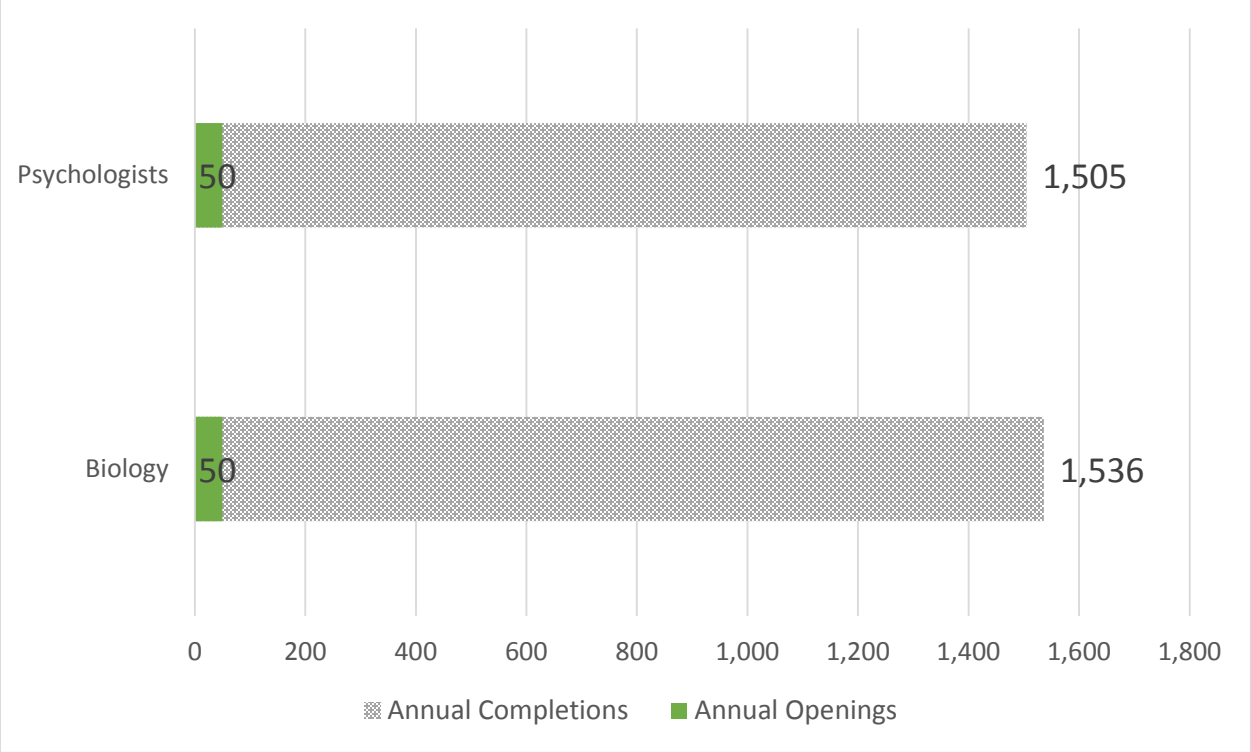
Among the completers in these CIP codes, about 95 percent received a bachelor's degree while 5 percent, or about 80 per year received a master's or doctoral degree. According to DEW there will only be about 20 job openings in this area per year for those with only a bachelor's degree. The remaining 30 job openings annually will require either a master's or doctoral degree. Thus, the potential mismatch in this field is minimized for the post-baccalaureate graduates but remains quite high for those with a bachelor's degree.

Researchers also project about 50 annual job openings for psychologists in the occupations of: Clinical, Counseling, and School Psychologists (19-3031), Industrial-Organizational Psychologists (19-3032), and Psychologists, All Other (19-3039). There were approximately 1,505 graduates per year in CIPs related to these occupations over the past five years. Unless graduates are finding work in closely related fields such as social work, there will be a significantly larger number of job seekers than jobs available in this field.

Looking more closely at the educational attainment of those 1,505 graduates shows that about 91 percent graduated with a bachelor's degree while the remaining 9 percent completed either a master's degree (6 percent), post-master's degree (2 percent), or doctoral degree (1 percent). All of the occupations associated with this area require either a master's degree or doctoral degree typically. This equates to about 138 graduates per year at this educational attainment level compared to the 50 job openings. This leaves a large number of graduates with bachelor's degrees with few job prospects within their chosen field unless they continue their education further or take positions in closely related fields.

Figure 11 shows these disparities.

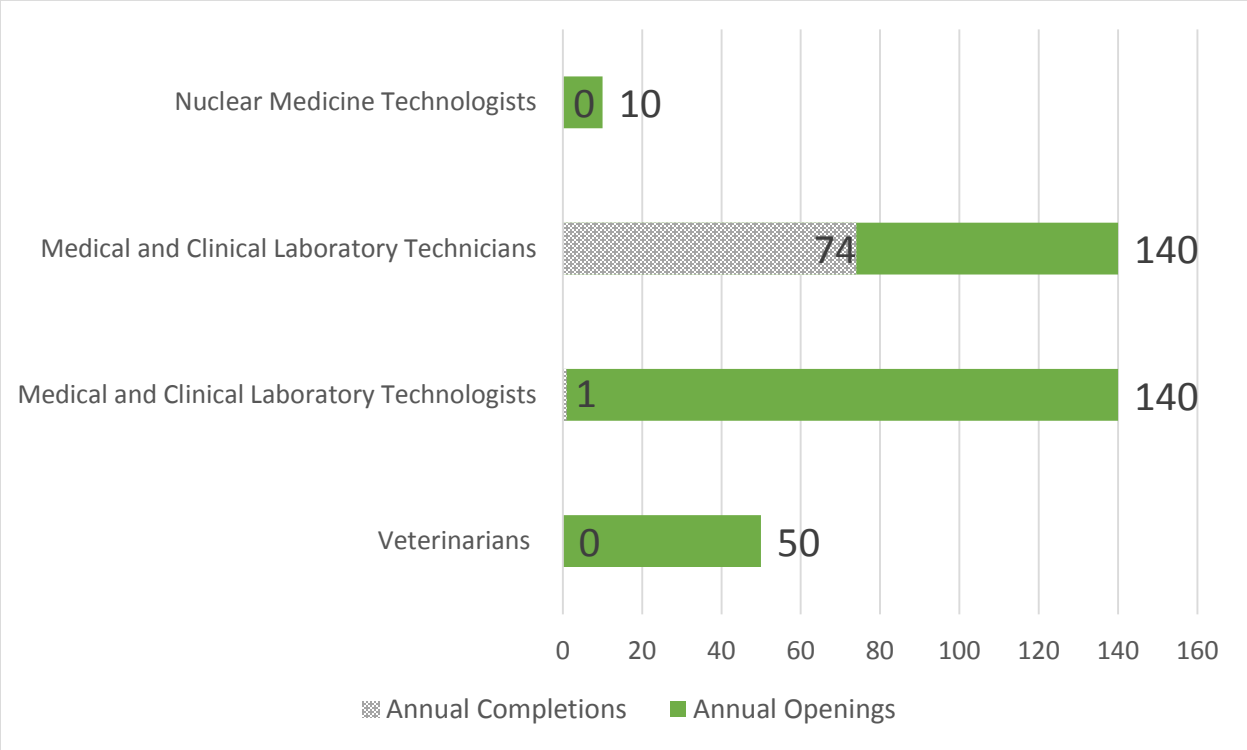
Figure 11: Life and Biological Sciences Occupations Annual Job Openings vs. Annual Graduates



There are currently only pre-veterinarian programs of study (51.0905) available to students in South Carolina. However, the state does have agreements with institutions in other states to allow SC residents to obtain in-state tuition for a certain number of veterinary seats. There will be a projected 50 new jobs available each year for Veterinarians (29-1131) but these will have to be filled by students who have graduated with a degree in another state who return to SC to work. There are a significantly larger number of pre-veterinarian graduates than there will be veterinarian job openings. Many of these individuals may be able to work in associated fields such as Veterinarian Technicians (29-2056) which will likely provide another 50 job openings annually.

While there are about 16 completions at the certificate level in Nuclear Medicine Technology-related fields of study (29-2033) each year, this job typically requires an associate's degree. It appears that there may be a significant shortage in the number of Medical and Clinical Laboratory Technologists (29-2011) and Medical and Clinical Laboratory Technicians (29-2012) graduates compared to the number of jobs needing to be filled. Typically the technician jobs require an associate's degree while the technologist jobs require a bachelor's degree. This information is displayed in Figure 12.

Figure 12: Life and Biological Sciences Occupations Annual Job Openings vs. Annual Graduates



COMPUTER SCIENCE

Computer science occupations are extremely difficult to match to unique CIP codes. There is a large overlap in the skills taught among different programs which could enable a graduate to work in multiple occupations within the field. Therefore, computer-related occupations were grouped into similar occupations and compared with a group of CIP codes to determine the potential mismatch in these sub-groups. Due to the overlap across CIP and SOC codes, there may be some double counting of annual completions.

Overall, the computer sciences occupations are expected to grow by about 17.7 percent between 2012 and 2022. There are expected to be about 1,630 jobs available per year in computer science occupations and only about 1,270 graduates in related subject areas.

Sub-group 1 includes: computer and information systems managers (11-3021), computer and information research scientists (15-1111), computer systems analysts (15-1121), and information security analysts (15-1122). There will be approximately 400 job openings per year for these occupations while there are about 524 annual completions by individuals receiving at least a bachelor's degree.

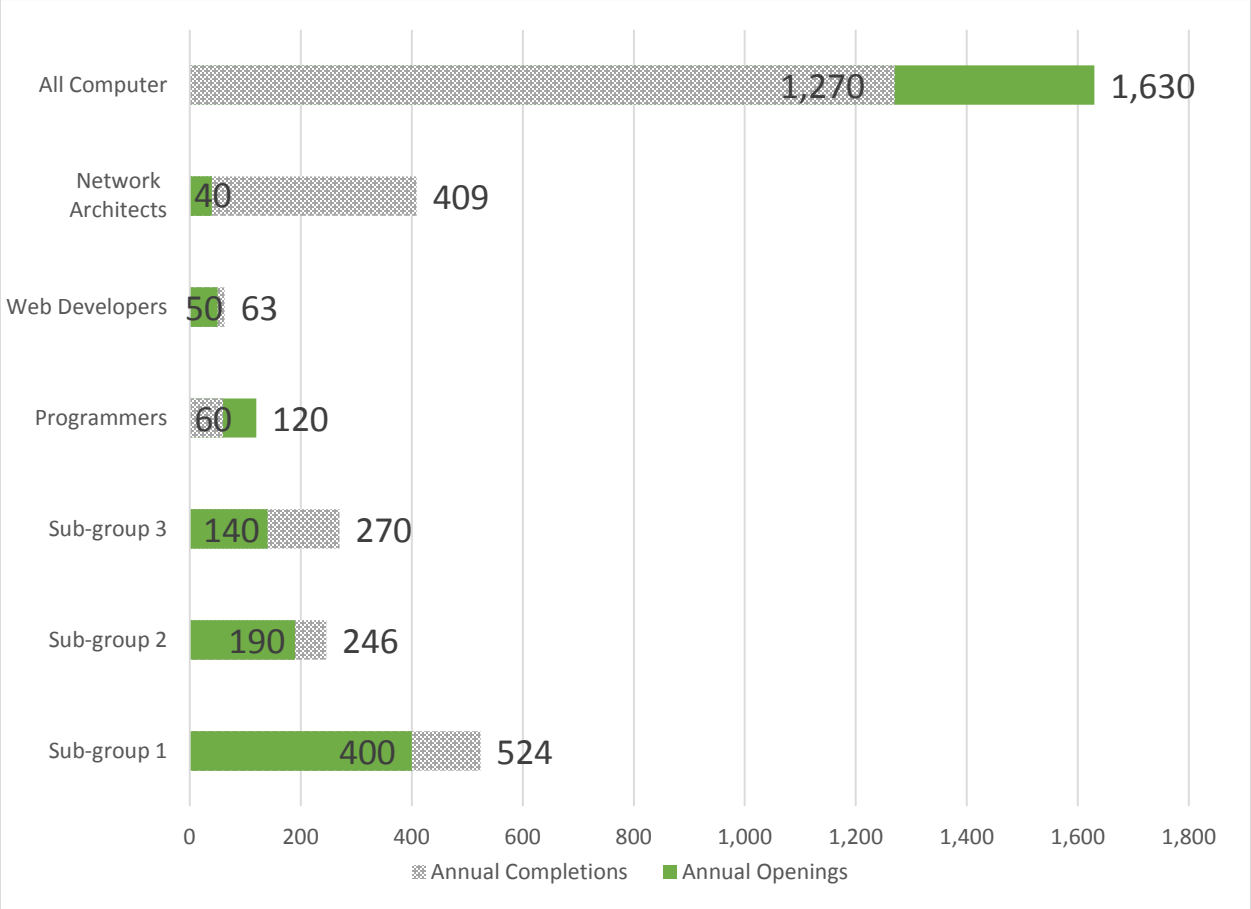
Sub-group 2 includes: Software developers, applications (15-1132) and software developers, systems software (15-1133). There will be approximately 190 annual job openings and about 246 annual completions at the bachelor's degree level or higher.

Sub-group 3 includes: database administrator (15-1141) and network and computer systems administrator (15-1142). There will be approximately 140 annual job openings among these occupations while there will be about 270 annual completions by those receiving a bachelor's degree or higher.

For computer programmers (15-1131) there will be a significantly higher number of job openings (120) compared to those graduating annually with at least a bachelor's degree (60). Web developers (15-1134) appear

to be more evenly balanced with about 50 job openings and 63 completions with at least an associate's degree. Finally, computer network architects (15-1143) has a high number of annual completions at 409 with only 40 available job openings anticipated. Note that some completers are double counted when trying to look at specific occupations thus the sum of completions overstates supply by about 300.

Figure 13: Computer Science Occupations Annual Job Openings vs. Annual Graduates

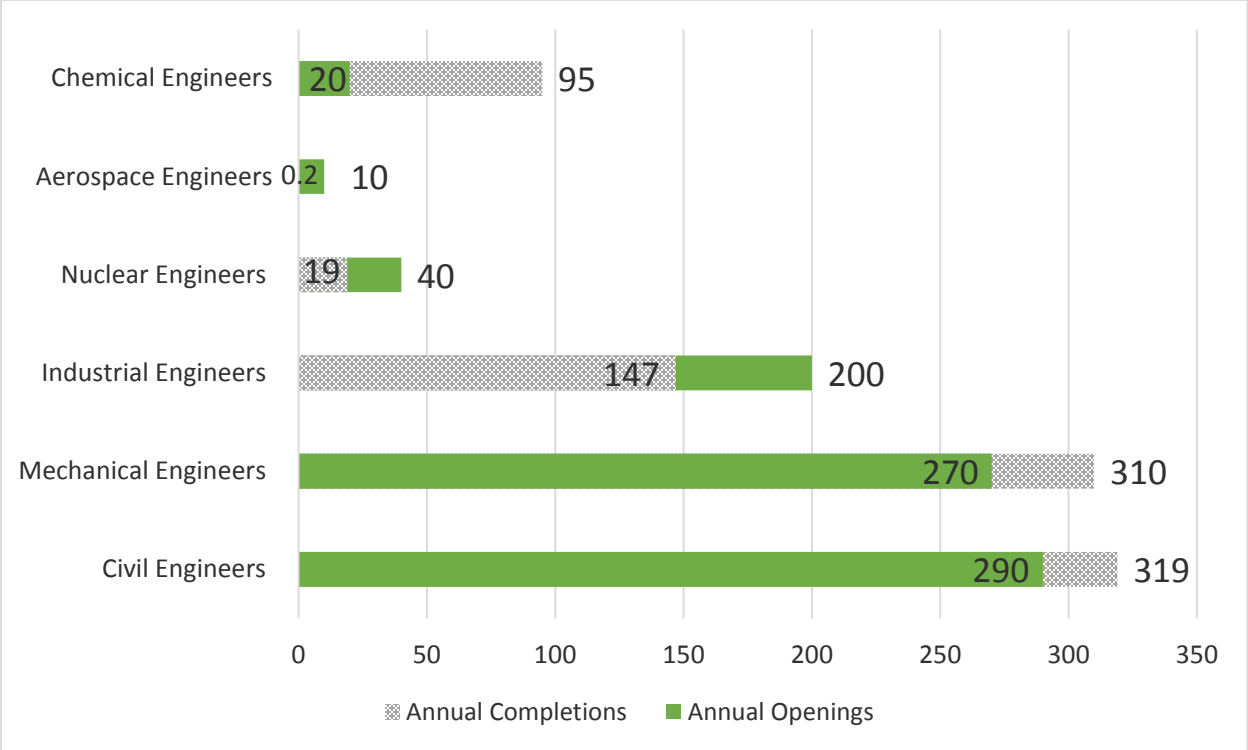


ENGINEERING

Employment in the engineering sub-group is expected to grow 10.9 percent through 2022 in South Carolina. Comparing all graduates in engineering-related CIPs to the projected job growth for the associated engineering occupations appears to be somewhat balanced: 1,971 graduates annually and 1,920 annual job openings. However, within certain occupations this is not the case.

Figure 14 provides the projected annual job openings for some of the more commonly discussed engineering occupations compared to the average number of graduates each year. It appears that the number of Civil and Mechanical Engineers is about balanced between openings and graduates. There are a significantly higher number of Chemical Engineers graduating each year than projected job openings. The three occupations with apparent projected shortages include: Industrial Engineers, Nuclear Engineers, and Aerospace Engineers. Although these are not large fields, they will likely grow over the next several years with an insufficient number of in-state graduates to fill those jobs.

Figure 14: Engineering Occupations Annual Job Openings vs. Annual Graduates



There are only two schools currently in SC that offer degrees in Nuclear Engineering, SC State University (SC State) and the University of South Carolina at Columbia (USC). SC State offers a bachelor's degree in the field while USC has both a bachelor's and master's degree program.

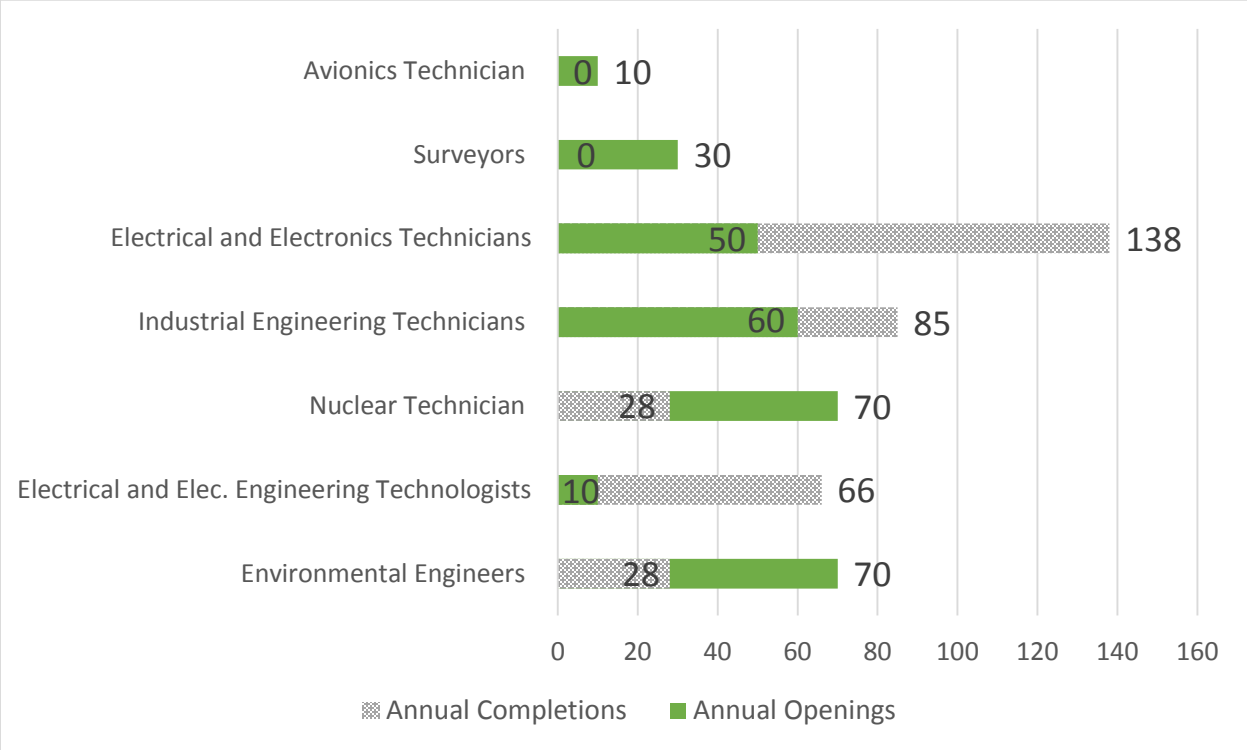
In the past five years there has been only one graduate from the University of South Carolina in Aerospace, Aeronautical, and Astronautical/Space Engineering. (14.0201). This trend will be insufficient to fill the projected 10 Aerospace Engineering jobs expected to be available annually through 2022. A recently announced partnership between the University of South Carolina's McNair Aerospace Center and Boeing may encourage additional interest in this field of study.

For Industrial Engineers, only Clemson University had graduates in the two instructional programs associated with the occupation (14.3501 and 15.1503) spread across bachelor's, master's, and doctoral programs.

Figure 15 analyzes the job prospects versus annual graduates in several other engineering occupations. There are shortages anticipated on a yearly basis for Environmental Engineers with 70 projected job openings and only 28 graduates; Nuclear Technicians with 70 job openings and 28 annual graduates (with at least an associate's degree); Surveyors with 30 job openings per year and 0 graduates per year; and Avionics Technicians which is expected to need 10 new workers per year while there are no graduates currently associated with that CIP code, 49.2091. Horry-Georgetown Technical College may be able to supply graduates who have similar skills when their advanced manufacturing program training facilities open in the fall of 2016. They are planning to offer advanced welding, machine tooling, robotics, and mechatronics.

The projected mismatch between electrical and electronics technicians is about 50 annual job openings with 138 annual graduates with at least an associate's degree. For industrial engineering technicians, the annual completions at an associate's degree level or higher drops is about 85—fairly close to the projected 60 job openings per year. All of the completers for electrical and electronic engineer technologists had at least a bachelor's degree, which is what the occupation typically requires. It appears that there are more than enough of these graduates to fill the projected jobs.

Figure 15: Engineering Occupations Annual Job Openings vs. Annual Graduates



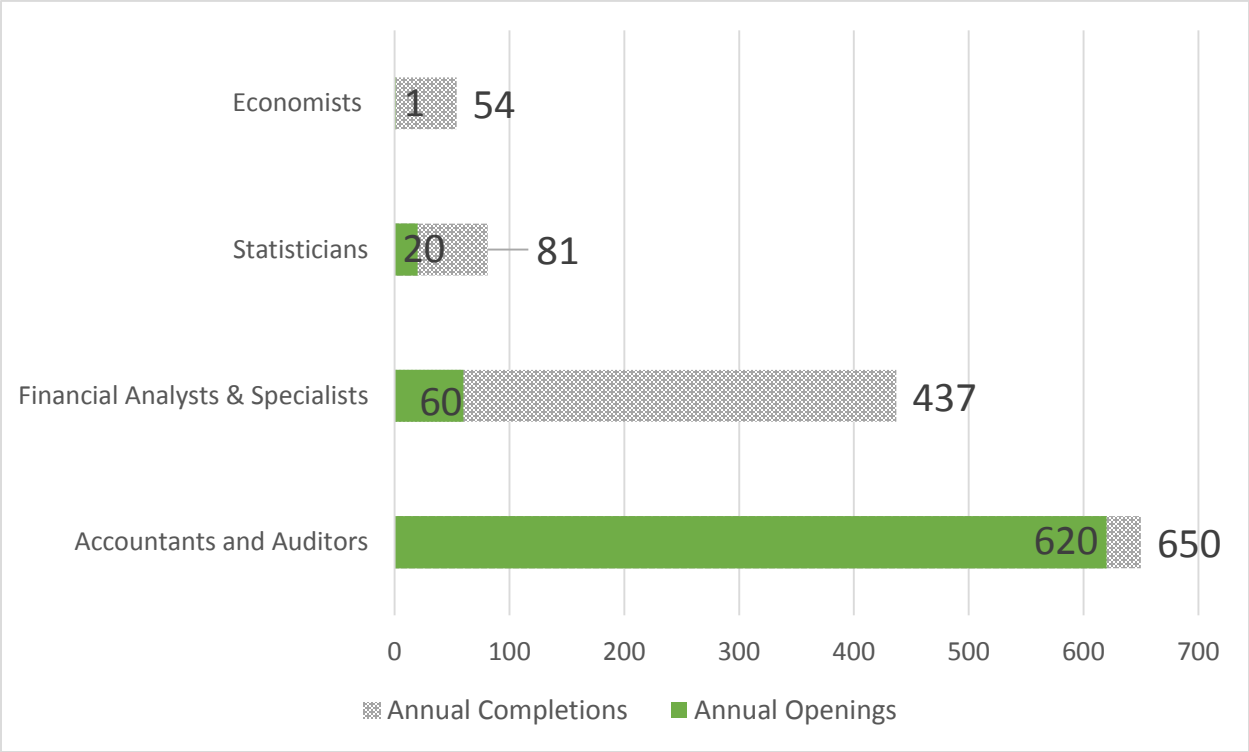
MATHEMATICS

Unfortunately, the Department of Employment and Workforce does not have any employment projections related to the occupation of Mathematicians (15-2021). There are about 254 graduates annually in programs of study related to that field. The more specific occuptaions such as Accountant, Financial Analyst, Statistician, and Economist have more detail.

Accounting (13-2011) is an extremely popular program of study at institutions across the state. Annually there are about 650 completions at the bachelor's degree level or higher while there are only projected to be about 620 new annual job openings.

For Financial Analysts (13-2051) there will be about 50 new job openings per year while there will be about 438 annual graduates receiving a bachelor's degree or higher. For Statisticians (15-2041) there are projected to be about 20 job openings which is lower than the 81 average annual completions in that field. There are only projected to be three additional economists needed between 2012 and 2022, or less than one per year. This field also typically requires a master's degree or higher, so while there are about 359 annual completions in economics, only about 54 annually have a master's degree or higher. These findings are displayed in Figure 16.

Figure 16: Mathematics Occupations Annual Job Openings vs. Annual Graduates



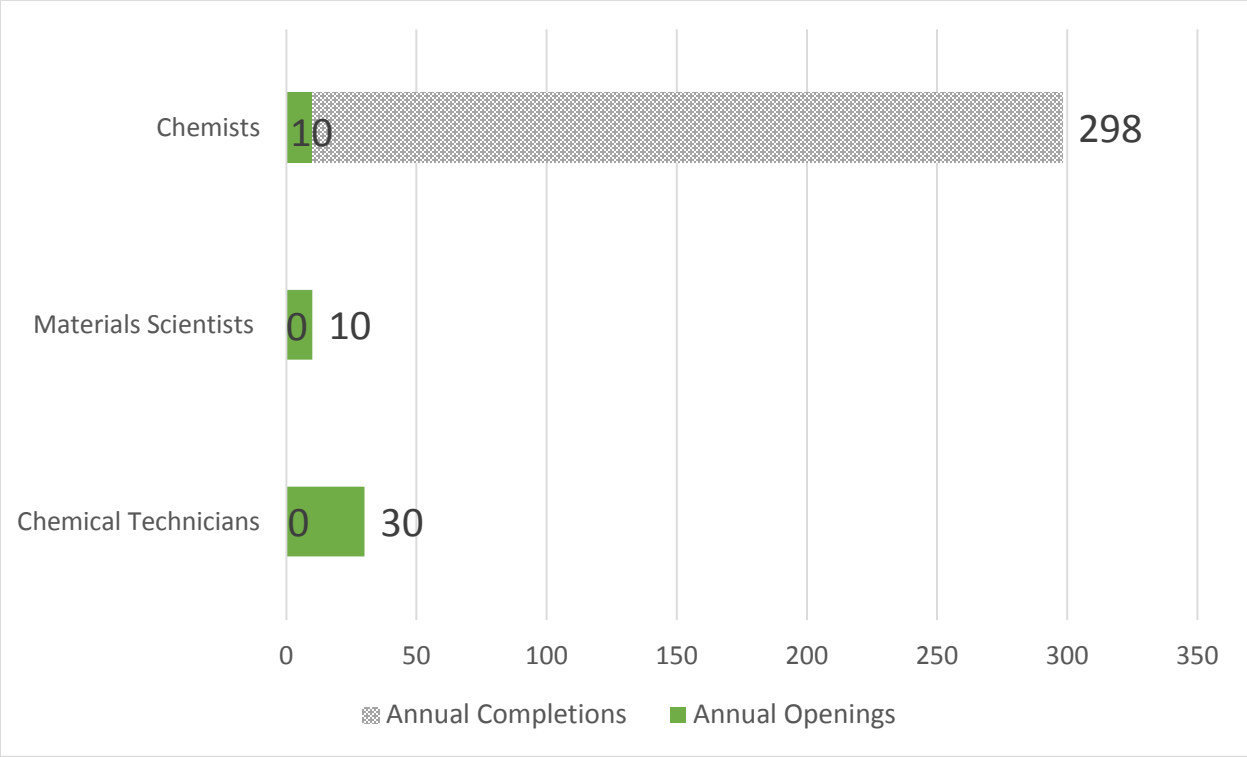
ALL OTHER STEM

There are a few other STEM occupations that are typically classified as part of the "Chemistry" or "Physics/Astronomy" sub-groups that also merit some discussion. In the Chemistry subgroup there are two fields which do not currently have enough SC graduates to fill the projected future job openings: Chemical Technicians (19-4031) and Materials Science (19-2032).

For the Chemical Technicians, that occupation's employment is projected to grow by about 30 job openings per year. There were only no graduates in fields of study related to that occupation. The large number of Chemistry majors compared to job openings for Chemists may result in some of them taking jobs in these two related occupations. DEW projects that there will be about 10 Chemist (19-2031) positions open annually while there are 298 average annual graduates. In addition to the Technician jobs mentioned above, these graduates may also pursue advanced medical degrees and find additional jobs in the teaching arena.

There are currently no schools offering programs in Materials Science (40.1001, 40.1002, and 40.1099). Given the growing importance of composite materials in the aerospace industry, this may be an area of opportunity to explore in order to continue to attract high-tech companies.

Figure 17: Chemistry Occupations Annual Job Openings vs. Annual Graduates



The STEM sub-group of "Physics and Astronomy" consists of occupations such as Astronomers (19-2011), Physicists (19-2012), and Atmospheric and Space Scientists (19-2021). Unfortunately there are no statewide employment projections for any of these fields. There may be no current demand for some of these occupations in South Carolina. There are currently no educational programs offered at SC higher education institutions in Atmostpheric and Space Science and there have only been an average of 4 graduates in Astronomy each year. For Physics (40.0801, 40.0807, 40.0899) there have been about 100 graduates per year for the past five years but it is unknown the local demand for these graduates.

There has been a concerted effort nationwide to increase the number of individuals pursing college degrees in science, technology, engineering, and math. This has resulted in increasing numbers of individuals with degrees, certificates, and diplomas in these fields. Overall, many of the sub-fields of STEM are seeing a fairly balanced or even slight oversupply of recent graduates compared to job openings. However, there are specific STEM occupations, particuarly in South Carolina, that are facing future potential shortages including:

- Medical and Clinical Laboratory Technologists
- Medical and Clinical Laboratory Technicians
- Chemical Technicians
- Aerospace Engineers
- Nuclear Engineers
- Industrial Engineers
- Avionic Technicians
- Nuclear Technicians
- Environmental Engineers
- Materials Scientists
- Computer Programmers

Depending on the percentage of STEM graduates in particular fields who find jobs in non-STEM occupations, there may be additional shortages, particularly among Civil and Mechanical Engineers.While this

section does not represent all of the individual occupations in STEM, it does provide an overview of some of the larger and faster growing ones that should be studied in more depth to determine the severity of the projected shortage and potential ways to mitigate those shortages.

SECTION 6: CONCLUSION

South Carolina colleges and universities have produced more total graduates each year than the previous year for the past five years. While increasing the number of citizens with some form of higher education is one goal, producing the right number of graduates in the right fields is another topic to be considered and discussed. Among the most popular programs of study over the past five years, there are many that do not have high projected employment through 2022. This may result in difficulties finding jobs in their field of training and possibly taking jobs in other fields that do not fully utilize their education background.

There appear to be enough graduates in popular majors such as Biology, Social Work, Psychology, English, and History to meet projected employment demand through 2022. In contrast, there are other areas that are projected to have rapid employment growth over the next several years where there could be an insufficient number of SC college graduates to fill them. These programs of study include LPN/LVN, Marketing Management, and Heat, Air, Ventilation, and Refrigerator Maintenance Technicians. While these are the trends seen in current data, it is important to note that there are limitations of the crosswalk between instructional program codes and occupational codes as well as rapid changes in the job market that may not be fully reflected in the 10-year employment projections. Thus, these findings should be seen as a starting point for further investigation into particular programs of study where imbalances may exist.

Among the occupations that the Department of Employment and Workforce project to grow the fastest between 2012 and 2022, there are several that appear to have too few in-state graduates to fulfill the demand. These include: Physical Therapists, Medical Assistants, Dental Hygienists, Medical and Clinical Laboratory Technicians, Dental Assistants, Nursing Assistants, and Middle School Teachers . Six of seven of these occupations are associated with the healthcare sector, which is the primary focus of South Carolina's Office for Healthcare Workforce Analysis and Planning.

Finally, when exploring the balance between graduates in STEM fields with the employment projections for STEM occupations, aggregate comparisons for sub-groups may obscure potential shortages in specific occupations. There continues to be a need to explore more in-depth several engineering, biological science, and computer science occupations to determine the potential severity of projected shortages and strategies to address them.

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APPENDIX A: TOP 30 MOST POPULAR CIPS MATCHED TO OCCUPATIONS

Popularity Rank	Program of Study (CIP)	Associated SOC
1	52.0201-Business Administration and Management, General	**11-1011**-Chief Executives **11-1021**-General and Operations Managers **11-2022**-Sales Managers **11-3011**-Administrative Services Managers **11-3051**-Industiral Production Managers **11-3071**-Transportation, Storage, and Distribution Managers **11-9021**-Construction Managers **11-9151**-Social and Community Service Managers **11-9199**-Managers, All Other **13-1051**-Cost Estimators **13-1111**-Management Analysts **25-1011**-Business Teachers, Post-Secondary
2	24.0101-Liberal Arts and Sciences	**25-1199**-Postsecondary Teachers, All Other (does not appear to be a good match)[23]
3	51.3801-Registered Nursing/Registered Nurse	**25-1072**-Nursing Instructors and Teachers, Post-Secondary **29-1141**-Registered Nurses
4	26.0101-Biology/Biological Sciences, General	**11-9121**-Natural Sciences Managers **19-1029**-Biological Scientists, All Other **19-1099**-Life Scientists, All Other **25-1042**-Biological Science Teachers, Post-Secondary **25-2031**-Secondary School Teachers, Except Special and Career/Technical Educ.
5	42.0101-Psychology, General	**11-9199**-Managers, All Other **19-3031**-Clinical, Counseling, and School Psychologists **19-3032**-Industrial-Organizational Psychologists **19-3039**-Psychologists, All Other **25-1066**-Psychology Teachers, Postsecondary
6	52.0301-Accounting	**13-2011**-Accountants and Auditors **13-2031**-Budget Analysts **13-2041**-Credit Analysts **13-2061**-Financial Examiners

[23] Due to the lack of good matching between 24.0101 and occupations, it is excluded from most of the study's findings.

Popularity Rank	Program of Study (CIP)	Associated SOC
		13-2081-Tax Examiners and Collectors, and Revenue Agents **25-1011**-Buisness Teachers, Post-Secondary
7	44.0701-Social Work	**11-9151**-Social and Community Service Managers **21-1013**-Marriage and Fmily Therapists **21-1019**-Counselors, All Other **21-1021**-Chid, Family, and School Social Workers **21-1022**-Healthcare Social Workers **21-1023**-Mental Health and Substance Abuse Social Workers **21-1029**-Social Workers, All Other **21-1092**-Probation Officers and Correctional Treatment Specialists **25-1113**-Social Work Teachers, Postsecondary
8	45.1001-Policital Science and Government, General	**11-9199**-Managers, All Other **19-3094**-Political Scientists **25-1065**-Political Science Teachers, Postsecondary
9	13.1202-Elementary Education and Teaching	**25-2021**-Elementary School Teachers, Except Special Educ.
10	23.0101-English Language and Literature, General	**25-1123**-English Language and Literature Teachers, Post-Secondary **25-2031**-Secondary School Teachers, Except Special and Career/Technical Educ.
11	13.1210-Early Childhood Education and Teaching	**25-2011**- Preschool Teachers, Except Special Educ. **25-2012**-Kindergarten Teachers, Except Special Educ.
12	54.0101-History, General	**11-9199**-Managers, All Other **19-3093**-Historians **25-1125**-History Teachers, Post-Secondary **25-2031**-Secondary School Teachers, Except Special and Career/Technical Educ.
13	51.3901-Licensed Practical/Vocational Nurse Training	**29-2061**-Licensed Practical and Licensed Vocational Nurses
14	43.0104-Criminal Justice/Safety Studies	**25-1111**-Criminal Justice and Law Enforcement Teachers, Postsecondary **33-1011**-First Line Supervisors of Correctional Officers **33-1012**-First Line Supervisors of Police and Detectives

Popularity Rank	Program of Study (CIP)	Associated SOC
15	Multi/Interdisciplinary Studies, Other	**No matching SOC**
16	11.0301-Data Processing and Data Processing Technology/Technician	**15-1199**-Computer Occupations, All Other **43-9011**-Computer Operators
17	52.0101-Business/Commerce, General	**11-1011**-Chief Executives **11-1021**-General and Operations Managers **11-2022**-Sales Managers **11-3011**-Administrative Services Managers **11-3051**-Industrial Production Managers **11-3071**-Transportation, Storage, and Distribution Managers **11-9021**-Construction Managers **11-9151**-Social and Community Service Managers **11-9199**-Managers, All Other **13-1051**-Cost Estimators **13-1111**-Management Analysts **25-1011**-Business Teachers, Post-Secondary
18	52.1401-Marketing/Marketing Management, General	11-2011 **11-2021**-Advertising and Promotions Managers **11-2022**-Marketing Managers **13-1161**-Market Research Analysts and Marketing Specialists **25-1011**-Business Teachers, Post-Secondary
19	43.0103-Criminal Justice/Law Enforcement Administration	**11-9199**-Managers, All Other **25-1111**-Criminal Justice and Law Enforcement Teachers, Postsecondary **33-1012**-First-Line Supervisors of Police and Detectives
20	45.1101-Sociology	**11-9199**-Managers, All Other **19-3041**-Sociologists **25-1067**-Sociology Teachers, Postsecondary
21	48.0508-Welding Technology/Welder	**51-4121**-Welders, Cutters, Solderers, and Brazers **51-4122**-Welding, Soldering, and Brazing Machine Setters, Operators, and Tenders
22	09.0101-Speech Communication and Rhetoric	**25-1122**-Communications Teachers, Postsecondary **27-3011**-Radio and Television Announcers **27-3012**-Public Address System and Other Announcers

Popularity Rank	Program of Study (CIP)	Associated SOC
		27-3031-Public Relations Specialist **27-3043**-Writers and Authors
23	52.0401-Administrative Assistant and Secretarial Science, General	**43-6011**-Executive Secretaries and Executive Administrative Assistants **43-6014**-Secreatries and Administrative Assistants, Except Legal, Medical, and Executive
24	52.0801-Finance, General	**11-1011**-Chief Executives **11-1021**-General and Operations Managers **11-3031**-Financial Managers **13-2031**-Budget Analysts **13-2041**-Credit Analysts **13-2051**-Financial Analysts **13-2052**-Personal Financial Advisors **13-2072**-Loan Officers **13-2099**-Financial Specialists, All Other **25-1011**-Business Teachers, Post-Secondary
25	47.0604-Automobile/Automotive Mechanics Technology/Technician	**49-2093**-Electrical and Electronics Installers and Repairers, Transportation Equipment **49-2096**-Electronic Equipment Installers and Repairers, Motor Vehicle **49-3023**-Automotive Service Technicians and Mechanics
26	13.0401-Educational Leadership and Administration, General	**11-9031**-Education Administrators, Preschool and Childcare Center/Programs **11-9032**-Education Administrators, Elementary and Secondary School **11-9033** Education Administrators, Postsecondary **11-9039** Education Administrators, All Other
27	47.0201-Heat, Air Cond., Ventilations & Refrig Maint Tech.	**49-9021**-Heating, Air Conditioning, and Refrigeration Mechanics and Installers
28	31.0504-Sports and Fitness Administration/Management	**25-1193**-Recreation and Fitness Studies Teachers, Postsecondary **27-2022**-Coaches and Scouts **39-9031**-Fitness Trainers and Aerobics Instructors
29	52.0299-Business	**No matching SOC**
30	14.0801-Civil Engineering, General	**11-9041**-Architectural and Engineering Managers **17-2051**-Civil Engineers

Popularity Rank	Program of Study (CIP)	Associated SOC
		25-1032-Engineering Teachers, Post-Secondary

APPENDIX B: FASTEST GROWING OCCUPATIONS MATCHED TO CIP CODES

Occupation (SOC)	Associated CIP
29-2021 Dental Hygienists	**51.0602**-Dental Hygiene/Hygienist
13-1161 Market Research Analysts and Marketing Specialist	**19.0203**-Consumer Merchandising/Retailing Management **45.0602**-Applied Economics **52.1401**-Marketing/Marketing Management, General **52.1402**-Marketing Research **52.1403**-International Marketing
29-1123 Physical Therapists	**51.2308-**Physical Therapy/Therapist **51.2311**-Kinesiotherapy/Kinesiotherapist
29-2055 Surgical Technologists	**51.0811**-Pathology/Pathologist Assistant **51.0909**-Surgical Technology/Technologist **51.1012**-Sterile Processing Technology/Technician
13-1051 Cost Estimators	**14.1801**-Materials Engineering **14.1901**-Mechanical Engineering **14.3301**-Construction Engineering **14.3601**-Manufacturing Engineering **15.1001**-Construction Engineering Technology/Technician **52.0101**-Business/Commerce, General **52.0201**-Business Administration and Management, General
29-2012 Medical and Clinical Laboratory Technicians	**51.0802**-Clinical/Medical Laboratory Assistant **51.1001** Blood Bank Technology Specialist **51.1003**-Hematology Technology/Technician **51.1004**-Clinical/Medical Laboratory Technician **51.1008**-Histologic Technician **51.1099**-Clinical/Medical Laboratory Science and Allied Professions, Other
21-1022 Healthcare social workers	**44.0701**-Social Work
15-1121 Computer systems analysts	**11.0101**-Computer and Information Sciences, General **11.0103**-Information Technology **11.0501**-Computer Systems Analysis/Analyst **11.0901**-Computer Systems Networking and Telecommunications
31-9092 Medical assistants	**51.0710**-Medical Office Assistant/Specialist **51.0712**-Medical Reception/Receptionist **51.0713**-Medical Insurance Coding Specialist/Coder **51.0716**-Medical Administrative/Executive Assistant and Medical Secretary **51.0801**-Medical/Clinical Assistant **51.0809**-Anesthesiologist Assistant

Occupation (SOC)	Associated CIP
	51.0813-Chiropractic Assistant/Technician
31-9091 Dental assistants	**51.0601**-Dental Assisting/Assistant

APPENDIX C: HIGH NUMERICAL GROWTH OCCUPATIONS MATCHED TO CIP CODES

Occupation (SOC)	Associated CIP
Registered nurses (29-1141)	**51.3801**-Registered Nursing/Registered Nurse **51.3802**-Nursing Administration **51.3803**-Adult Health Nurse/Nursing **51.3805**-Family Practice Nurse/Nursing **51.3806**-Maternal/Child Health and Neonatal Nurse/Nursing **51.3808**-Nursing Science **51.3809**-Pediatric Nurse/Nursing **51.3810**-Psychiatric/Mental Health Nurse/Nursing **51.3811**-Public Health/Community Nurse/Nursing **51.3812**-Perioperative/Operating Room and Surgical Nurse/Nursing **51.3813**-Clinical Nurse Specialist **51.3814**-Critical Care Nursing **51.3815**-Occupational and Environmental Health Nursing **51.3816**-Emergency Room/Trauma Nursing **51.3818**-Nursing Practice **51.3819**-Palliative Care Nursing **51.3820**-Clinical Nurse Leader **51.3821**-Geriatric Nurse/Nursing **51.3822**-Women's Health Nurse/Nursing **51.3899**-Registered Nursing, Nursing Admin, Nursing Research and Clinical Nursing, Other
General and operations managers (11-1021)	**31.0399**-Parks, Recreation and Leisure Facilities Management, Other **44.0401**-Public Administration **52.0101**-Business/Commerce, General **52.0201**-Business Administration and Management, General **52.0212**-Retial Management **52.0701**-Entrepreneeurship/Entrepreneurial Studies **52.0801**-Finance, General **52.1101**-International Business/Trade/Commerce **52.1301**-Management Science
Heavy and tractor trailer truck drivers (53-3032)	**49.0205**-Truck and Bus Driver/Commercial Vehicle Operator and Instructor
Nursing assistant (31-1014)	**51.3902**-Nursing Assistant/Aide and Patient Care Assistant/Aide
Elementary school teachers, except special education (25-2021)	**13.0201**-Bilingual and Multilingual Education

Occupation (SOC)	Associated CIP
	13.1202-Elementary Education and Teaching **13.1206**-Teacher Education, Multiple Levels **13.1338**-Environmental Education **13.1401**-Teaching English as a Second or Foreign Language/ESL Language Instructor
Accountants and auditors (13-2011)	**30.1601**-Accounting and Computer Science **43.0117**-Financial Forensics and Fraud Investigation **52.0301**-Accounting **52.0303**-Auditing **52.0304**-Accounting and Finance **52.0305**-Accounting and Business/Management **52.1601**-Taxation
Licensed practical and licensed vocational nurses (29-2061)	**51.3901**-Licensed Practical/Vocational Nurse Training **51.3999**-Practical Nursing, Vocational Nursing and Nursing Assistants, Other
Secondary school teachers, except special and career/technical (25-2031)	**13.0201**-Bilingual, Multilingual, and Multicultural Education **13.1203**-Junior High/Intermediate/Middle School Education & Teaching **13.1205**-Secondary Education and Teaching **13.1206**-Teacher Education, Multiple Levels **13.1302-**Art Teacher Education **13.1304-**Driver and Safety Teacher Education **13.1305-**English/Language Arts Teacher Education **13.1306-**Foreign Language Teacher Education **13.1307-**Health Teacher Education **13.1308-**Family & Consumer Sciences/Home Economics Teacher Education **13.1309-**Technology Teacher Education/Industrial Arts Teacher Education **13.1311-**Mathematics Teacher Education **13.1312-**Music Teacher Education **13.1314-**Physical Education Teaching and Coaching **13.1315-**Reading Teacher Education

Occupation (SOC)	Associated CIP
	13.1316-Science Teacher Education/General Science Teacher Education **13.1317-**Social Science Teacher Education **13.1318-**Social Studies Teacher Education **13.1321-**Computer Teacher Education **13.1322-**Biology Teacher Education **13.1323-**Cheimstry Teacher Education **13.1324-**Drama and Dance Teacher Education **13.1325-**French Language Teacher Education **13.1326-**German Language Teacher Education **13.1328-**History Teacher Education **13.1329-**Physics Teacher Education **13.1330-**Spanish Language Teacher Education **13.1331-**Speech Teacher Education **13.1332-**Geography Teacher Education **13.1333-**Latin Teacher Education **13.1335-**Psychology Teacher Education **13.1337-**Earth Science Teacher Education **13.1338-**Environmental Education **13.1401**-Teaching English as a Second or Foreign Language ***16.0101****-Foreign Languages and Literatures, General* ***16.0500****-Germanic Languages, Literatures, and Linguistics, General* ***16.0900****-Romance Languages, Literatures and Linguistics, General* ***16.0901****-French Language and Literature* ***16.0905****-Spanish Language and Literature* ***16.1203****-Latin Language and Literature* ***19.0101****-Family and Consumer Sciences/Human Sciences, General* ***23.0101****-English Language and Literature, General* ***26.0101****-Biology, General* ***27.0101****-Mathematics, General* ***40.0101****-Physical Sciences* ***40.0501****-Chemistry, General* ***40.0801****-Physics, General* ***45.0101****-Social Sciences, General* ***50.0701****- Art/Art Studies, General* ***50.0901****-Music, General* ***54.0101****-History, General*

Occupation (SOC)	Associated CIP
Medical assistants (31-9092)	**51.0710**-Medical Office Assistant/Specialist **51.0712**-Medical Reception/Receptionist **51.0713**-Medical Insurance Coding Specialist/Coder **51.0716**-Medical Administrative/Executive Assistant and Medical Secretary **51.0801**-Medical/Clinical Assistant **51.0809**-Anesthesiologist Assistant **51.0813**-Chiropractic Assistant/Technician
Middle school teachers, except special and career/technical (25-2022)	**13.0201**-Bilingual, Multilingual, and Multicultural Education **13.1203**-Junior High/Intermediate/Middle School Education & Teaching **13.1302-**Art Teacher Education **13.1305-**English/Language Arts Teacher Education **13.1306-**Foreign Language Teacher Education **13.1307-**Health Teacher Education **13.1308-**Family & Consumer Sciences/Home Economics Teacher Education **13.1309-**Technology Teacher Education/Industrial Arts Teacher Education **13.1311-**Mathematics Teacher Education **13.1312-**Music Teacher Education **13.1314-**Physical Education Teaching and Coaching **13.1315-**Reading Teacher Education **13.1316-**Science Teacher Education/General Science Teacher Education **13.1317-**Social Science Teacher Education **13.1318-**Social Studies Teacher Education **13.1321-**Computer Teacher Education **13.1322-**Biology Teacher Education **13.1323-**Cheimstry Teacher Education **13.1324-**Drama and Dance Teacher Education **13.1325-**French Language Teacher Education **13.1326-**German Language Teacher Education **13.1327**-Health Occupations Teacher Education **13.1328-**History Teacher Education

Occupation (SOC)	Associated CIP
	13.1330-Spanish Language Teacher Education **13.1331-**Speech Teacher Education **13.1332-**Geography Teacher Education **13.1333-**Latin Teacher Education **13.1337-**Earth Science Teacher Education **13.1338-**Environmental Education **13.1401**-Teaching English as a Second or Foreign Language

APPENDIX D: DISTRIBUTION OF TEACHING "COMPLETIONS" AMONG GRADE LEVELS

An individual completing a program of study in Art Teacher Education (13.1302) may be employed teaching art in an elementary school, a middle school, or a high school. Information is not currently available on the exact distribution of graduates in these multi-level areas amongst the different educational levels. The "supply" of teachers presented in Section 5 of this report relies on the following assumptions.

Using the South Carolina Center for Educator Recruitment, Retention and Advancement's (CERRA) Fall 2014 Supply and Demand Survey report, it was determined what percent of licensed teaching positions were allocated in each subject area. For example: all 17,867.29 FTEs for "Early Childhood/Elementary (any or all core subjects) were allocated to Primary/Elementary, so in the chart below, all completions in CIP 13.1202 "Elementary Education and Teaching" are assumed to be available for jobs in the elementary school (100%) and none for the middle and secondary schools (0%). In contrast, of all completions in 13.1302 "Art Teaching Education," it was assumed that 47 percent would be available to teach in elementary schools, 29 percent available to teach in middle schools, and 24 percent available to teach in secondary schools based on there being 621.85 Primary/Elementary Licensed Positions, 388.705 for Middle, and 320.13 for Secondary.

CIP	Description	Distribution				Completions		
		Elemen.	Middle	Second.		Elemen.	Middle	Second.
13.0201	Bilingual	13%	21%	66%		0	0	0
13.1202	Elementary	100%	0%	0%		3,222	0	0
13.1203	Middle and Junior	0%	100%	0%		0	826	0
13.1205	Secondary	0%	0%	100%		0	0	1,353
13.1206	Multi-Level	40%	24%	37%		51	31	48
13.1302	Art	47%	29%	24%		99	62	51
13.1304	Drivers Ed	0%	0%	100%		0	0	0
13.1305	Language Arts	0%	47%	53%		0	55	62
13.1306	Foreign Language	13%	21%	66%		5	8	26
13.1307	Health	40%	20%	40%		0	0	0
13.1308	Family and Home Ec	0%	23%	77%		0	33	110
13.1309	Technology	0%	12%	88%		0	4	25
13.1311	Math	0%	47%	53%		0	73	80
13.1312	Music	44%	32%	25%		206	149	117
13.1314	PE	40%	26%	34%		541	353	459
13.1315	Reading	82%	12%	6%		375	56	26
13.1316	Science	0%	46%	54%		0	22	26
13.1317	Social Sciences	0%	0%	100%		0	0	0
13.1318	Social Studies	0%	46%	54%		0	29	34
13.1321	Computer	0%	48%	52%		0	0	0
13.1322	Biology	0%	0%	100%		0	0	12
13.1323	Chemistry	0%	0%	100%		0	0	0

CIP	Description	Distribution				Completions		
		Elemen.	Middle	Second.		Elemen.	Middle	Second.
13.1324	Drama and Dance	20%	38%	42%		2	3	4
13.1325	French	9%	23%	68%		0	0	0
13.1326	German	11%	19%	70%		0	0	0
13.1328	History	0%	0%	100%		0	0	27
13.1329	Physics	0%	0%	100%		0	0	0
13.1330	Spanish	12%	20%	68%		1	2	6
13.1331	Speech	81%	13%	7%		0	0	0
13.1332	Geography	0%	0%	100%		0	0	0
13.1333	Latin	0%	29%	71%		0	0	0
13.1335	Psychology	0%	0%	100%		0	0	0
13.1337	Earth Science	0%	0%	100%		0	0	0
13.1338	Environmental Science	0%	0%	100%		0	0	0
13.1401	ESL	60%	21%	19%		58	20	18
Total Completions						4,561	1,726	2,484
Average Annual Completions						912	345	497
Annual Job Openings						701	361	441
Potential Surplus/Shortage						211	-16	56

Highlighted areas have been identified as having vacancies in the Fall 2014 CERRA Teacher Supply and Demand Report

For "multi-level," used distribution among "other," "guidance," "gifted & talented," "business & marketing technology," "agriculture," "media specialist," and "school psychologist" subject areas in CERRA reports.

For "bilingual," used average distribution among all foreign languages in CERRA reports.

For "foreign languages," used average distribution among all foreign languages in CERRA reports.