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| GAP Analysis  North Florida Community College  – Final Report | | | |  |
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|  | **Prepared for the**  **Florida College System Council of Presidents**  **Contracted by the Association of  Florida Colleges (AFC)** | | LOGO Color 300 res | |
|  | **By the**  **Center for Economic Forecasting and Analysis Florida State University**  **Julie Harrington, Ph.D.**  **Martijn Niekus, Drs.**  [**Nadette James**](http://www.cefa.fsu.edu/Staff/Current-Staff/Nadette-James)  [**Julio Alvarez**](http://www.cefa.fsu.edu/Staff/Current-Staff/Julio-Alvarez)  **January 2017** | |  |  |

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# Executive Summary for the Florida College System

The Florida College System is one of the largest state supported college systems in the United States, consisting of 28 public community and state colleges in Florida. The Florida College System Council of Presidents (FCS COP), administered through the Association of Florida Colleges (AFC), coordinates and advocates on issues and matters of concern to Florida’s public college system.

In 2014-15, the Florida College System (FCS) 28 institutions served 813,838 students (350,000 FTE) and had a record 110,844 graduates. Those academic degrees awarded included: 32,271 Postsecondary Vocational Certificates, 70,861 Associate (AA and AS), and 6,776 Bachelor’s degrees. In addition, there were 716 Educator Preparation Institute (EPI) and 59 Certificates of Professional Preparation awarded.

In 2016, the FCS COP commissioned the Florida State University Center for Economic Forecasting and Analysis (FSU CEFA) to conduct a Gap and Economic Impact Analysis study in order to assess whether current college programs are adequately training and educating the local workforce in order to properly service the current and future needs of their respective regional economies.

FSU CEFA first examined the major industries and occupations, by region and projected growth in the near future, as well as the potential salaries of graduates from regional colleges, by program or specialization. The study also looked at whether new programs should be created to address the evolving needs of local economies including where those skills are oversupplied and in demand, and a statewide look at how the college system may be in a position to fill major workforce gaps.

Since 1990, the economic makeup of employment has changed significantly in the state. In earlier years, Manufacturing (NAICS 33), Wholesale Trade (NAICS 42), and Accommodation and Food Services (NAICS 72) dominated the labor markets in Florida, whereas in more recent years, Administrative (NAICS 56) and Professional (NAICS 54), and some Construction (NAICS 23) sectors have prevailed in the Florida economy. Currently, the top three major economic sectors in Florida are: Waste Management and Remediation Services (NAICS 56[[1]](#footnote-1)), Retail Trade (NAICS 44-45), and Health Care and Social Assistance (NAICS 62). These economic sectors represent approximately 34.1 percent of the total employed in Florida as of 2015.

According to the DEO Employment Projections Data for 2015, educational attainment in Postsecondary Vocational, Associate Degrees, and Bachelor’s Degrees, were 35.9, 13.6 and 9.4 percent, respectively. Based on these three relevant educational attainment levels, 5,083,308 employees were represented. As projected by the Department of Economic Opportunity (DEO), this number will increase to 5,783,653 employees, in year 2023. The projected average annual job openings (to year 2023), including growth and replacement, are expected to be in the order of 189,534. The larger average annual employment demand, or needs, by occupation (SOC code), are expected to be in:

1. Office and Administrative Support (SOC 43);
2. Business and Financial Operations (SOC 13);
3. Healthcare Practitioners and Technical (SOC 29);
4. Education, Training, and Library (SOC 25);
5. Construction and Extraction (SOC 47), and;
6. Sales and Related (SOC 41).

Based on the SOC-CIP crosswalk, the average graduated student supply from the FCS institutions (over the three previous years) is 102,311 as opposed to the matched need of 164,684, leaving an identified gap or shortage, of 62,373 on an annual basis. The greatest difference, or gap, occurs in the presently offered programs at the respective colleges:

1. Business, Management, Marketing, and Related Support Services (CIP 52);
2. Business, Management, Marketing, and Related Support Services, and Other (CIP 52.9999);
3. International Business/Trade/ Commerce (CIP 52.1101);
4. Entrepreneurship/Entrepreneurial Studies (CIP 52.0701);
5. Accounting Technology/Technician and Bookkeeping (CIP 52.0302), and;
6. Business Administration and Management, General (CIP 52.0201).

2) Personal and Culinary Services (CIP 12); Culinary Arts/Chef Training (CIP 12.0503);

3) Public Administration and Social Service Professions (CIP 44); Public Administration

(CIP 44.0401);

4) Education (CIP 13); Technology Teacher Education/Industrial Arts Teacher (CIP 13.1309), and;

5) Construction Trades (CIP 46); Plumbing Technology/Plumber (CIP 46.0503).

Currently identified in oversupply are the student numbers graduating in:

1. Health Professions and Related Programs (CIP 51), and;
2. Homeland Security, Law Enforcement, Firefighting and Related Protective Services (CIP 43).

In order to gauge individual colleges perceptions regarding their respective area’s workforce and program development needs, FSU CEFA developed a survey that was distributed by the AFC to all 28 State College Institutional Research (IR)/Institutional Effectiveness (IE) Offices in early July, 2016. The following report provides a summary of responses given by the respective college’s IR/IE Offices. It should be noted that the individual college responses are available in their respective college-level reports.

The total economic impacts of the FCS of Florida in 2014-15, including economic multiplier effects arising from supply chain activity (indirect effects) and employee household spending (induced effects), are presented in the following Table. In summary, the FCS is an important contributor to Florida’s economy both directly and indirectly through spending for payroll, operations or expenses, capital improvements and student spending, and also through increased earnings and spending by graduates. In 2014-15 the total economic impacts of the Florida College System were estimated at $49.1 billion in output or revenues, $30.1 billion in value added (GDP), and 384,872 fulltime and part time jobs. This included significant impacts attributed to the projected earnings differentials (compared with high school graduates) by FCS graduates over a 30-year period of employment.

**Table ES1. Summary of Economic Impacts, by Economic Activity, of the Florida College System**



Values in 2016 dollars. Sources: FCS financial data for revenues and expenditures, and IMPLAN software and state/county data.

# Introduction[[2]](#footnote-2)



The Florida Legislature of 1957 authorized North Florida Junior College and five other community colleges in the state. Now named North Florida Community College, the college helps students achieve their goals in a wide variety of areas, whether they are looking to gain technical skills in their field of interest or earning an associate’s degree to go on to higher education.

* North Florida Community College Ranked 2015’s Best Community College by WalletHub
* In 2013, North Florida Community College ranked #2 nationwide in the “America’s Best Community Colleges” category of *Washington Monthly* magazine’s 2013 College Rankings.
* North Florida Community College Awarded 1st Place in Social Media Marketing

In 2016, the COP commissioned the Florida State University Center for Economic Forecasting and Analysis (FSU CEFA) to conduct a Gap and Economic Impact Analysis study in order to assess whether current college programs are adequately training and educating the local workforce in order to properly service the current and future needs of their respective regional economies. FSU CEFA first examined the major industries and occupations, by region and their projected growth in the near future, as well as the potential salaries of graduates from regional colleges, by program or specialization. The study also looked at whether new programs should be created to address the evolving needs of local economies including where those skills are oversupplied and in demand, and a statewide look at how the college system may be in a position to fill major workforce gaps.

FSU CEFA developed a mapping tool (using the three-way crosswalk) matching the industry, occupation and program (i.e., the NAICS, SOC and CIP) codes in Florida, which provides a greater understanding of how existing area businesses are linked to the FCS. The research team also used the Regional Demand Occupations Lists generated by the Florida Department of Economic Opportunity (DEO) to identify the demand for labor by each occupation in Florida. The supply of graduates for each occupation by CIP code and college was obtained from the IPEDS College Navigator website. The research team next identified the following gaps: between the number of jobs demanded and the number of graduates supplied for each related occupation in the individual college, and State of Florida areas.

FSU CEFA compiled the gap summaries for each of the 28 individual FCS areas, in addition to a statewide report, and included programs that are oversupplying, and undersupplying (in demand) with respect to the market area. In addition, an economic impact analysis was performed of the impacts associated with the FCS, which is presented in the statewide report.

Following the Introduction and Literature Review sections, the report will first highlight the demographics and labor (or supply) markets of the North Florida Community College area. The labor supply markets include the short-term labor market dynamics, longer term structural changes, and employment by industry sectors (given that they set demand for employment) as well as provide an overall picture of educational attainment in the North Florida Community College area. In the second section, Florida’s employment demand is outlined, in terms of Standard Occupation Codes (SOC). In the third section, North Florida Community College’s employment demand is presented in terms of Classification of Instructional Programs (CIP) Codes. The Gap Analysis results are also presented and discussed in this section. The fourth section provides a summary of the results of a qualitative survey analysis of North Florida Community College’s Institutional Research (IR)/Institutional Effectiveness (IE) Offices associated with the best management practices and processes involved with educational program development. The last section includes the study’s conclusions with a discussion of the summary gap, program survey and economic impact results. The Appendices provide additional detail with respect to the Gap Analysis findings by program code, and the Gap Analysis methodology.

# Literature Review

The Florida College System continues to expand over time, in terms of enrollment and program offerings, and through a focus on building the diverse student population’s academic and jobs skill development to be in line with local workforce development needs and the latest advancements in emerging technologies. In a recent study of rankings of the nation’s colleges, Florida was ranked #4 for Best College System for 2016.[[3]](#footnote-3) Although Florida has recently risen to third in terms of population growth in the state, the #4 rank for the FCS is quite notable given the recent recession, where Florida was especially hard hit in the construction trades and tourism sectors, two industries strongly represented in the FCS program curricula.

The FCS performs extremely well in the area of student transfers between and among postsecondary institutions. Florida was recently ranked first in the nation, in terms of the “Transfer-With-Award-Rate (%)”, at 58 percent. In other words, Florida is doing extremely well in ensuring student transfers either have an associate’s degree or certificate in hand before transferring between or to another institution. Regarding the outcomes on all the institutional measures, Florida, Illinois, and New Jersey were among only three states that performed above the national average on all measures.[[4]](#footnote-4)

The FCS continues to expand their STEM and emerging technologies program offerings. The recent STEM profile report generated by Astra’s Global STEM & Innovation project, found that the number one STEM occupation projected in year 2025 was for SOC 11-9199 (Managers, All Other), which is a strong program currently reflected among the state colleges (#7 in terms of DEO projected average annual job openings). The median hourly wage for managers projected by the DEO, was $45.96, whereas the STEM profile report showed wages as much lower, at $20.09. The other top STEM fields projected are in: Accounting and Auditors, Postsecondary teachers and Business Operations Specialists (All Other), and First-Line Supervisors of Food Prep & Serving Workers. All four of these STEM fields are also currently projected as in demand occupations in Florida.

A recent study, involving a partnership between the State of Florida and College Measures, examined the median first-year earnings of recent graduates and completers from Florida’s public postsecondary education institutions including the SUS, FCS, and District Technical Centers. They found substantial differences in wage earnings among degrees and programs. They found that three of the four fastest growth industries were related to construction. Also, that the health care industry is projected to increase due to population growth, the aging population, and improved technologies. The authors also found that physical therapists were in high demand. Another finding was that Florida’s colleges and universities were set to produce fewer Securities and Financial Service Sales Agents than the projected demand, thereby resulting in a shortage of about 1,100 trained graduates.

There have been a number of Gap Analysis studies that have been conducted recently in Florida. A few studies, in the Tampa Bay, Hillsborough and Pinellas county areas were performed by the respective CareerSource areas and the Florida High Tech Corridor Council. They focused on specific industries; namely the Manufacturing, IT, and Financial Services sectors. Another CareerSource study, involved Brevard, Central Florida, and Flagler/Volusia counties, and the Florida High Tech Corridor Council, performed a talent Gap Analysis. There was also a recent labor market analysis study involving IT and Advanced Manufacturing conducted by the University of West Florida, Greater Pensacola Chamber, CareerSource Florida, and Gulf Power for the Pensacola MSA. They examined the two industry clusters in terms of impacts and workforce. In 2015, the Florida Board of Governors (BOG) performed a supply/demand workforce gap study on health-related programs as part of an environmental scan of the BOG’s Health Initiative Committee. They examined 23 health-related occupations and found that the FDEO projected 6,979 annual openings for Registered Nurses, 357 annual openings for Nurse Practitioners, and 140 annual openings for Nurse Anesthetists from 2014 to 2022. In addition, Florida produced roughly 8,600 new Registered Nursing graduates, 580 new Nurse Practitioner graduates, and 140 new Nurse Anesthetist graduates in 2012-2013.

The Lumina Foundation uses a national set of metrics to measure their impact and measure progress to Year 2025. They focus on a set of four factors to increasing educational attainment, including: awareness, enrollment, persistence and completion. Each metric has a specific benchmark and target date. For example, they’ve increased the overall annual higher education completion rate to 57 percent (including 3 million awards) in 2015. There are 26 states that have set state attainment goals that meet the Lumina Foundation’s criteria for rigor and efficacy (i.e., that the goal is quantifiable, challenging, long term, addresses gaps, and is in statute and/or a strategic plan). They underscore the need for further development of pathways across the postsecondary system including certificates and certifications as a means for students to climb the “credential ladder”. Florida has recently (in late 2016) set a goal to meet Lumina’s criteria.[[5]](#footnote-5)

In 2016, the Florida Chamber found that in the last two decades, Florida has made significant strides in Florida’s education system by improving student learning and adopting effective education policies.[[6]](#footnote-6) They did find however, that Florida was still not globally competitive and must make improvements in becoming more innovative on a global-scale. They stated that the local businesses become advocates in their communities for promoting higher education standards, creative career and professional academies, student internships, and talent development.

# Florida College System and North Florida Community College Area Demographics and Labor Markets

The Florida College System (FCS), consists of 28 public community and state colleges in Florida, with a recent annual enrollment of 813,838 (350,000 FTE) students, and a record 110,844 graduates. Those academic degrees awarded included: 32,271 Postsecondary Vocational Certificates, 70,861 Associate (AA and AS), and 6,776 Bachelor’s degrees. In addition, there were 716 Educator Preparation Institute (EPI) and 59 Certificates of Professional Preparation awarded. The FCS totals 13,369 acres, with 2,106 owned buildings with a combined value of about $8 billion.

The Florida College System employed a total of 45,294 persons directly in 2015, not including temporary staff and student workers. Approximately 50 percent of the FCS employee population is faculty, with 6,156 full-time, and 16,309 part-time faculty. With regard to the student population, about 160,253 (or 35 percent), and 295,010 (or 65 percent) were full-time and part-time students, respectively.

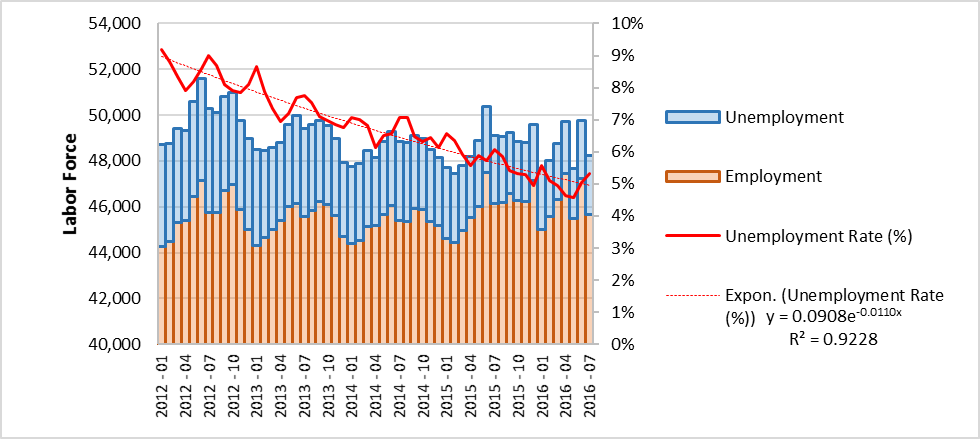
Expenditures or revenues by all state colleges-related entities, including general revenue, student fees and lottery funding totaled about $2 billion in 2014-15. Concerning the total expenditures, about 77 percent of the FCS budget is comprised of payroll (including full-time and part-time), 21 percent is in current expenses (e.g., utilities, office supplies, etc.) and 2 percent is in capital expenses. For Fall 2015, resident students have averaged $3,202 in tuition and fees, and non-resident students have averaged $11,686 for the lower level credit courses. For upper level credit programs, residents typically pay about $3,647 per semester, and non-resident students $15,424. Overall, the FCS student transfer-with-award rate of 58 percent is higher than any other state in the U.S.[[7]](#footnote-7)

Florida’s Colleges operate in 28 defined regions or “service areas” corresponding to 24 workforce regions in the state. To better understand the state, or FCS area, labor market conditions and college degree education, some general demographics and statistics are presented below.

According to the US Census[[8]](#footnote-8), the North Florida Community College area has an estimated population of 121,700 as of July 2015, showing a decrease of 0.1 percent over the April 2010 base, which is equivalent to 0.0 percent annually. Persons under 18 years of age and 65 years of age and over constitute about 36 percent of the estimated population. The civilian labor force for 2015 is estimated at 49,127[[9]](#footnote-9) or about 40 percent of the population 16 years of age and older. The percent of foreign born persons is about 4 percent. Total number of households is 42,480 with an average of 2.55 persons per household. Of persons 25 and older, about 78 percent have a high school diploma or higher, and about 12 percent have a Bachelor’s degree or higher. Median household income (in 2014 dollars) is $37,270, and median per capita income is $17,764. The mean travel time to work, for a worker age 16 years and over, is 25.0 minutes.

Figure 1 provides a general and short term view of North Florida Community College area labor force; employment and unemployment, and the unemployment rate per month from January 2012 through July 2016.[[10]](#footnote-10)

**Figure 1. North Florida Community College** **Area Labor Force and Unemployment Rate, January 2012 through July 2016**



From the underlying data, it is surmised that the labor force decreases at a rate of approximately 0.1 percent annually. The number of employed increases at approximately 0.8 percent annually, hence, there is a decrease in unemployment of approximately 0.8 percentage points on an annual basis.

Regardless of the shorter-term dynamics shown, there is also an important longer term economic structure concerning the quality, or type of labor needed, that is addressed in this study. The project team utilized the DEO longer term North Florida Community College area employment projections (to year 2023) which took into account historical time-series data in the forecasting methodology. Table 1 depicts the relative employment shares and changes therein at the NAICS 2-digit industry code levels, ranging from years 1990 through 2013.[[11]](#footnote-11)

Estimates for the years 2015 and 2023 are included in the last two columns. Indexing is applied to best represent the structural changes, this apart from changes associated with the increasing size of the National Establishment Time Series (NETS) Database over the years. The green highlights are applied per individual row; representing the change in employment share per year over time, thus to depict the share-shift in labor market dynamics.

**Table 1. Jobs and Job Changes by NAICS Industry Sector in North Florida Community College** **Area for Years 1990 through 2013; 2015 and 2023 (Estimated)**



Source: The National Establishment Time Series (NETS) Database Release 2013

As shown in Table 1, the economic makeup of employment changed significantly in the North Florida Community College area, where Agriculture, Forestry, Fishing and Hunting (NAICS 11), Manufacturing (NAICS 32 and 31), and Construction (NAICS 23), dominated the labor markets, whereas in more recent years, Government (NAICS 92), Administrative and Support and Waste Management and Remediation Services (NACIS 56), and Retail Trade (NAICS 45) prevailed in the North Florida Community College area economy. The largest relative change is seen with Mining, Quarrying, and Oil and Gas Extraction (21), albeit at a rather low share. A more sizable sector in terms of changes in employment is Administrative and Support and Waste Management and Remediation Services (NACIS 56).

Currently the top three major economic sectors in the North Florida Community College area are: Government (NAICS 90), Retail Trade (NAICS 44-45), and Manufacturing (NAICS 31-33). Figure 2 shows employment estimates[[12]](#footnote-12) in the North Florida Community College area for the year 2015 (by 2-digit NAICS Codes). The top three sectors mentioned represent about 37 percent of the total employed in 2015.

**Figure 2. North Florida Community College** **Area Estimated Employment by NAICS for the Year 2015**



Source: The National Establishment Time Series (NETS) Database Release 2013

Figure 3 presents the shares of educational attainment of the employed, in the North Florida Community College area.[[13]](#footnote-13) It should be noted that the current DEO data provides three FCS-specific educational attainment levels only. The recalibration is provided in the last column of Table 2b.[[14]](#footnote-14) Both Tables 2a and 2b illustrate that North Florida Community College are responsible for presently feeding into, or supplying, a work force of 15,650 (out of 32,445), while the current and projected annual or annual average college attainment need is 461 (out of a total need of 1,015).

**Figure 3. North Florida Community College** **Area Adult Population and Educational Attainment** **for the Year 2015, and Average Annual College Educational Attainment Levels 2015 and 2023**

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Table 2 presents the shares of educational attainment of the employed, in the North Florida Community College area, for the years 2015 and 2023, as well as the annual average (over the eight years).[[15]](#footnote-15) The differences between Table 2a and 2b are due to marginal categories not included in the DEO Employment Projections, and growth and replacement differentials (per county/workforce area and per college area respectively).[[16]](#footnote-16) The highlighted categories; Postsecondary Vocational, Associate Degree, and Bachelor’s Degrees are the relevant educational attainment levels for further Gap Analysis (i.e. 15,650 in total for 2015, and 461 in average annual demand post-2015).

**Table 2a. North Florida Community College Area Florida Workforce Data on Educational Attainment for Years 2015 and 2023 (Estimated)**



**Table 2b. North Florida Community College Area Florida Workforce Data on Educational Attainment for Years 2015 and 2023 (Estimated)**



Figure 4 shows the employment levels and associated changes by 2-digit NAICS at the relevant educational attainment levels: Postsecondary Vocational, Associate and Bachelor’s degrees.[[17]](#footnote-17) The blue bars represent the number of jobs in 2015; the gray bars the estimated number of jobs in 2023, while the orange bars represent the average annual changes, or employment demand, between the two years 2015 and 2023. Figure 5 in the next section “Jobs by Occupation” shows a similar framework, with the blue bars representing the number of jobs in 2015, the gray bars the estimated number of jobs in 2023, and the orange bars representing the average annual changes per occupation, or Standard Occupation Code (SOC).

**Figure 4. Employment Levels and Associated Changes , or Demand, by NAICS Industry Sector in the North Florida Community College Area for Years 2015 and 2023 (Estimated)**

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Source: DEO Employment Projections (2015-2023), SOC to NAICS crosswalk and the National Establishment Time Series (NETS) Database Release 2013

Relating to employment, the Government (NAICS 90-99) is a strongly represented sector, followed next by Health Care and Social Assistance (NAICS 62), Administrative and Support and Waste Management and Remediation Services (NAICS 56), Retail Trade (NAICS 44-45), and Education Services (NAICS 61). In terms growth, the top three sectors are Government (NAICS 90-99), Administrative and Support and Waste Management and Remediation Services (NAICS 56), and Retail Trade (NAICS 44-45).

As can be shown in Table 3, and relating to the aforementioned three relevant educational attainment levels, there were 16,650 employees distributed over the twenty sectors (by NAICS code), in 2015. As projected by the Department of Economic Opportunity (DEO), this number will increase to 16,574 employees, in year 2023. Table 3 presents the data from DEO, using a cross-walk from SOC to NAICS.[[18]](#footnote-18) The average annual job openings are shown in the third column which represent the relevant employment demand (for the three educational attainment levels), which takes into account both annual changes in growth and replacement. The average annual change is also expressed as annual growth percentage and relative employment share, as per the years 2015 and 2023, in the last columns respectively.

**Table 3. Current and Projected Employment, Average Annual Job Openings, and Median Hourly Earnings by NAICS Industry Codes, in the North Florida Community College Area, Years 2015 and 2023**



Source: DEO Employment Projections (2015-2023), SOC to NAICS crosswalk and the National Establishment Time Series (NETS) Database Release 2013

The largest industries in terms of employment are Government (NAICS 90-99) is a strongly represented sector followed at a distance by Health Care and Social Assistance (NAICS 62), and Administrative and Support and Waste Management and Remediation Services (NAICS 56). The ranking, according to the DEO’s expectation, doesn’t change between the two years shown. The most important number is the projected average annual job openings (i.e., a change of 461), also termed “employment demand”. The relative annual employment change may be a bit misleading when considered e.g. the annual growth in Mining, Quarrying, and Oil and Gas Extraction (NAICS 21), which constitutes only a small number, but the column does reflect an industry-by-industry relative need. The last two columns show the relative employment shares per industry, in 2015 and 2023, respectively. The higher shares are highlighted with green shading. Government (NAICS 90-99) shows a solid green color.

# Jobs by Occupation

The current and projected employment by Standard Occupation Group (SOC) codes, according to the relevant three aforementioned educational attainment levels, is shown in Table 4. The annual average job openings are shown in the third column, followed by the relative annual changes. In addition, the 2015 Median Wages are shown in the last column.

**Table 4. North Florida Community College Area Current and Projected Employment per Standard Occupation Code (SOC), for Years 2015 and 2023**



Source: DEO Employment Projections (2015 and 2023)

The higher occupational needs, or specific employment demand, are expected to be in the Office and Administrative Support (SOC 43), followed by Protective Service (SOC 33), and Education, Training, and Library (SOC 25). In addition, several other occupations such as Transportation and Material-Moving (SOC 53), Installation, Maintenance, and Repair (SOC 49), and Healthcare Practitioners and Technical (SOC 29) top the list in employment demand. As can be observed, the average annual employment or job openings are rather spread more evenly as compared to the previous employment needs by Industry. The Median Wages for 2015, shown in the last column, may reflect some temporary (year 2015) scarcity with respect to Management (SOC 11), followed by specialties in Architecture and Engineering (SOC 17).

Figure 5 depicts the average annual employment/job openings.[[19]](#footnote-19) While Education, Training, and Library (SOC 25) clearly is in high demand for the area; two other occupations top an annual average expectation on job openings, with each 60 jobs annually and a total of 201 jobs annually between them.

**Figure 5. Average Annual Job Openings, or Employment Demand, by SOC Code in the North Florida Community College Area, for Years 2015 to 2023**

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Source: DEO Employment Projections (2015 and 2023)

# Program Gap Analysis

The purpose of this Gap Analysis is to highlight and communicate the workforce gap in the North Florida Community College area as it pertains to the North Florida Community College annual stream of graduates (supply) and the North Florida Community College educational programs offered (demand). Gap Analysis is a technique used to assess the supply and demand of skilled workers and identify the educational programs that need to be adapted in order to fill any existing or future labor market gaps. Ultimately, the objective of this Gap Analysis[[20]](#footnote-20) is to provide the respective colleges with information that may be used in decision-making concerning current and future educational program development.

The Classification of Instructional Programs (CIP) provides a taxonomic scheme that supports the accurate tracking and reporting of educational fields of study and program completions activities. To match the CIP to the SOC codes, the National Crosswalk Service Center SOC to CIP crosswalk was used.[[21]](#footnote-21) In applying the crosswalk, some data was lost due to missing codes (even when using the category: “No Related CIP” (i.e., CIP 99)). The average annual job openings are estimated to be 461 persons, however, only 402 (or about 87 percent) could be matched with one or more CIP codes.[[22]](#footnote-22)

Table 5 (and Figure 6) shows the average annual three-year (2011-2014) program completer or student graduates, i.e., the specific labor supply,[[23]](#footnote-23) as per the North Florida Community College, by major program or CIP code. As a means to provide the broadest representation over the available programs, the average graduate student numbers for academic years 2011-12, 2012-13 and 2013-14 were used.[[24]](#footnote-24) The total average number obtained for North Florida Community College was 782 students annually (see Column 1). The total, spread over the various rows of the table is kept constant at the same three-year average student counts per CIP. The second column of Table 5 represents the distribution of labor demand at 402 over the existing North Florida Community College programs.[[25]](#footnote-25) The third column shows the employment gap (taken as the difference between the first column as supply and the second as demand). Oversupply is denoted in positive numbers and undersupply in negative numbers. The programs that show large gaps are highlighted in orange color shading. The last two columns refer to the same gap calculation, however, the research team also used an alternative approach. Instead of distributing the labor demand over the existing college programs only, the 402 in labor demand were distributed over ALL available programs (according to one or more matched CIP codes).[[26]](#footnote-26) The latter approach applies the distribution across substantially more programs, which indicates that additional programs may be needed. That said, it is also realized that programs may not be offered for a few students only, that partial programs may be offered, or some programs may be offered under different program names. In short, these “across all programs” results provide a broader programmatic perspective.

**Table 5. North Florida Community College Average Annual Student Graduation, or Supply, and Average Annual Job Openings, or Employment Demand, to Year 2023; Two Alternative Scenarios**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **2010 CIP Code** | **2010 CIP Title** | **Average Annual Student Graduation 2011-2014 (Supply)** | **DEO Average Annual Job Openings or Demand** | | | |
| **Present Offered Educational Programs**  **(Demand)** | **GAP, or Under-Supply in Programs** | **All Educational Programs**  **(Demand)** | **GAP, or Under-Supply in Programs** |
|  |  | **(1)** | **(2)** | **(3) = (1-2)** | **(4)** | **(5) = (1-4)** |
|  |  | **782** | **402** | ***380*** | **402** | ***380*** |
| 1 | Agriculture, Agriculture Operations, and Related Sciences | - | - | - | 15 | (15) |
| 3 | Natural Resources and Conservation | - | - | - | 1 | (1) |
| 4 | Architecture and Related Services | 2 | - | 2 | - | 2 |
| 5 | Area, Ethnic, Cultural, Gender, and Group Studies | - | - | - | - | - |
| 9 | Communication, Journalism, and Related Programs | 2 | - | 2 | 1 | 1 |
| 10 | Communications Technologies/Technicians and Support Services | 1 | - | 1 | - | 1 |
| 11 | Computer and Information Sciences and Support Services | 12 | - | 12 | 0 | 12 |
| 12 | Personal and Culinary Services | - | - | - | 3 | (3) |
| 13 | Education | 21 | 43 | (22) | 145 | (125) |
| 14 | Engineering | - | - | - | 6 | (6) |
| 15 | Engineering Technologies and Engineering-Related Fields | 9 | - | 9 | 3 | 6 |
| 16 | Foreign Languages, Literatures, and Linguistics | - | - | - | - | - |
| 19 | Family and Consumer Sciences/Human Sciences | 24 | - | 24 | 11 | 13 |
| 22 | Legal Professions and Studies | 2 | - | 2 | 0 | 2 |
| 23 | English Language and Literature/Letters | - | - | - | - | - |
| 24 | Liberal arts And Sciences, General Studies and Humanities[[27]](#footnote-27) | 392 | - | 392 | - | 392 |
|  |  |  |  |  |  |  |
| **Table 5. North Florida Community College Average Annual Student Graduation, or Supply, and Average Annual Job Openings, or Employment Demand, to Year 2023; Two Alternative Scenarios, Cont.** | | | | | | |
| **2010**  **CIP**  **Code** | **2010 CIP Title** | **Average**  **Annual**  **Student**  **Graduation**  **2011-2014**  **(Supply)** | **DEO Average Annual Job Openings or Demand** | | | |
| **Present**  **Offered**  **Educational**  **Programs**  **(Demand)** | **GAP, or**  **Under-**  **Supply**  **in**  **Programs** | **All**  **Educational**  **Programs**  **(Demand)** | **GAP, or**  **Under-**  **Supply**  **in**  **Programs** |
|  |  | **(1)** | **(2)** | **(3) = (1-2)** | **(4)** | **(5) = (1-4)** |
| 25 | Library Science | - | - | - | 1 | (1) |
| 26 | Biological and Biomedical Sciences | - | - | - | 1 | (1) |
| 27 | Mathematics and Statistics | - | - | - | - | - |
| 28 | Military Science, Leadership and Operational Art | - | - | - | - | - |
| 29 | Military Technologies and Applied Sciences | - | - | - | - | - |
| 30 | Multi/Interdisciplinary Studies | - | - | - | 2 | (2) |
| 31 | Parks, Recreation, Leisure, and Fitness Studies | - | - | - | 3 | (3) |
| 32 | Basic Skills and Developmental/Remedial Education | - | - | - | - | - |
| 33 | Citizenship Activities | - | - | - | - | - |
| 34 | Health-Related Knowledge and Skills | - | - | - | - | - |
| 35 | Interpersonal and Social Skills | - | - | - | - | - |
| 36 | Leisure and Recreational Activities | - | - | - | - | - |
| 37 | Personal Awareness and Self-Improvement | - | - | - | - | - |
| 38 | Philosophy and Religious Studies | - | - | - | - | - |
| 39 | Theology and Religious Vocations | - | - | - | 5 | (5) |
| 40 | Physical Sciences | - | - | - | 0 | (0) |
| 41 | Science Technologies/Technicians | - | - | - | 0 | (0) |
| 42 | Psychology | - | - | - | - | - |
| 43 | Homeland Security, Law Enforcement, Firefighting and Related Protective Services | 59 | 12 | 47 | 42 | 16 |
| 44 | Public Administration and Social Service Professions | - | - | - | 4 | (4) |
| 45 | Social Sciences | - | - | - | - | - |
| 46 | Construction Trades | - | - | - | 17 | (17) |
| 47 | Mechanic and Repair Technologies/Technicians | 2 | - | 2 | 11 | (9) |
| 48 | Precision Production | 0 | - | 0 | 2 | (1) |
| 49 | Transportation and Materials Moving | - | - | - | 8 | (8) |
| 50 | Visual and Performing Arts | 3 | - | 3 | 2 | 1 |
| 51 | Health Professions and Related Programs | 169 | - | 169 | 22 | 146 |
| 52 | Business, Management, Marketing, and Related Support Services | 86 | 347 | (261) | 93 | (7) |
| 53 | High School/Secondary Diplomas and Certificates | - | - | - | - | - |
| 54 | History | - | - | - | - | - |
| 60 | Residency Programs | - | - | - | - | - |
| 99 | No Related CIP | - | - | - | 3 | (3) |

As shown in Table 5, there is actually an overall surplus gap; 780 in supply compared with the matched demand of 402 needed, hence a surplus. However, the total gap clearly comes with gap in different capacities. The largest difference occurs in two main categories. First in Business, Management, Marketing, and Related Support Services (CIP 52). In Appendix 1, where the CIP 52 is further delineated by subcategories, that gap shows at: Accounting Technology/Technician and Bookkeeping (CIP 52.0302), Entrepreneurship/Entrepreneurial Studies (CIP 52.0701), and Business Administration and Management, General (CIP 52.0201), according to presently offered programs. If examined from the “all program distribution” alternative scenario perspective, Appendix 1 (Table 7) shows a more diverse picture among potential CIP 52-programs. The second largest gap, albeit at a distance, occurs in Education (CIP 13); in particular, Early Childhood Education and Teaching (CIP 13.1210). It is noted that, given the near discrete distribution in the all program distribution it is impossible to discern a specialty within this need. Clearly in oversupply, at least according to Table 5, are the number of students graduating in Health Professions and Related Programs (CIP 51).

Figure 6 represents the same data as presented previously in Table 5. The blue bar represents the average number of graduating students in the academic years 2011-12, 2012-13 and 2013-14, as mentioned earlier in the report. The green bar represents the distribution of labor demand at 402 in total over the existing programs provided, and the red bar represents the employment needed (labor demand) distributed over all programs.

**Figure 6. North Florida Community College Average Annual Student Graduation, or Supply, and Average Annual Job Openings, or Employment Demand, to 2023; Two Alternative Scenarios**

|  |
| --- |
|  |

Note: This analysis does not include an analysis of CIP code 24 because the primary focus of students who earn an Associate in Arts degree is to transfer to colleges or universities to continue their education, hence the entry N/A

**Figure 6. North Florida Community College Average Annual Student Graduation, or Supply, and Average Annual Job Openings, or Employment Demand, to 2023; Two Alternative Scenarios, Cont.**

|  |
| --- |
|  |

# Survey Results

In order to gauge individual colleges perceptions regarding their respective area’s workforce and program development needs, a survey was developed and distributed to all 28 State College Institutional Research (IR)/Institutional Effectiveness (IE) Offices in early July, 2016. The survey instrument was developed by FSU CEFA staff with input from the Association of Florida Colleges (AFC) and a few State College Administrators. The survey was created in Survey Monkey by AFC staff.[[28]](#footnote-28) The survey ended on August 8th with a 100 percent response rate from the colleges.

The Survey comprised 23 questions, about half of which containing check boxes, and CEFA staff provided comment boxes as well with each question in order for respondents to provide additional clarification, if needed. The remainder of other questions required open-ended responses. The focus of the survey was on qualitative issues relating to: state colleges program development, data collection and program evaluation, students’ job search, meeting labor market’s needs, communication with the Workforce Region, and perceptions regarding the role of the respective Office(s) of Institutional Research. Respondents answered, on average, 80 percent of each survey.

Based on the State College IR/IE Offices survey results, this section provides a summary of responses given by the North Florida Community College. The following survey questions and responses were categorized and summarized for this report:

**Program Development Input and Feedback from North Florida Community College Students and Workforce**

New programs[[29]](#footnote-29) at the North Florida Community College are (with estimated and/or available enrollment per program between brackets):

*1) AS - Accelerated RN - LPN to RN Bridge (66)*

1. *CCC - Business Dev and Entrepreneurship (3)*
2. *PSAV - Automation and Production Technology (19)*
3. *PSAV CMS Law Enforcement (52);*
4. *PSAV Crossover Corrections to CMS Law Enforcement (42);*
5. *PSAV Corrections/Law Enforcement Dual Certification (18);*
6. *AS in Accounting Technology (5);*
7. *CCC Accounting Tech Mgmt (0);*
8. *CCC Accounting Tech Ops (1);*
9. *CCC Accounting Tech Specialist (2)*

Recently closed programs, and estimated enrollment per program, are:

*1) AS - Business Adm/Management (replaced by AS in Business Administration) (20)*

1. *AS-Early Education Childhood (0)*
2. *Cisco CCNA (1)*
3. *Pharmacy Technician (7);*
4. *Fire Fighter (0)*

**North Florida Community College’s Plans for New Programs**

*North Florida Community College’s**program development plans include:*

*1. Short term plans include transitioning a six-month, online, workforce development program in Health Information Technology into a 1110 clock hour PSAV certificate program delivered on campus face to face.*

*2. Strong industry support and partnership with CareerSource is also allowing NFCC to pursue opening a program in Commercial Truck Driving.*

*3. The Career and Technical Education (CTE) department's Medical Administrative Specialist program will transition to a Medical Assistant program in Fall 2017.*

*4. The CTE department is also advertising for an Advanced Manufacturing Director to aid in the creation of an AS Degree in Engineering Technology.*

*5. NFCC is also preparing to begin an ADN-RN to Bachelor of Science degree in Nursing in Fall 2017.*

*With the number of programs slated to begin over the next year, this department will be focused on effective support and continuous improvement of these programs, as well as for the programs already established. The programs selected meet the current needs of our local industry; programs have not yet been identified beyond what we offer and those programs mentioned in the program development plans. However, the CTE department remains committed to listening and responding to local and regional needs as they emerge.*

**Measurement and Evaluation of Existing North Florida Community College Programs**

*Prior to beginning the application process with FLDOE to offer an ADN-RN to Bachelor of Science degree in Nursing (BSN), graduates, including those currently working in field, from NFCC's Associate in Science Degree for Registered Nursing (ADN-RN) were contacted regarding their interest in earning a BSN degree. Graduates were also queried about their interest in earning a BSN degree from NFCC. Respondents indicated that the additional academic curriculum and advanced degree would allow them to enter degree-related leadership positions at the current workplaces, continue educational training, or pursue related career pathways. The overwhelming response was positive to the questions about earning a BSN and doing so at NFCC should a program become available. This positive feedback, in addition to support from major health care agencies for nurses with BSN degrees in NFCC's service district. This feedback was the impetus for beginning the BSN application process.*

*Career and Technical Program faculty, staff, and administrators work with Advisory Committees comprised of business and industry professionals in NFCC's 6-county service district. These professionals are consulted on a regular basis in a variety of ways: committee meetings, individual meetings at various work places, and surveys that gauge satisfaction with student learning, student programs, and student employment. The Associate Dean also attends workforce roundtable discussions with economic development representatives as well as business and industry leaders, and he participates in local service organizations, such as Rotary and Kiwanis, in an additional effort to meet with the public and represent the College.*

*Qualitative measures used by NFCC to evaluate existing programs are:*

- *Student Surveys - course evaluations and program evaluation*

* *Graduating Student Feedback Surveys*
* *Employer Surveys*
* *Advisory Council Meeting Discussions, as recorded in meeting minutes*

*NFCC educational programs assess student learning outcomes, program completion rates, graduate licensure rates, and graduate employment rates. Additionally, program directors are asked to set, assess, and report at least 5 student learning outcomes per program as well as additional outcomes that measure completion, licensure, and employment.*

*Program Directors and faculty are then asked to determine which courses and assessments will be selected for assessment (mapping). Courses are generally selected across the length of the program to determine growth of student learning. Results are reported annually to the College; every three years, the program reviews the data to assess its effectiveness in achieving the established outcomes. Discussion of results with Advisory Councils regarding student achievement as well as observed and reported behavior of graduates employed in the workplace can then be discussed.*

*Program outcomes for Career and Technical Education programs, including Associate in Science degrees, College Credit Certificates, and Postsecondary Adult Vocational Certificates, are based on current FLDOE Curriculum Frameworks for each program.*

*General Education Competencies for students pursuing Associate in Arts degrees with plans to transfer to a university are established by a committee comprised of academic faculty. Once competencies are established, the mapping process used by CTE programs is applied to courses identified by FLDOE as General Education Core courses. Again, courses are selected across the program to determine growth of student learning.*

*Results are reported annually to the College; every three years, the program reviews the data to assess its effectiveness in achieving the established outcomes. Assessment results can then be discussed during articulation agreement meetings between the college and the public-school districts within our service district and universities.*

**Data Sources and Collection Methods used in the North Florida Community College Program Development Process**

*The Associate Dean sits on the Local Workforce Board and is actively engaged on several projects with CareerSource. He attends local and regional Economic Development meetings and summits where workforce needs are addressed. He meets with business and industry leaders at various public service functions involving civic organizations. As needs are addressed, state and local data are collected and analyzed. Surveys have been sent to various agencies asking for their input regarding to potential student placement and future job openings.*

*Major contributing factors to student success and program completion at NFCC are considered to be:*

*1. Low teacher-student ratio/small classes*

1. *Rigor of curriculum*
2. *Strong academic support programs*
3. *Strong collaboration between College programs and business and industry leaders leading to student employment opportunities*

**Job Placement Offices at the North Florida Community College**

*While there is no dedicated office or resource dedicated to student job placement, many Career Technical Education programs include internships with local business partners that often lead to student employment. These partnerships are deliberately cultivated by the College and its industry partners for this purpose, and they are a benefit to both students and businesses.*

*Internship (or other) type opportunity (i.e., that match an enrolled student with prospective business/employer) are currently offered in the following programs:*

*1) Medical Administrative Specialist*

1. *Automation and Production Technology,*
2. *Network Security*
3. *AS Business Administration*
4. *Health Information Technology Certificate Program*
5. *Medical Coding and Billing (to begin Spring 2017)*
6. *All Allied Health and EMS programs*

*The only other program that NFCC would consider adding on top of the programs already identified is an Industrial Machinery Maintenance program, but NFCC is hopeful that the AS in Engineering Technology specializing in Advanced Manufacturing will satisfy this need. NFCC has developed strong partnerships with local manufacturing firms that are represented on this advisory board, and these industry leaders will assist in the curriculum development to ensure that NFCC meets their workforce needs.*

*All programs are modified to meet labor market needs while adhering to the standards and benchmarks set forth in the frameworks. One reason NFCC hosts advisory council meetings is to ensure NFCC's programs stay current with trends within the various industries served. Every three years, by statute, the frameworks must be reviewed and modified. The Associate Dean ensures that as framework reviews take place, program instructors and directors participate in order to ensure local industry needs are reflected in possible modifications at the state level.*

*Most collaboration is done at program advisory committee meetings. Individual businesses are recruited through working with Career Source and Chambers of Commerce. The Associate Dean also serves as an active member of the Regional Workforce Board. Additionally, the Associate Dean attends workforce roundtable discussions with economic development representatives and business and industry leaders. The Associate Dean also participates in local service organizations, such as Rotary and Kiwanis, in an additional effort to meet with the public and represent the College.*

*NFCC partners in the manufacturing sector are in need of graduates with stronger skills in motor controls, programmable logic controllers, robotics troubleshooting and programming, welding, and industrial maintenance and repair.*

*Industry representatives from the logging and timber industry need to be able to hire more drivers with a CDL and logging experience. NFCC is working with those industry leaders in the logging industry and with Career Source to develop a Commercial Truck Driving school to begin in Spring 2017. Funding is the major obstacle. Career Source North Florida has submitted a grant proposal to Career Source Florida for $150,000 to assist with the purchase of two used semi-trucks, and industry leaders are willing to assist with the purchase of a third.*

*NFCC is also working toward offering an AS degree in Engineering Technology specializing in Advanced Manufacturing in order to better address the needs of manufacturing employers in the service district. Funding for the AS degree in Engineering Technology is still being researched.*

**North Florida Community College Institutional Research Roles and Responsibilities**

N/A

**Suggestions and Recommendations by the North Florida Community College in Meeting Labor Market Demand in the Area**

*To help the College become more effective at meeting the labor market demands, an increase in staffing for Career Technical Education (CTE) programs, including the addition of a position similar to the Director for Curriculum and Instruction, would be very useful. This person would assist with course syllabi review, program assessments and reporting, survey completions, and CTE advising and recruiting. This additional staffing would allow the Associate Dean more time to meet with industry and economic development representatives and research possible new program areas.*

# Conclusions

In 2016, the FCS COP commissioned the Florida State University Center for Economic Forecasting and Analysis (FSU CEFA) to conduct a Gap and Economic Impact Analysis study in order to assess whether current college programs are adequately training and educating the local workforce in order to properly service the current and future needs of their respective regional economies. FSU CEFA first examined the major industries and occupations, by region and projected growth in the near future, as well as the potential salaries of graduates from regional colleges, by program or specialization. The study also looked at whether new programs should be created to address the evolving needs of local economies including where those skills are oversupplied and in demand, and a statewide look at how the college system may be in a position to fill major workforce gaps.

Since 1990, the economic makeup of employment has changed significantly in the North Florida Community College area. There is a shift from Manufacturing (NAICS 32 and a bit 31), Retail Trade (NAICS 44), and Construction (NAICS 23) to Government (NAICS 92), Administrative and Support and Waste Management and Remediation Services (NACIS 56), and some Retail Trade (NAICS 45). Currently the top three major economic sectors in the North Florida Community College service are: Government (NAICS 90), Retail Trade (NAICS 44-45), and Manufacturing (NAICS 31-33). These economic sectors represent approximately 36.6 percent of the total employed in the North Florida Community College area, in 2015.

Based on Postsecondary, Associate and Bachelor’s degrees the three relevant educational attainment levels in 2015, 15,650 employees were represented. As projected by the Department of Economic Opportunity (DEO), this number will increase to 16,574 employees, in 2023.[[30]](#footnote-30) The projected average annual job openings (to year 2023), including growth and replacement, are expected to be in the order of 461 in the North Florida Community College area. The larger average annual employment demand, or needs, by occupation (SOC code), are expected to be in Office and Administrative Support (SOC 43), followed by Protective Service (SOC 33), and Education, Training, and Library (SOC 25). In addition, several other occupations such as Transportation and Material-Moving (SOC 53), Installation, Maintenance, and Repair (SOC 49), and Healthcare Practitioners and Technical (SOC 29) top the list in employment demand.

In applying the SOC-CIP crosswalk to the expected average annual demand of 461 employees, it is noted that only 402, or 87.2 percent of the total employees, could be matched with a CIP code. Based on the SOC-CIP crosswalk, one can observe that the average graduate student supply from North Florida Community College to its area (over the three previous years[[31]](#footnote-31)) is 782 as opposed to the matched need of 402,[[32]](#footnote-32) leaving an assignable gap, or surplus, of 380 on an annual basis. The largest difference, or gap, occurs in the current program offerings main category Business, Management, Marketing, and Related Support Services (CIP 52), and most notably in the subcategories Accounting Technology/Technician and Bookkeeping (CIP 52.0302), Entrepreneurship/Entrepreneurial Studies (CIP 52.0701), and Business Administration and Management, General (CIP 52.0201), and at least according to presently offered programs. If examined from the all program distribution the gaps are spread over a cadre of capacities. The second largest gap occurs at Education (CIP 13); in particular, Early Childhood Education and Teaching (CIP 13.1210). It is noted that, given the near discrete distribution in the all program distribution it is impossible to discern a specialty within this need. Clearly in oversupply, at least according to Table 5, is the number of students graduating in Health Professions and Related Programs (CIP 51).

In order to gauge individual colleges perceptions regarding their respective area’s workforce and program development needs, a survey was developed and distributed to all 28 State College Institutional Research (IR)/Institutional Effectiveness (IE) Offices in early July, 2016. The state college IR/IE office survey results reveal that some new programs will be added to the curriculum of North Florida Community College, of which Accounting and Business at least fall within the broader category Business, Management, Marketing, and Related Support Services (CIP 52). The course AS-Early Education Childhood however is dropped. Career and Technical Program faculty, staff, and administrators work with Advisory Committees comprised of business and industry professionals in NFCC's 6-county service district. In addition, the Associate Dean sits on the Local Workforce Board and is actively engaged on several projects with CareerSource.

Also, pertaining to the survey results, the North Florida Community College has many Career Technical Education programs which include internships with local business partners that often lead to student employment. North Florida Community College hosts advisory council meetings to ensure that programs stay current with trends within the various industries served. To become more effective, an increase in staffing for Career Technical Education (CTE) programs, including the addition of a position similar to the Director for Curriculum and Instruction, is deemed to be very useful.

The total economic impacts of the FCS in 2014-15, including regional economic multiplier effects arising from supply chain activity (indirect effects) and employee household spending (induced effects) for new final demand generated by FCS operations, capital improvements, student spending, and 30-year lifetime earnings differential of graduates, are summarized in the following Table. The industry output impacts were estimated at $49.1 billion, representing the sales revenues received for goods and services sold to the FCS and employees of related businesses. The total employment impacts were estimated at 384,872 fulltime and part-time jobs, representing 3.4 percent of the Florida workforce in 2015. The total value added impact of $30.1 billion represents the net value of total economic activity generated, and is also equivalent to 3.4 percent of the State Gross Domestic Product (GDP). Labor income impacts of $18.4 billion represented wages, salaries and benefits received by employees and business owners, or 3.8 percent of the state labor income.[[33]](#footnote-33)

**Table 6. Summary of Economic Impacts, by Economic Activity, of the Florida College System**



Values in 2016 dollars. Sources: FCS financial data for revenues and expenditures, and IMPLAN software state & county data.

In summary, the FCS is an important contributor to Florida’s economy both directly and indirectly through spending for payroll, operations or expenses, capital improvements and student living expenses, and also through increased earnings and spending by graduates. In 2014-15, the total economic impacts of the Florida College System were estimated at $49.1 billion in output or revenues, $30.1 billion in value added (GDP), and 384,872 jobs. This included significant impacts attributed to the projected earnings differentials by FCS graduates over a 30-year period of employment.

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# Appendix 1. North Florida Community College Gap Analysis Supply and Demand for Years 2015 and 2023

**Table 7. North Florida Community College Detailed Average Annual Student Graduation, or Supply, and Average Annual Job Openings, or Employment Demand, to Year 2023; Two Alternative Scenarios**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **2010 CIP Code** | **2010 CIP Title** | **Average Annual Student Graduates 2011-2014, or Supply** | **DEO Average Annual Job Openings, or Demand** | | | |
| **Present Offered Educational Programs**  **(Demand)** | **GAP, or Under-Supply in Programs** | **All Educational Programs**  **(Demand)** | **GAP, or Under-Supply in Programs** |
|  |  | **(1)** | **(2)** | **(3) = (1-2)** | **(4)** | **(5) = (1-4)** |
|  |  | **780** | **402** | **380** | **402** | **380** |
| 10104 | Farm/Farm and Ranch Management | - | - | - | 1 | (1) |
| 10105 | Agricultural/Farm Supplies Retailing and Wholesaling | - | - | - | 1 | (1) |
| 10106 | Agricultural Business Technology | - | - | - | 2 | (2) |
| 10199 | Agricultural Business and Management, Other | - | - | - | 0 | (0) |
| 10301 | Agricultural Production Operations, General | - | - | - | 0 | (0) |
| 10302 | Animal/Livestock Husbandry and Production | - | - | - | 1 | (1) |
| 10303 | Aquaculture | - | - | - | 0 | (0) |
| 10304 | Crop Production | - | - | - | 1 | (1) |
| 10306 | Dairy Husbandry and Production | - | - | - | 0 | (0) |
| 10307 | Horse Husbandry/Equine Science and Management | - | - | - | 0 | (0) |
| 10399 | Agricultural Production Operations, Other | - | - | - | 0 | (0) |
| 10401 | Agricultural and Food Products Processing | - | - | - | 0 | (0) |
| 10605 | Landscaping and Groundskeeping | - | - | - | 0 | (0) |
| 10606 | Plant Nursery Operations and Management | - | - | - | 0 | (0) |
| 10607 | Turf and Turfgrass Management | - | - | - | 0 | (0) |
| 10608 | Floriculture/Floristry Operations and Management | - | - | - | 2 | (2) |
| 10801 | Agricultural and Extension Education Services | - | - | - | 0 | (0) |
| 10802 | Agricultural Communication/Journalism | - | - | - | 0 | (0) |
| 10901 | Animal Sciences, General | - | - | - | 0 | (0) |
| 10902 | Agricultural Animal Breeding | - | - | - | 0 | (0) |
| 10904 | Animal Nutrition | - | - | - | 1 | (1) |
| 10905 | Dairy Science | - | - | - | 0 | (0) |
| 10906 | Livestock Management | - | - | - | 0 | (0) |
| 10907 | Poultry Science | - | - | - | 0 | (0) |
| 11101 | Plant Sciences, General | - | - | - | 0 | (0) |
| 11102 | Agronomy and Crop Science | - | - | - | 0 | (0) |
| 11106 | Range Science and Management | - | - | - | 0 | (0) |
| 19999 | Agriculture, Agriculture Operations, and Related Sciences, Other | - | - | - | 0 | (0) |
| 30103 | Environmental Studies | - | - | - | 0 | (0) |
| 30104 | Environmental Science | - | - | - | 0 | (0) |
| 30301 | Fishing and Fisheries Sciences and Management | - | - | - | 0 | (0) |
| 30601 | Wildlife, Fish and Wildlands Science and Management | - | - | - | 0 | (0) |
| 40901 | Architectural Technology/Technician | 2 | - | 2 | - | 2 |
| 90101 | Speech Communication and Rhetoric | - | - | - | 0 | (0) |
| 90702 | Digital Communication and Media/Multimedia | 2 | - | 2 | - | 2 |
| 90902 | Public Relations/Image Management | - | - | - | 0 | (0) |
| 90903 | Advertising | - | - | - | 0 | (0) |
| 90904 | Political Communication | - | - | - | 0 | (0) |
| 90905 | Health Communication | - | - | - | 0 | (0) |
| 100105 | Communications Technology/Technician | 1 | - | 1 | - | 1 |
| 110101 | Computer and Information Sciences, General | - | - | - | 0 | (0) |
| 110103 | Information Technology | 3 | - | 3 | - | 3 |
| 110201 | Computer Programming/Programmer, General | 1 | - | 1 | 0 | 1 |
| 110202 | Computer Programming, Specific Applications | 0 | - | 0 | - | 0 |
| 110401 | Information Science/Studies | - | - | - | 0 | (0) |
| 110501 | Computer Systems Analysis/Analyst | - | - | - | 0 | (0) |
| 110602 | Word Processing | - | - | - | 0 | (0) |
| 110701 | Computer Science | - | - | - | 0 | (0) |
| 110801 | Web Page, Digital/Multimedia and Information Resources Design | 2 | - | 2 | 0 | 2 |
| 110803 | Computer Graphics | 5 | - | 5 | 0 | 5 |
| 110901 | Computer Systems Networking and Telecommunications | 1 | - | 1 | - | 1 |
| 111001 | Network and System Administration/Administrator | 1 | - | 1 | - | 1 |
| 120500 | Cooking and Related Culinary Arts, General | - | - | - | 2 | (2) |
| 120501 | Baking and Pastry Arts/Baker/Pastry Chef | - | - | - | 0 | (0) |
| 120503 | Culinary Arts/Chef Training | - | - | - | 2 | (2) |
| 130201 | Bilingual and Multilingual Education | - | - | - | 0 | (0) |
| 130202 | Multicultural Education | - | - | - | 0 | (0) |
| 130401 | Educational Leadership and Administration, General | - | - | - | 0 | (0) |
| 130404 | Educational, Instructional, and Curriculum Supervision | - | - | - | 0 | (0) |
| 130406 | Higher Education/Higher Education Administration | - | - | - | 0 | (0) |
| 130407 | Community College Education | - | - | - | 0 | (0) |
| 130408 | Elementary and Middle School Administration/Principalship | - | - | - | 0 | (0) |
| 130409 | Secondary School Administration/Principalship | - | - | - | 0 | (0) |
| 130499 | Educational Administration and Supervision, Other | - | - | - | 0 | (0) |
| 131201 | Adult and Continuing Education and Teaching | - | - | - | 1 | (1) |
| 131202 | Elementary Education and Teaching | 12 | - | 12 | 4 | 7 |
| 131203 | Junior High/Intermediate/Middle School Education and Teaching | - | - | - | 4 | (4) |
| 131205 | Secondary Education and Teaching | - | - | - | 3 | (3) |
| 131206 | Teacher Education, Multiple Levels | - | - | - | 7 | (7) |
| 131209 | Kindergarten/Preschool Education and Teaching | - | - | - | 2 | (2) |
| 131210 | Early Childhood Education and Teaching | 3 | 43 | (40) | 2 | 1 |
| 131301 | Agricultural Teacher Education | - | - | - | 3 | (3) |
| 131302 | Art Teacher Education | - | - | - | 4 | (4) |
| 131303 | Business Teacher Education | - | - | - | 3 | (3) |
| 131304 | Driver and Safety Teacher Education | - | - | - | 3 | (3) |
| 131305 | English/Language Arts Teacher Education | - | - | - | 4 | (4) |
| 131306 | Foreign Language Teacher Education | - | - | - | 4 | (4) |
| 131307 | Health Teacher Education | - | - | - | 4 | (4) |
| 131308 | Family and Consumer Sciences/Home Economics Teacher Education | - | - | - | 4 | (4) |
| 131309 | Technology Teacher Education/Industrial Arts Teacher Education | - | - | - | 5 | (5) |
| 131310 | Sales and Marketing Operations/Marketing and Distribution Teacher Education | - | - | - | 3 | (3) |
| 131311 | Mathematics Teacher Education | 1 | - | 1 | 4 | (3) |
| 131312 | Music Teacher Education | - | - | - | 4 | (4) |
| 131314 | Physical Education Teaching and Coaching | - | - | - | 4 | (4) |
| 131315 | Reading Teacher Education | - | - | - | 4 | (4) |
| 131316 | Science Teacher Education/General Science Teacher Education | - | - | - | 4 | (4) |
| 131317 | Social Science Teacher Education | - | - | - | 4 | (4) |
| 131318 | Social Studies Teacher Education | - | - | - | 4 | (4) |
| 131321 | Computer Teacher Education | - | - | - | 4 | (4) |
| 131322 | Biology Teacher Education | - | - | - | 3 | (3) |
| 131323 | Chemistry Teacher Education | - | - | - | 3 | (3) |
| 131324 | Drama and Dance Teacher Education | - | - | - | 3 | (3) |
| 131325 | French Language Teacher Education | - | - | - | 3 | (3) |
| 131326 | German Language Teacher Education | - | - | - | 3 | (3) |
| 131327 | Health Occupations Teacher Education | - | - | - | 4 | (4) |
| 131328 | History Teacher Education | - | - | - | 4 | (4) |
| 131329 | Physics Teacher Education | - | - | - | 3 | (3) |
| 131330 | Spanish Language Teacher Education | - | - | - | 3 | (3) |
| 131331 | Speech Teacher Education | - | - | - | 3 | (3) |
| 131332 | Geography Teacher Education | - | - | - | 3 | (3) |
| 131333 | Latin Teacher Education | - | - | - | 3 | (3) |
| 131399 | Teacher Education and Professional Development, Specific Subject Areas, Other | - | - | - | 4 | (4) |
| 131401 | Teaching English as a Second or Foreign Language/ESL Language Instructor | - | - | - | 0 | (0) |
| 131501 | Teacher Assistant/Aide | - | - | - | 3 | (3) |
| 131502 | Adult Literacy Tutor/Instructor | - | - | - | 0 | (0) |
| 131599 | Teaching Assistants/Aides, Other | - | - | - | 3 | (3) |
| 139999 | Education, Other | 5 | - | 5 | - | 5 |
| 140101 | Engineering, General | - | - | - | 0 | (0) |
| 140301 | Agricultural Engineering | - | - | - | 0 | (0) |
| 140401 | Architectural Engineering | - | - | - | 0 | (0) |
| 140801 | Civil Engineering, General | - | - | - | 0 | (0) |
| 140804 | Transportation and Highway Engineering | - | - | - | 0 | (0) |
| 140805 | Water Resources Engineering | - | - | - | 0 | (0) |
| 140899 | Civil Engineering, Other | - | - | - | 0 | (0) |
| 141101 | Engineering Mechanics | - | - | - | 0 | (0) |
| 141201 | Engineering Physics/Applied Physics | - | - | - | 0 | (0) |
| 141301 | Engineering Science | - | - | - | 0 | (0) |
| 141801 | Materials Engineering | - | - | - | 1 | (1) |
| 141901 | Mechanical Engineering | - | - | - | 1 | (1) |
| 142401 | Ocean Engineering | - | - | - | 0 | (0) |
| 142701 | Systems Engineering | - | - | - | 0 | (0) |
| 142801 | Textile Sciences and Engineering | - | - | - | 0 | (0) |
| 143201 | Polymer/Plastics Engineering | - | - | - | 0 | (0) |
| 143301 | Construction Engineering | - | - | - | 1 | (1) |
| 143401 | Forest Engineering | - | - | - | 0 | (0) |
| 143501 | Industrial Engineering | - | - | - | 1 | (1) |
| 143601 | Manufacturing Engineering | - | - | - | 1 | (1) |
| 143801 | Surveying Engineering | - | - | - | 0 | (0) |
| 143901 | Geological/Geophysical Engineering | - | - | - | 0 | (0) |
| 149999 | Engineering, Other | - | - | - | 0 | (0) |
| 150506 | Water Quality and Wastewater Treatment Management and Recycling Technology/Technician | - | - | - | 0 | (0) |
| 150803 | Automotive Engineering Technology/Technician | - | - | - | 1 | (1) |
| 151001 | Construction Engineering Technology/Technician | - | - | - | 1 | (1) |
| 151102 | Surveying Technology/Surveying | - | - | - | 0 | (0) |
| 151201 | Computer Engineering Technology/Technician | 3 | - | 3 | - | 3 |
| 151301 | Drafting and Design Technology/Technician, General | 3 | - | 3 | - | 3 |
| 151302 | CAD/CADD Drafting and/or Design Technology/Technician | 0 | - | 0 | - | 0 |
| 151303 | Architectural Drafting and Architectural CAD/CADD | 1 | - | 1 | - | 1 |
| 151306 | Mechanical Drafting and Mechanical Drafting CAD/CADD | 2 | - | 2 | - | 2 |
| 190101 | Family and Consumer Sciences/Human Sciences, General | - | - | - | 0 | (0) |
| 190201 | Business Family and Consumer Sciences/Human Sciences | - | - | - | 0 | (0) |
| 190202 | Family and Consumer Sciences/Human Sciences Communication | - | - | - | 0 | (0) |
| 190203 | Consumer Merchandising/Retailing Management | - | - | - | 3 | (3) |
| 190401 | Family Resource Management Studies, General | - | - | - | 0 | (0) |
| 190402 | Consumer Economics | - | - | - | 0 | (0) |
| 190403 | Consumer Services and Advocacy | - | - | - | 0 | (0) |
| 190499 | Family and Consumer Economics and Related Services, Other | - | - | - | 0 | (0) |
| 190501 | Foods, Nutrition, and Wellness Studies, General | - | - | - | 0 | (0) |
| 190504 | Human Nutrition | - | - | - | 0 | (0) |
| 190505 | Foodservice Systems Administration/Management | - | - | - | 0 | (0) |
| 190599 | Foods, Nutrition, and Related Services, Other | - | - | - | 0 | (0) |
| 190601 | Housing and Human Environments, General | - | - | - | 0 | (0) |
| 190605 | Home Furnishings and Equipment Installers | - | - | - | 1 | (1) |
| 190699 | Housing and Human Environments, Other | - | - | - | 0 | (0) |
| 190702 | Adult Development and Aging | - | - | - | 0 | (0) |
| 190704 | Family Systems | - | - | - | 0 | (0) |
| 190706 | Child Development | - | - | - | 0 | (0) |
| 190707 | Family and Community Services | - | - | - | 0 | (0) |
| 190708 | Child Care and Support Services Management | 6 | - | 6 | 2 | 4 |
| 190709 | Child Care Provider/Assistant | 18 | - | 18 | 2 | 16 |
| 190799 | Human Development, Family Studies, and Related Services, Other | - | - | - | 0 | (0) |
| 190901 | Apparel and Textiles, General | - | - | - | 0 | (0) |
| 199999 | Family and Consumer Sciences/Human Sciences, Other | - | - | - | 0 | (0) |
| 220301 | Legal Administrative Assistant/Secretary | - | - | - | 0 | (0) |
| 220302 | Legal Assistant/Paralegal | 2 | - | 2 | - | 2 |
| 240101 | Liberal Arts and Sciences/Liberal Studies | 392 | - | 392 | - | 392 |
| 250301 | Library and Archives Assisting | - | - | - | 1 | (1) |
| 260499 | Cell/Cellular Biology and Anatomical Sciences, Other | - | - | - | 0 | (0) |
| 260701 | Zoology/Animal Biology | - | - | - | 0 | (0) |
| 260702 | Entomology | - | - | - | 0 | (0) |
| 260707 | Animal Physiology | - | - | - | 0 | (0) |
| 260708 | Animal Behavior and Ethology | - | - | - | 0 | (0) |
| 260709 | Wildlife Biology | - | - | - | 0 | (0) |
| 260799 | Zoology/Animal Biology, Other | - | - | - | 0 | (0) |
| 261301 | Ecology | - | - | - | 0 | (0) |
| 301601 | Accounting and Computer Science | - | - | - | 2 | (2) |
| 301701 | Behavioral Sciences | - | - | - | 0 | (0) |
| 301901 | Nutrition Sciences | - | - | - | 0 | (0) |
| 310101 | Parks, Recreation and Leisure Studies | - | - | - | 1 | (1) |
| 310301 | Parks, Recreation and Leisure Facilities Management, General | - | - | - | 1 | (1) |
| 310504 | Sport and Fitness Administration/Management | - | - | - | 1 | (1) |
| 310599 | Health and Physical Education/Fitness, Other | - | - | - | 1 | (1) |
| 319999 | Parks, Recreation, Leisure, and Fitness Studies, Other | - | - | - | 1 | (1) |
| 390601 | Theology/Theological Studies | - | - | - | 1 | (1) |
| 390602 | Divinity/Ministry | - | - | - | 1 | (1) |
| 390604 | Pre-Theology/Pre-Ministerial Studies | - | - | - | 1 | (1) |
| 390605 | Rabbinical Studies | - | - | - | 1 | (1) |
| 390699 | Theological and Ministerial Studies, Other | - | - | - | 1 | (1) |
| 390701 | Pastoral Studies/Counseling | - | - | - | 1 | (1) |
| 390702 | Youth Ministry | - | - | - | 1 | (1) |
| 390799 | Pastoral Counseling and Specialized Ministries, Other | - | - | - | 1 | (1) |
| 399999 | Theology and Religious Vocations, Other | - | - | - | 1 | (1) |
| 400601 | Geology/Earth Science, General | - | - | - | 0 | (0) |
| 400605 | Hydrology and Water Resources Science | - | - | - | 0 | (0) |
| 400607 | Oceanography, Chemical and Physical | - | - | - | 0 | (0) |
| 410101 | Biology Technician/Biotechnology Laboratory Technician | - | - | - | 0 | (0) |
| 410399 | Physical Science Technologies/Technicians, Other | - | - | - | 0 | (0) |
| 419999 | Science Technologies/Technicians, Other | - | - | - | 0 | (0) |
| 430102 | Corrections | 10 | 12 | (2) | 12 | (3) |
| 430103 | Criminal Justice/Law Enforcement Administration | 5 | - | 5 | 0 | 5 |
| 430104 | Criminal Justice/Safety Studies | - | - | - | 0 | (0) |
| 430107 | Criminal Justice/Police Science | 39 | - | 39 | 2 | 37 |
| 430109 | Security and Loss Prevention Services | - | - | - | 0 | (0) |
| 430110 | Juvenile Corrections | - | - | - | 12 | (12) |
| 430111 | Criminalistics and Criminal Science | - | - | - | 2 | (2) |
| 430112 | Securities Services Administration/Management | - | - | - | 0 | (0) |
| 430199 | Corrections and Criminal Justice, Other | - | - | - | 12 | (12) |
| 430203 | Fire Science/Fire-fighting | 4 | - | 4 | - | 4 |
| 430302 | Crisis/Emergency/Disaster Management | 1 | - | 1 | - | 1 |
| 440401 | Public Administration | - | - | - | 3 | (3) |
| 440501 | Public Policy Analysis, General | - | - | - | 0 | (0) |
| 449999 | Public Administration and Social Service Professions, Other | - | - | - | 1 | (1) |
| 460101 | Mason/Masonry | - | - | - | 1 | (1) |
| 460201 | Carpentry/Carpenter | - | - | - | 1 | (1) |
| 460301 | Electrical and Power Transmission Installation/Installer, General | - | - | - | 1 | (1) |
| 460302 | Electrician | - | - | - | 2 | (2) |
| 460303 | Lineworker | - | - | - | 1 | (1) |
| 460399 | Electrical and Power Transmission Installers, Other | - | - | - | 1 | (1) |
| 460401 | Building/Property Maintenance | - | - | - | 1 | (1) |
| 460402 | Concrete Finishing/Concrete Finisher | - | - | - | 1 | (1) |
| 460403 | Building/Home/Construction Inspection/Inspector | - | - | - | 1 | (1) |
| 460404 | Drywall Installation/Drywaller | - | - | - | 1 | (1) |
| 460406 | Glazier | - | - | - | 1 | (1) |
| 460408 | Painting/Painter and Wall Coverer | - | - | - | 1 | (1) |
| 460410 | Roofer | - | - | - | 1 | (1) |
| 460412 | Building/Construction Site Management/Manager | - | - | - | 1 | (1) |
| 460499 | Building/Construction Finishing, Management, and Inspection, Other | - | - | - | 1 | (1) |
| 460502 | Pipefitting/Pipefitter and Sprinkler Fitter | - | - | - | 0 | (0) |
| 460503 | Plumbing Technology/Plumber | - | - | - | 1 | (1) |
| 460504 | Well Drilling/Driller | - | - | - | 1 | (1) |
| 460505 | Blasting/Blaster | - | - | - | 1 | (1) |
| 460599 | Plumbing and Related Water Supply Services, Other | - | - | - | 0 | (0) |
| 469999 | Construction Trades, Other | - | - | - | 1 | (1) |
| 470103 | Communications Systems Installation and Repair Technology | - | - | - | 0 | (0) |
| 470104 | Computer Installation and Repair Technology/Technician | 2 | - | 2 | - | 2 |
| 470106 | Appliance Installation and Repair Technology/Technician | - | - | - | 0 | (0) |
| 470303 | Industrial Mechanics and Maintenance Technology | - | - | - | 2 | (2) |
| 470399 | Heavy/Industrial Equipment Maintenance Technologies, Other | - | - | - | 2 | (2) |
| 470603 | Autobody/Collision and Repair Technology/Technician | - | - | - | 0 | (0) |
| 470604 | Automobile/Automotive Mechanics Technology/Technician | - | - | - | 1 | (1) |
| 470605 | Diesel Mechanics Technology/Technician | - | - | - | 0 | (0) |
| 470612 | Vehicle Emissions Inspection and Maintenance Technology/Technician | - | - | - | 1 | (1) |
| 470613 | Medium/Heavy Vehicle and Truck Technology/Technician | - | - | - | 2 | (2) |
| 470614 | Alternative Fuel Vehicle Technology/Technician | - | - | - | 1 | (1) |
| 480501 | Machine Tool Technology/Machinist | - | - | - | 0 | (0) |
| 480503 | Machine Shop Technology/Assistant | - | - | - | 0 | (0) |
| 480508 | Welding Technology/Welder | 0 | - | 0 | 1 | (0) |
| 490202 | Construction/Heavy Equipment/Earthmoving Equipment Operation | - | - | - | 1 | (1) |
| 490205 | Truck and Bus Driver/Commercial Vehicle Operator and Instructor | - | - | - | 6 | (6) |
| 490206 | Mobil Crane Operation/Operator | - | - | - | 1 | (1) |
| 490299 | Ground Transportation, Other | - | - | - | 1 | (1) |
| 500102 | Digital Arts | 1 | - | 1 | - | 1 |
| 500401 | Design and Visual Communications, General | - | - | - | 0 | (0) |
| 500402 | Commercial and Advertising Art | - | - | - | 0 | (0) |
| 500404 | Industrial and Product Design | - | - | - | 0 | (0) |
| 500409 | Graphic Design | - | - | - | 0 | (0) |
| 500602 | Cinematography and Film/Video Production | 1 | - | 1 | - | 1 |
| 500913 | Music Technology | 2 | - | 2 | - | 2 |
| 501002 | Fine and Studio Arts Management | - | - | - | 1 | (1) |
| 501004 | Theatre/Theatre Arts Management | - | - | - | 1 | (1) |
| 510601 | Dental Assisting/Assistant | 1 | - | 1 | 0 | 1 |
| 510602 | Dental Hygiene/Hygienist | - | - | - | 0 | (0) |
| 510701 | Health/Health Care Administration/Management | 4 | - | 4 | 0 | 4 |
| 510702 | Hospital and Health Care Facilities Administration/Management | - | - | - | 0 | (0) |
| 510704 | Health Unit Manager/Ward Supervisor | - | - | - | 0 | (0) |
| 510705 | Medical Office Management/Administration | - | - | - | 1 | (1) |
| 510706 | Health Information/Medical Records Administration/Administrator | - | - | - | 0 | (0) |
| 510707 | Health Information/Medical Records Technology/Technician | 10 | - | 10 | 0 | 10 |
| 510710 | Medical Office Assistant/Specialist | - | - | - | 1 | (1) |
| 510711 | Medical/Health Management and Clinical Assistant/Specialist | - | - | - | 2 | (2) |
| 510712 | Medical Reception/Receptionist | - | - | - | 1 | (1) |
| 510713 | Medical Insurance Coding Specialist/Coder | - | - | - | 1 | (1) |
| 510716 | Medical Administrative/Executive Assistant and Medical Secretary | 5 | - | 5 | 1 | 4 |
| 510717 | Medical Staff Services Technology/Technician | - | - | - | 0 | (0) |
| 510799 | Health and Medical Administrative Services, Other | - | - | - | 0 | (0) |
| 510801 | Medical/Clinical Assistant | - | - | - | 1 | (1) |
| 510805 | Pharmacy Technician/Assistant | - | - | - | 1 | (1) |
| 510809 | Anesthesiologist Assistant | - | - | - | 1 | (1) |
| 510810 | Emergency Care Attendant (EMT Ambulance) | - | - | - | 1 | (1) |
| 510811 | Pathology/Pathologist Assistant | - | - | - | 0 | (0) |
| 510813 | Chiropractic Assistant/Technician | - | - | - | 1 | (1) |
| 510899 | Allied Health and Medical Assisting Services, Other | - | - | - | 1 | (1) |
| 510904 | Emergency Medical Technology/Technician (EMT Paramedic) | 74 | - | 74 | 1 | 73 |
| 510907 | Medical Radiologic Technology/Science - Radiation Therapist | 6 | - | 6 | 0 | 6 |
| 510909 | Surgical Technology/Technologist | - | - | - | 0 | (0) |
| 510911 | Radiologic Technology/Science - Radiographer | - | - | - | 0 | (0) |
| 510999 | Allied Health Diagnostic, Intervention, and Treatment Professions, Other | - | - | - | 0 | (0) |
| 511002 | Cytotechnology/Cytotechnologist | - | - | - | 0 | (0) |
| 511005 | Clinical Laboratory Science/Medical Technology/Technologist | - | - | - | 0 | (0) |
| 511007 | Histologic Technology/Histotechnologist | - | - | - | 0 | (0) |
| 511010 | Cytogenetics/Genetics/Clinical Genetics Technology/Technologist | - | - | - | 0 | (0) |
| 511011 | Renal/Dialysis Technologist/Technician | - | - | - | 0 | (0) |
| 511099 | Clinical/Medical Laboratory Science and Allied Professions, Other | - | - | - | 0 | (0) |
| 511506 | Clinical Pastoral Counseling/Patient Counseling | - | - | - | 1 | (1) |
| 511599 | Mental and Social Health Services and Allied Professions, Other | - | - | - | 1 | (1) |
| 511801 | Opticianry/Ophthalmic Dispensing Optician | - | - | - | 0 | (0) |
| 511802 | Optometric Technician/Assistant | - | - | - | 1 | (1) |
| 511803 | Ophthalmic Technician/Technologist | - | - | - | 1 | (1) |
| 511804 | Orthoptics/Orthoptist | - | - | - | 1 | (1) |
| 512201 | Public Health, General | - | - | - | 0 | (0) |
| 512208 | Community Health and Preventive Medicine | - | - | - | 0 | (0) |
| 512211 | Health Services Administration | - | - | - | 0 | (0) |
| 512310 | Vocational Rehabilitation Counseling/Counselor | - | - | - | 0 | (0) |
| 512312 | Assistive/Augmentative Technology and Rehabilitation Engineering | - | - | - | 0 | (0) |
| 512603 | Medication Aide | - | - | - | 0 | (0) |
| 512699 | Health Aides/Attendants/Orderlies, Other | - | - | - | 0 | (0) |
| 513101 | Dietetics/Dietitian | - | - | - | 0 | (0) |
| 513102 | Clinical Nutrition/Nutritionist | - | - | - | 0 | (0) |
| 513199 | Dietetics and Clinical Nutrition Services, Other | - | - | - | 0 | (0) |
| 513602 | Yoga Teacher Training/Yoga Therapy | - | - | - | 0 | (0) |
| 513701 | Aromatherapy | - | - | - | 0 | (0) |
| 513702 | Herbalism/Herbalist | - | - | - | 0 | (0) |
| 513703 | Polarity Therapy | - | - | - | 0 | (0) |
| 513704 | Reiki | - | - | - | 0 | (0) |
| 513799 | Energy and Biologically Based Therapies, Other | - | - | - | 0 | (0) |
| 513801 | Registered Nursing/Registered Nurse | 42 | - | 42 | - | 42 |
| 513802 | Nursing Administration | - | - | - | 0 | (0) |
| 513901 | Licensed Practical/Vocational Nurse Training | 14 | - | 14 | 3 | 11 |
| 513902 | Nursing Assistant/Aide and Patient Care Assistant/Aide | 12 | - | 12 | - | 12 |
| 520101 | Business/Commerce, General | - | - | - | 4 | (4) |
| 520201 | Business Administration and Management, General | 9 | 108 | (99) | 4 | 5 |
| 520202 | Purchasing, Procurement/Acquisitions and Contracts Management | 43 | - | 43 | 0 | 43 |
| 520204 | Office Management and Supervision | 4 | - | 4 | 2 | 2 |
| 520205 | Operations Management and Supervision | 18 | - | 18 | 2 | 16 |
| 520206 | Non-Profit/Public/Organizational Management | - | - | - | 1 | (1) |
| 520207 | Customer Service Management | 1 | - | 1 | 2 | (1) |
| 520208 | E-Commerce/Electronic Commerce | - | - | - | 2 | (2) |
| 520299 | Business Administration, Management and Operations, Other | - | - | - | 1 | (1) |
| 520301 | Accounting | - | - | - | 2 | (2) |
| 520302 | Accounting Technology/Technician and Bookkeeping | 4 | 132 | (127) | 2 | 3 |
| 520303 | Auditing | - | - | - | 2 | (2) |
| 520304 | Accounting and Finance | - | - | - | 2 | (2) |
| 520305 | Accounting and Business/Management | - | - | - | 2 | (2) |
| 520399 | Accounting and Related Services, Other | - | - | - | 2 | (2) |
| 520401 | Administrative Assistant and Secretarial Science, General | 0 | - | 0 | 5 | (4) |
| 520402 | Executive Assistant/Executive Secretary | - | - | - | 5 | (5) |
| 520406 | Receptionist | - | - | - | 4 | (4) |
| 520407 | Business/Office Automation/Technology/Data Entry | 3 | - | 3 | - | 3 |
| 520408 | General Office Occupations and Clerical Services | - | - | - | 1 | (1) |
| 520410 | Traffic, Customs, and Transportation Clerk/Technician | - | - | - | 0 | (0) |
| 520411 | Customer Service Support/Call Center/Teleservice Operation | - | - | - | 4 | (4) |
| 520701 | Entrepreneurship/Entrepreneurial Studies | 3 | 108 | (104) | 2 | 1 |
| 520702 | Franchising and Franchise Operations | - | - | - | 1 | (1) |
| 520703 | Small Business Administration/Management | - | - | - | 1 | (1) |
| 520799 | Entrepreneurial and Small Business Operations, Other | - | - | - | 1 | (1) |
| 520801 | Finance, General | - | - | - | 1 | (1) |
| 520803 | Banking and Financial Support Services | - | - | - | 3 | (3) |
| 520806 | International Finance | - | - | - | 0 | (0) |
| 520808 | Public Finance | - | - | - | 0 | (0) |
| 520809 | Credit Management | - | - | - | 1 | (1) |
| 520899 | Finance and Financial Management Services, Other | - | - | - | 0 | (0) |
| 520903 | Tourism and Travel Services Management | - | - | - | 1 | (1) |
| 520999 | Hospitality Administration/Management, Other | - | - | - | 1 | (1) |
| 521001 | Human Resources Management/Personnel Administration, General | - | - | - | 0 | (0) |
| 521002 | Labor and Industrial Relations | - | - | - | 0 | (0) |
| 521101 | International Business/Trade/Commerce | - | - | - | 2 | (2) |
| 521501 | Real Estate | - | - | - | 0 | (0) |
| 521601 | Taxation | - | - | - | 2 | (2) |
| 521701 | Insurance | - | - | - | 0 | (0) |
| 521801 | Sales, Distribution, and Marketing Operations, General | - | - | - | 2 | (2) |
| 521803 | Retailing and Retail Operations | - | - | - | 2 | (2) |
| 521804 | Selling Skills and Sales Operations | - | - | - | 3 | (3) |
| 521899 | General Merchandising, Sales, and Related Marketing Operations, Other | - | - | - | 2 | (2) |
| 521902 | Fashion Merchandising | - | - | - | 2 | (2) |
| 521904 | Apparel and Accessories Marketing Operations | - | - | - | 2 | (2) |
| 521907 | Vehicle and Vehicle Parts and Accessories Marketing Operations | - | - | - | 1 | (1) |
| 521909 | Special Products Marketing Operations | - | - | - | 4 | (4) |
| 521999 | Specialized Merchandising, Sales, and Marketing Operations, Other | - | - | - | 4 | (4) |
| 529999 | Business, Management, Marketing, and Related Support Services, Other | - | - | - | 6 | (6) |
| 999999 | No related CIP | - | - | - | 3 | (3) |
|  |  | **780** | **402** | **378** | **402** | **378** |

# Appendix 2. FSU-CEFA Gap Methodology

The employment data was derived from the NETS Database[[34]](#footnote-34) per Florida County (using available FIPS codes[[35]](#footnote-35)) and 6-digit NAICS[[36]](#footnote-36) codes, for the years 1990 through 2013 (the latest year available data to date). Data per County is combined per the twenty-eight Florida College System Regions as shown in Figure 7.

**Figure 7. Map of the Florida College System Regions**

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From the NETS employment data, it can be deduced not only which sector is responsible for most employment in each region, but also in which sectors job growth is seen (or for that matter a shift in employment between sectors). One drawback is that the database is gradually built over the last twenty-four years, with increasing establishments or businesses. The CEFA staff used an index method across the years (time-series) of NAICS codes, using external employment information. For the analysis, twenty-four years of indexing is used to extrapolate 2-digit NAICS level indexes for both the years 2015 and 2023, as a means to match the employment projection years of the Department of Economic Opportunity Regional Employment Projections. Hence, the indexing from the NETS is combined with the projections of the Department of Economic Opportunity.

The Department of Economic Opportunity data is provided per Standard Occupational Classification (SOC).[[37]](#footnote-37) Per each SOC code, two annual employment data points are projected (for years 2015 and 2023), as well as average annual openings (a result of growth and replacement), or employment needs. It is noted that the data does not reveal a total breakout per major category, since the numbers do not add up into the three major educational categories; hence some relative percentages are not represented in full detail. The educational attainment in the Department of Economic Opportunity data is provided on six current levels of education, of which only three levels apply to the present study, namely: Postsecondary Vocational Education, Associate Degree and Bachelor’s Degree. Only the relevant and corresponding projected employment data (for both 2015 and 2023), and the average annual openings data, is selected for the present study.

In order to present employment, and especially projected employment needs per NAICS, a 1,427 row (SOC) by 1,618 column (NAICS) matrix was set up to map the crosswalk between SOC and NAICS, using the National Crosswalk Service Center SOC to NAICS crosswalk.[[38]](#footnote-38) This matrix was used to calculate employment (2015), employment projections (2023) and average annual openings in terms of NAICS. The results are aggregated to the major NAICS groups and adjusted or normalized to both the NETS and Department of Economic Opportunity (DEO) data.

Next, the Florida College data was collected (per individual State College) from the National Center for Education Statistics (NCES; IPEDS Data Center),[[39]](#footnote-39) which provided: CIP codes,[[40]](#footnote-40) program name, award level (five levels) and graduate counts. Instead of using the most recent year available only, three years, namely 2011-’12, 2012-’13 and 2013-’14 (most recent available data at the time the analysis was performed), were collected and used, which represented a fuller picture of the offered programs at each College. The downside to this approach is that programs may be used in the analysis that are abandoned as per the latter years where no graduate student numbers are showing, and that the average annual student count is a tad lower than in the graduate student count final year, in case of increasing student graduation counts (and vice versa). No attempt is made by the research team to extrapolate graduate student counts to year 2014-’15 (in many cases none can be made due to one data point only), hence the comparison tables will show an actual average graduate count for the previously mentioned three years, and three levels of graduates, or average annual employment, as per the Department of Economic Opportunity projections.

To match the CIP to the SOC codes, the National Center for Education Statistics (NCES), SOC to CIP crosswalk was used.[[41]](#footnote-41),[[42]](#footnote-42) In this case, a 969 row (SOC) by 1,382 column (CIP) matrix was set up to match combinations from the crosswalk. The results were adjusted or normalized to the Department of Economic Opportunity data (projected average annual openings). This approach opens up two different approaches to the Gap Analysis: a gap between student levels present (the averages as mentioned), further defined as “employment supply”, and the average annual projected, or graduate “demand” per the existing or utilized College programs. The second, or alternative method, uses “all college programs” (or CIPs) available in the FCS area.

**Limitations of the Data**

One of the largest setbacks in data encountered for in this analysis is the inconsistent use or even absence of standardized program coding (or even available descriptors of coding). Although this is in part an overarching issue (e.g. the SOC to CIP Crosswalk), it is clear, however, that Colleges use their own coding systems, and additions to coding systems for “labeling” studies. It is recognized that some flexibility is warranted given emerging and cross-disciplinary programs, but for the bulk of programs standardization in coding should not be an issue. In addition, part of the same coding should be educational attainment as there presently is no mechanism to categorize data to the various degree levels. In short, the program coding and description needs to be better standardized.

In addition, more detailed data on regional wages would be an asset in conducting further similar studies or analysis. The wage differentials signal “gaps” in the labor market, which represent similar gaps that Colleges use for areas of program or curriculum development. Finally, concerning the commuting worker flow, there is limited data from the United States Census Bureau.[[43]](#footnote-43) The commuter data does not come with SOC, CIP or NAICS coding, hence it cannot be linked with any of the collected data. No attempt was made by the CEFA research team to extrapolate or break out an absolute or relative number for matching commute patterns in-between the FCS areas and it is up to the reader to make possible connections/ deductions as to the incentives or reasons behind the commute. The purpose for mentioning the commute is that it is a significant component of labor market dynamics.

1. Formal definition for NAICS 56: Administrative and Support and Waste Management and Remediation Services. [↑](#footnote-ref-1)
2. Information retrieved from: <http://www.nfcc.edu/about-nfcc/history/index.html> and <http://www.nfcc.edu/about-nfcc/accolades-and-honors/index> [↑](#footnote-ref-2)
3. The study, performed by WalletHub, identified the best and worst community colleges of the U.S. Their methodology involved a sample of 821 institutions according to 12 key metrics. Data used to create these rankings were collected from the National Center for Education Statistics, Council for Community and Economic Research and College Measures. See: <https://wallethub.com/edu/states-with-best-worst-community-college-systems/15073/> [↑](#footnote-ref-3)
4. Jenkins, D. and J. Fink. 2016. Tracking Transfer: New Measures of Institutional and State Effectiveness in Helping Community College Students Attain Bachelor’s Degrees. CCRC, The Aspen Institute, and the NSCRC. See: <http://ccrc.tc.columbia.edu/publications/tracking-transfer-institutional-state-effectiveness.html> [↑](#footnote-ref-4)
5. http://www.helios.org/news-media/news/statement-on-the-florida-higher-education-coordinating-council-s-adoption-of-a-postsecondary-attainment-goal [↑](#footnote-ref-5)
6. Florida Chamber Foundation. 2016. From Excuses to Excellence. See:<http://www.flchamber.com/research/research-programs/from-excuses-to-excellence/> [↑](#footnote-ref-6)
7. Data retrieved from the FCS Fact Book 2016: see: <http://www.fldoe.org/core/fileparse.php/15267/urlt/FactBook2016.pdf>, and;

   Jenkins, D. and J. Fink. 2016. Tracking Transfer: New Measures of Institutional and State Effectiveness in Helping Community College Students Attain Bachelor’s Degrees. CCRC [↑](#footnote-ref-7)
8. This paragraph is, unless otherwise indicated, based on date retrieved from: <http://www.census.gov/quickfacts/table/PST045215/12047,12065,12067,12079,12121,12123> [↑](#footnote-ref-8)
9. Labor Force data point July 2015, taken from <http://freida.labormarketinfo.com>. At the same point in time employment is estimated at 46,151, unemployment at 2,976 or 6.1 percent. [↑](#footnote-ref-9)
10. A short-term view is chosen to portray the current or present dynamics which is reflective of the shorter-term perspective of this Gap Analysis study. [↑](#footnote-ref-10)
11. The North American Industry Classification System (NAICS) is the standard used by Federal statistical agencies in classifying business establishments for the purpose of collecting, analyzing, and publishing statistical data related to the U.S. business economy. The typical denomination for the data is not industries but sectors. In the main text, these terms may be used interchangeably. Repeated sector labels are custom as the decimal system runs out of space to categorize different e.g. Manufacturing sub-categories, where there is no standard term in use to distinguish the first ten from the second ten sub-sectors.

    Data used here is from the National Establishment Time Series (NETS) Database. The National Establishment Time-Series (NETS) Database is a time-series database on establishment information. NETS provide longitudinal data on various dynamics of the U.S. economy that include establishment job creation and destruction, sales growth performance, survivability of business startups, mobility patterns, changes in primary markets, corporate affiliations that highlight M&A, and historical D&B credit and payment ratings. It contains information on some 4.5 million unique establishments in Florida, businesses, non-profit and government, between 1990 and 2013.

    The NETS database is the most important database available on the subject, providing data beyond the capacity of the Bureau of Economic Analysis and the Bureau of Labor Statistics, or even CareerSource and DEO.

    Next, the FSU Research Team opted to use NAICS, as it is Sectors that will need employment. This perception is lost where mere occupation codes are presented. Education after all is not about acquiring knowledge and skills to fill an occupation, but to perform in a specific (yet unknown) industry environment. [↑](#footnote-ref-11)
12. Estimates based on the NETS database time-series from 1990 through 2013 (NETS release 2013). [↑](#footnote-ref-12)
13. Florida Labor Market Statistics (LMS) produces projections of all 24 Local Workforce Development Areas (LWDA) each year by first projecting industry employment which is done at the detailed industry level for 12 regions using a historic industry database from 1972. For industry projections, LMS uses the Projections Managing Partnership (PMP) software. The PMP is a consortium of states with the Bureau of Labor Statistics (BLS) who maintain the PMP software. Analysts use the PMP Long-Term Industry Projections module to produce projections for the 12 regions using a mix of regression and shift-share models. Over 30 models are available for each industry. Industry projections are selected by an analyst and then reviewed by the LMS projections team to set the final models and employment levels. State projections are produced first and then used as an independent variable in the regional models. There are 300 industry levels for statewide and in each region, so each year approximately 3,900 models must be selected and reviewed. Base years are adjusted to reflect the most recent changes in industry employment by area. After the projection, region industry levels are finalized, and factored out to various geographic configurations using detailed industry employment. This is done for LWDAs, large counties, and Florida College System areas. Industry staffing patterns based on BLS metro area survey data are used to produce the occupational projections. The staffing pattern is the ratio of occupational employment to industry employment derived from a massive survey of employers conducted by LMS under BLS technical guidance. Job openings due to growth and replacement needs are produced by occupation in the occupational projections process. Replacement openings are created when workers change occupations, retire or leave the labor force. The final published tables contain industry and occupational projections for all 24 LWDAs, all large counties with over 100,000 base year employment and Florida College System areas. Projections are used to produce the statewide and LWDA Demand Occupations Lists. The next round of projections to be published early next year will be from 2016-2024. Personal communication, Sept. 2016, with George Foster, Economist Manager Occupational Employment Statistics & Employment Projections, Department of Economic Opportunity. [↑](#footnote-ref-13)
14. The recalibration was conducted as a means for improved readability. [↑](#footnote-ref-14)
15. DEO Employment Projections (2015-2023), data retrieved from <http://www.floridajobs.org/labor-market-information/data-center/statistical-programs/employment-projections> [↑](#footnote-ref-15)
16. Rather than using calculus to correct the differentials the CEFA research team opted to use the actual data. [↑](#footnote-ref-16)
17. DEO Employment Projections (2015-2023) and SOC to NAICS crosswalk. National Crosswalk Service Center SOC to NAICS crosswalk**, Occupation-to-Industry Linkages (updated to latest information: 2010 SOC, 2012 NAICS)**,retrieved from <http://www.xwalkcenter.org/index.php/classifications/crosswalks>

    For a description of the methodology used by FSU-CEFA, see Appendix 2. [↑](#footnote-ref-17)
18. See also Table 1 in NAICS. Observed differences between Table 3 and Table 1 are due to source differences. [↑](#footnote-ref-18)
19. Which are equivalent to the center column in Table 4. [↑](#footnote-ref-19)
20. In the following Gap Analysis, it should be noted that graduating students may be a major supply for jobs, but are not the only source of labor supply. Among several labor supply sources are the unemployed and commuters from areas. beyond the areas under analysis. Unemployment data may also provide important context when identifying the training programs that are best suited to transitioning unemployed workers into in-demand occupations. It is beyond the scope of this Gap Analysis to account for in- and outflow commuter patterns. In the following Gap Analysis, it is assumed by the CEFA research team that the demand and supply of employment is derived by the FCS graduate population. [↑](#footnote-ref-20)
21. National Crosswalk Service Center SOC to NAICS crosswalk, **Occupation-to-Training Classification Crosswalks,** retrieved from <http://www.xwalkcenter.org/index.php/classifications/crosswalks> [↑](#footnote-ref-21)
22. The FSU Research Team did not pursue enhancement of the available SOC-to-CIP crosswalk, as there are 1.3 million potential combinations that may need attention. There were some codes that could not be matched, mainly due to blanks on either side of the crosswalk. [↑](#footnote-ref-22)
23. National Center for Education Statistics (NCES), data retrieved for years 2011-12, 2012-13 and 2013-14; <http://nces.ed.gov/ipeds/datacenter/Default.aspx> and <http://nces.ed.gov/ipeds/datacenter/InstitutionProfile.aspx?unitid=acaeb0b2acb2> [↑](#footnote-ref-23)
24. The most recent data available at the time of this study. [↑](#footnote-ref-24)
25. The count mentioned does not include the unmatched 59 (due to blanks on either side of the crosswalk). [↑](#footnote-ref-25)
26. A full table on six-digit CIP codes with the same set-up is provided in Appendix 1, for further 6-digit detail. [↑](#footnote-ref-26)
27. Note: This analysis does not include an analysis of CIP code 24 because the primary focus of students who earn an Associate in Arts degree is to transfer to colleges or universities to continue their education. [↑](#footnote-ref-27)
28. The Survey Monkey survey was developed by Eileen Johnson, Director of Finance and Administration, AFC. [↑](#footnote-ref-28)
29. More recent than two years ago [↑](#footnote-ref-29)
30. The DEO Employment projections do not include certain marginal categories, and growth and replacement differentials (per county/workforce area and per college area respectively). [↑](#footnote-ref-30)
31. Data for 2011-2012, 2012-2013 and 2013-2014 were the most recent data available when CEFA staff performed the analysis for all the state colleges. [↑](#footnote-ref-31)
32. It should be noted that North Florida Community College graduates are not the only source of labor supply. [↑](#footnote-ref-32)
33. Note that these economic measures are independent and should not be summed together. [↑](#footnote-ref-33)
34. The National Establishment Time-Series (NETS) Database is a time-series database on establishment information. NETS provide longitudinal data on various dynamics of the U.S. economy that include establishment job creation and destruction, sales growth performance, survivability of business startups, mobility patterns, changes in primary markets, corporate affiliations that highlight M&A, and historical D&B credit and payment ratings. It contains information on some 4.5 million unique establishments in Florida, businesses, non-profit and government, between 1990 and 2013. [↑](#footnote-ref-34)
35. Federal Information Processing Standard (FIPS) is a United States federal government system standard used to accredit cryptographic modules by non-military government agencies and government contractors. [↑](#footnote-ref-35)
36. The North American Industry Classification System (NAICS) is the standard used by Federal statistical agencies in classifying business establishments for the purpose of collecting, analyzing, and publishing statistical data related to the U.S. business economy. [↑](#footnote-ref-36)
37. See Footnote 5 earlier in the text.

    The Standard Occupational Classification (SOC) system is used by Federal statistical agencies to classify workers into occupational categories for the purpose of collecting, calculating, or disseminating data. [↑](#footnote-ref-37)
38. National Crosswalk Service Center SOC to NAICS crosswalk**, Occupation-to-Industry Linkages (updated to latest information: 2010 SOC, 2012 NAICS)**,retrieved from <http://www.xwalkcenter.org/index.php/classifications/crosswalks> [↑](#footnote-ref-38)
39. Data retrieved from: <http://nces.ed.gov/ipeds/datacenter/> [↑](#footnote-ref-39)
40. Classification of Instructional Programs (CIP). The purpose of the Classification of Instructional Programs is to provide a taxonomic scheme that will support the accurate tracking, assessment, and reporting of fields of study and program completions activity. [↑](#footnote-ref-40)
41. National Center for Education Statistics (NCES), **Classification of Instructional Programs (CIP),** CIP to SOC Crosswalk, retrieved from <http://nces.ed.gov/ipeds/cipcode/resources.aspx?y=55> [↑](#footnote-ref-41)
42. It should be noted that: this analysis does not include an analysis of CIP code 24 because the primary focus of students who earn an Associate in Arts degree is to transfer to colleges or universities to continue their education. [↑](#footnote-ref-42)
43. United States Census Bureau: Commuting (Journey to Work) Worker Flows, 2009-2013 5-Year American Community Survey, Table 1. Data retrieved from: <http://www.census.gov/hhes/commuting/data/commutingflows.html> [↑](#footnote-ref-43)