



Tennessee Statewide Supply and Demand Analysis for the 16 Education Clusters

**Tennessee Department of Labor and Workforce Development
Employment Security Division
Labor Market Information Section**

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- 08.1150000 Dieticians and Nutritionists
- 08.1160000 Occupational Therapy
- 08.1170000 Physical Therapy
- 08.1180000 Surgical Technologist
- 08.1190000 Emergency Medical Tech.
- 08.1210000 Recreation Therapists
- 08.1220000 Respiratory Therapy
- 08.1230000 Psychiatric Tech and Aides
- 08.1240000 Message Therapy
- 08.1250000 Physician Assisting
- 08.1260000 Physicians and Surgeons
- 08.1270000 Audiology and Speech Pathology
- 08.1280000 Optometry
- 08.1290000 Dentistry
- 08.1310000 Podiatrists
- 08.1320000 Pharmacy Assisting
- 08.1330000 Pharmacists
- 08.1340000 Dental Assisting
- 08.1350000 Dental Hygiene
- 08.1360000 Radiation Therapy
- 08.1370000 Alternative Medical Systems
- 08.1380000 Chiropractors
- 08.1390000 Health Specialists Teachers, Postsecondary

8.2 Diagnostic Services

- 08.2110000 Ultrasonic Technician
- 08.2190000 Medical Imaging-Radiology
- 08.2210000 Medical and Clinical Laboratory Technologists
- 08.2220000 Medical and Clinical Laboratory Technicians
- 08.2230000 Cardiovascular Technologists and Technicians
- 08.2240000 Nuclear Medicine Technology

8.3 Health Informatics

08.3110000 Medical Records Tech
08.3120000 Administrative Support (double listed as 4.6)

8.4 Support Services

08.4110000 Dispensing Optician
08.4120000 Health Education
08.4130000 Industrial Hygiene
08.4140000 Dietician Assistance
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10.2130000 Human Services

10.3 Family and Community Services Career Pathway

10.3110000 Social Work
10.3120000 Religion
10.3130000 Religious Activities and Education
10.3140000 Social Sciences

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- 12.4130000 Law Enforcement
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- 13.1000000 Precision Production
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14.4000000 Marketing Communication (Refer to 11.32 Electronic Publishing)

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14.7000000 Financial Services Marketing (Refer to 06.3110000 Banking and Finance)

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- 15.1140000 Electrical/Computer Engineering
- 15.1150000 Mechanical Engineering
- 15.1160000 Industrial Engineering
- 15.1170000 Material Engineering
- 15.1180000 Nuclear Engineering
- 15.1190000 All Other Engineers
- 15.1210000 Agricultural Engineering
- 15.1220000 Biomedical Engineering
- 15.1230000 Environmental Engineering
- 15.1240000 Engineering Technology
- 15.1250000 Surveying and Civil Technology
- 15.1260000 Drafting and Design Technology
- 15.1270000 Electronic/Computer Engineering Tech.
- 15.1280000 Mechanical Engineering Technology
- 15.1290000 Nuclear Technicians/Technologists

15.1310000 Chemical Technology

15.3 Science and Mathematics

15.3110000 Life Science (Refer to 08.5110000 Biological/Life Science)

15.3120000 Physics/Astronomy

15.3130000 Earth Science

15.3140000 Chemistry

15.3160000 Science Technologies

15.3170000 Mathematics, Actuarial Science

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Programs and Sub-Programs of Study

16.1 Transportation Operations Including Aviation Flight

16.1100000 Aviation Flight

16.1200000 Transportation Systems

16.1300000 Truck, Bus, Rail, Water Transportation, and Heavy Equipment Operation

16.1400000 Facility and Mobile Equipment Maintenance

16.4100000 Automotive Technology

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Introduction

Every two years, the Labor Market Information Unit of the Tennessee Department of Labor and Workforce Development prepares information on the supply and demand for occupations in the state. Used in conjunction with data on placement from the Tennessee Board of Regents, outlook ratings are assigned to clusters to assess whether the occupations in the cluster will be “in demand” on a long-term basis in the labor market.

Supply and demand reports serve a variety of purposes. They can provide information to individuals who are seeking jobs, changing careers, or planning on enrolling in training concerning the longer-term outlook for a particular occupational area. Many training programs require individuals to enroll in demand occupations. In Tennessee, occupations in demand can be accessed using the Department’s Source Web site (www.jobs4tn.gov ; Labor Supply and Demand). The reports illustrate the types of jobs usually associated with specific training programs. At the system or institutional level, they can indicate where there is an excess or shortage of completers compared to expected labor market demand – information which can be used to consider adding or deleting programs in particular areas of the state.

The supply and demand reports can be used by students, parents, educators, employment and educational counselors, educational and workforce administrators, economic development professionals, analysts and planners. Suggestions on doing so can be found below.

In 2007, the Department began working with the Tennessee Department of Education to change the basis of the supply/ demand clusters to the 16 Career and Technical Education Clusters being developed at the national level. The clusters include all educational programs (designated by Classification of Instructional Programs, or CIPs). Within the clusters are subcategories called “programs of study.” The Tennessee Department of Education has chosen to adjust some of the national programs of study to more closely fit the educational programs being offered in Tennessee, so not all national programs are represented here.

To meet the requirements of the revised Carl Perkins Act, career and technical educators needed information on high wage, high skill, and high demand occupations associated with their programs. To provide this information, the two departments collaborated on the *Tennessee Career Cluster Guides for 2008 and 2009*, which aligned courses in the programs of study with Tennessee’s occupations using the Standard Occupational Classification system (SOC), using some national and local crosswalks.

The current set of tables, which addresses the need for more current information on demand, incorporates updated Tennessee Department of Education Career and Technical Education course codes, 2000 CIP codes, and the 2000 SOC codes, along with updated 2008- 2018 statewide projections and 2009 completer data. Program completers

include all higher education and certified proprietary school recipients in 2009 in Tennessee receiving certificates to advanced postsecondary degrees, as well as secondary school completers who are ready to enter the labor force.

The clusters can be used to spot areas of oversupply, as well as shortages of workers in areas critical to Tennessee's economic development. In times when unemployment is high, such as the present, it is even more important to make this information available to students and career changers to inform their educational decision-making. Numbers of currently unemployed workers in selected fields have been included in the reports for the first time.

Information on current numbers of unemployed workers are also available for some clusters, and have been included to supplement the completer analysis. Comments on the alignments of programs and occupations are welcome.

How to use this publication: The sixteen Career and Technical Education clusters have been subdivided by Tennessee into programs of study. To make more accurate supply and demand analysis possible, the programs of study have in many cases been subdivided into subprograms of study. For example, the Engineering and Technology program of study has been divided into 19 subprograms of study, reflecting the variety of professional and semi-professional engineering disciplines for which training is available in Tennessee. The Table of Contents lists all this detail. Following the Introduction is the Executive Summary. This section lists all the programs and subprograms of study which were found to have a shortage of trained personnel, however small the magnitude. Additional criteria were then applied to the programs, as listed at the top of the page.

To find the programs and subprograms of study at the state level considered high skill, high wage, and in demand using currently available data, find the items with an asterisk. Further documentation containing detailed occupational projections and program completer data can be found on the Supply and Demand reports system (for Excel) now available from the Department (contact Martha Wettemann martha.wettemann@tn.gov or Kevin Hedges (Kevin.hedges@tn.gov) and also on the Source (jobs4tn.gov). On the other hand, programs of study which have an excess of trained personnel (four times the number of trained personnel compared to demand) are listed at the end of the study.

Statewide projections will be updated during 2012. Contact Martha Wettemann or Kevin Hedges at the above address for further information. Comments on this publication are welcome as the Labor Market Information Section strives to provide data that meets your needs.

**Executive Summary: Programs of Study with a Shortage of Completers
(Shortage to Balance in the last column of the tables)**

The following programs/subprograms of study could accommodate additional completers in Tennessee – there are not sufficient trained personnel for expected job openings. Detailed supply and demand reports are available on request. The programs with an asterisk, in addition, train for High Skill, High Wage, In Demand occupations.

These * programs of study share the following characteristics: (a) High Skill- Require long term on-the-job training or college education of one year or more up to and including post-graduate study; (b) High Wage – Earn annual wages more than the median 2010 annual wage in Tennessee of \$29,470; (c) In Demand - Expect to have 25 or more job openings per year. For additional information, consult <https://jobs4tn.gov>.

1.0 Agriculture, Food, and Natural Resources

- Agriculture and Food Science
- Conservation and Environmental Science
- Veterinary Technology

2.0 Architecture and Construction

- *Technical Design and Preconstruction

3.0 Arts, A/V Technology and Communications

- Fashion Design

4.0 Business, Management and Administration

- Accounting Administrative Support
- *Human Resources
- *Business Analysis
- *Communications Development

5.0 Education and Training

- *Library Science
- Interpreters/Translators
- Pre-K Early Childhood Education Teachers
- *Elementary Teachers, Except Special Education
- Middle, Secondary, and Vocational Education Teachers
- *Elementary, Middle, and Secondary Special Education Teachers

6.0 Finance

- Banking and Finance Support Services

7.0 Government and Public Administration

- *Compliance Officers
- Urban Planning
- *Revenue and Taxation
- Eligibility Interviewers, Government Programs

8.0 Health Science

- LPN
- Physical Therapy
- Recreation Therapists

- *Physician Assisting
- *Physicians and Surgeons
- *Pharmacists
- *Dental Hygienists
- Ultrasonic Technicians
- *Medical and Clinical Laboratory Technologists
- *Medical and Clinical Laboratory Technicians
- Dispensing Opticians

9.0 Hospitality and Tourism

- Restaurants and Food and Beverage Services
- Travel and Tourism

10.0 Human Services

- Early Childhood Development and Services
- Human Services
- *Social Work
- Funeral Services
- Personal and Home Care Aides

11.0 Information Technology

- *Network Systems
- *Web/Multimedia Management, Programming

12.0 Public Safety, Corrections, and Security

- Security and Protective Services Pathway
- *Law Enforcement
- *Fire Fighting

13.0 Manufacturing

- Production, Moderate Skill
- *Production Design

14.0 Marketing, Sales, and Service

- *Selling and Sales Management
- Merchandising
- Channel Management

15.0 Science, Technology, Engineering, and Mathematics

- *Industrial Engineering
- *Environmental Engineering
- *Surveying and Civil Technology
- *Chemical Technology
- *Physics/Astronomy

16.0 Transportation, Distribution, and Logistics

- N/A

1.0 Summary: Agriculture, Food, and Natural Resources Supply and Demand

Occupations and training programs in the Agriculture, Food, and Natural Resources Cluster include the production, processing, marketing, distribution, financing, and development of agricultural commodities and resources including food, fiber, wood products, natural resources, horticulture, and other plant and animal products/resources.

The Agriculture, Food, and Natural Resources Cluster consists of 14 supply and demand clusters, with educational requirements ranging from high school career and technical education through graduate school. Of the 14 clusters, ten primarily require less than a bachelor’s degree and four generally require a bachelor’s degree or more.

Three of the four clusters for occupations generally requiring a bachelor’s degree show a shortage or balance of educational completers and expected demand. These include:

Cluster	TN Educational Completers	Expected Outlook	Expected Outlook Including Claimants
Agricultural and Food science	Graduate Degree	Shortage	Shortage
Conservation and environmental science	Bachelor’s Degree and Above	Shortage	Balance
Veterinary medicine	Graduate Degree	Balance tending to surplus	Balance tending to surplus

The only cluster in this group showing a surplus of completers is wildlife biology:

Cluster	TN Educational Completers	Expected Outlook	Expected Outlook
Zoology and wildlife biology	Bachelor’s Degree	Surplus	Significant Surplus

With the current high unemployment rates, there are considerable numbers of unemployed skilled and semi-skilled workers who need to be counted in the labor supply. How does this impact the shortage/balance clusters listed above? For Agricultural Science, Veterinary Medicine, and Zoology and Wildlife Biology, there are few claimants; Conservation and Environmental Science had more. However, in each case the number of claimants does not affect the outlook.

Clusters with occupations generally requiring less than a bachelor’s degree initially fall into three categories: shortage, surplus, and no training available. The four clusters which initially show a shortage of completers compared to demand include:

Cluster	TN Educational Completers	Expected Outlook	Expected Outlook Including Claimants
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Plant Systems Pathway- Turfgrass/Nursery Production	Secondary	Shortage	Surplus
Veterinary Technology	Range	Shortage	Shortage
Plant Systems Pathway- Horticulture Production	Range	Shortage	Surplus
Agribusiness and Operations	Bachelor's Degree	Shortage	Surplus

Veterinary Technology, which has associate degree, certificate, and secondary career and technical education completers, continues to show a shortage of workers if unemployment claimants are considered as part of supply.

A second set of clusters which shows a surplus of completers over openings even before unemployment claimants are considered includes:

Cluster	TN Educational Completers	Expected Outlook	Expected Outlook Including Claimants
Animal Systems Pathway—Production Animals	Bachelor's Degree	Surplus	Surplus
Water and Wastewater Treatment	Certificate	Surplus	Surplus
Power Structural and Technical Systems Pathway	Secondary	Surplus	Significant Surplus

A third set of clusters has no formal training programs available in Tennessee- Forest Maintenance and Conservation, Forest Production, and Oil, Coal, and Gas workers. Again, sufficient numbers of unemployed workers are available to meet the expected demand for these occupations.

2.0 Summary: Architecture and Construction Supply and Demand

Occupations and training programs in the Architecture and Construction Cluster encompass designing, planning, managing, building, and maintaining the built environment.

The occupations requiring bachelor's degrees and above in the architecture and construction area include Architecture; Landscape Architecture; and Interior Design.

A surplus of employees exists in Architecture and Interior Design. The number of individuals in landscape architecture is relatively small and Tennessee has few training programs.

Cluster	TN Educational Completers	Expected Outlook	Expected Outlook Including Claimants
Architecture	Bachelor's Degree	Surplus	Significant Surplus
Landscape Architecture	Bachelor's Degree	Balance	Surplus
Interior Design	Bachelor's Degree	Significant Surplus	Significant Surplus

In the construction clusters requiring less than a bachelor's degree, most (except for Technical Design and Preconstruction) showed a shortage of workers before unemployed workers in these areas were taken into consideration. With high unemployment in the construction trades at present, all programs of study show a current surplus of workers. The magnitude of the surplus is considerable for most construction occupations, as can be seen in the table in the next section.

Cluster	TN Educational Completers	Expected Outlook	Expected Outlook Including Claimants
Technical Design and Preconstruction	Range	Shortage	Shortage
Construction Electrical	Certificate	Shortage	Surplus
Construction Masonry & Concrete	Secondary	Shortage	Surplus
Construction Plumbing	Secondary	Shortage	Significant Surplus
Construction HVAC/R	Certificate	Surplus	Significant Surplus
Construction Welding	Certificate	Shortage	Surplus
Construction Carpenters	Secondary	Shortage	Significant Surplus
All Other Construction	Certificate	Shortage	Surplus

For example, for the pathway Construction Electrical, an estimated 755 openings are expected annually. However, the number of claimants in a recent month (June) were 1,864, nearly two and a half times the number of expected openings. For construction carpenters, there were an estimated 185 openings compared to 886 claimants.

3.0 Summary: Arts, A/V Technology and Communications Supply and Demand

Occupations and training programs in the Arts, A/V Technology and Communications Cluster involve designing, producing, exhibiting, performing, writing and publishing multimedia content, including visual and performing arts and design, journalism, and entertainment services.

Most occupations in these clusters require long-term or some technical training, but not necessarily a bachelor's degree. For instance, Fine Artists, Instrumental Musicians and Actors require long term training; however, many

in the field have bachelor's degrees. Competition tends to be significant in these areas with new graduates entering the fields and many unemployed as well.

Cluster	Educational Completers	Expected Outlook	Expected Outlook Including Claimants
Audio and video technologies	Range	Surplus	Significant Surplus
Fine arts	Bachelor's Degree	Surplus	Significant Surplus
Graphic communications and printing	Range	Shortage	Surplus
Visual arts- design communications	Range	Surplus	Surplus
Visual arts- fashion design	None	Shortage	Shortage
Dramatic arts	Bachelor's Degree	Balance	Surplus
Music	Bachelor's Degree	Balance tending towards surplus	Surplus
Journalism and broadcasting	Bachelor's Degree	Surplus	Significant surplus

In Journalism and Broadcasting, which generally requires a bachelor's degree, the number of individuals completing degrees is more than 3 times the expected openings. In addition, more than 200 individuals with related jobs are currently receiving unemployment insurance. Because the number of potential applicants for jobs including claimants is four times the number of expected openings, the outlook is designated a significant surplus. Changes in the printing industry have resulted in significant numbers of unemployed.

On the other hand, there are currently no courses in Fashion Design, and few claimants, so this program of study displays a shortage of available workers.

4.0 Business Management and Administration

Occupations and training programs in the Business Management and Administration Cluster involve planning, organizing, directing, and evaluating business functions essential to efficient and productive business operations. Opportunities are available in all sectors of the economy.

Cluster	TN Educational Completers	Expected Outlook	Expected Outlook Including Claimants
Business management	Bachelor's Degree and above	Surplus	Significant Surplus
Accounting	Bachelor's Degree	Shortage	Surplus

Accounting administrative support	Associate's Degree	Shortage	Balance
Human resources	Graduate Degree	Shortage	Shortage
Business analysis	Certificate	Shortage	Shortage
Communications development	Bachelor's Degree	Shortage	Shortage
Administrative and information support	Certificate	Shortage	Surplus

Programs of study in this cluster include those requiring business management and accounting degrees, as well as those providing administrative support. The business management program of study includes most types of managers in the private sector (government management is discussed in Cluster 7.0). Within the management occupations, some areas are projected to decline, whereas several have significant growth potential. Areas of decline include those managers affected by lower growth in the economy overall, such as general and operations managers and purchasing managers.

The decline in industrial production; engineering; and transportation, storage, and distribution managers is related to declining manufacturing employment. However, increasing rates of growth are seen for medical and health services managers as the health care industries expand. Training and development and compensation and benefits managers are increasing in employment as benefits complexity increases and companies focus on increasing productivity with existing employees who are increasingly cross-trained for additional functions.

The slower-than-historical growth in management occupations, at the same time that the number of graduates of training programs is increasing, is creating a surplus of management talent. Adding to this surplus were the nearly 4,000 managers receiving unemployment benefits in a recent period.

In recent years, the **accounting** program of study has experienced a shortage of personnel; currently comparing expected openings to completers shows a shortage to a balance in the labor market. With nearly 1,000 claimants available for work, the labor market situation appears to be oversupplied.

More promising areas of employment, which have some shortages of trained personnel, include those requiring college degrees such as business analysis, human resources and compensation (including training), and communications development. Selecting the best people, finding savings in the compensation area, and designing training programs to increase productivity are important areas of business practice. For those without bachelor's degrees, **accounting administrative support** shows a shortage to a balance of employees. However, in the **general administrative and information support** program of study, the number of claimants outweighs job openings by about two to one.

5.0 Education and Training

The Education and Training career cluster includes jobs and training programs for the purpose of managing and providing education and training services and other services in support of learning.

Teaching Training Services Program of Study

This program of study has been subdivided into two sections: Educational Administration and Support Services, and All Other Teaching and Training Services.

Educational Administration and Support Services

Cluster	TN Educational Completers	Expected Outlook	Expected Outlook Including Claimants
Educational Administration	Graduate Degree	Significant Surplus	Significant Surplus
Support Services – Library Science	Graduate Degree	Shortage	Shortage
Support Services – Interpreters/Translators	Bachelor’s Degree	Shortage	Shortage
Support Services – Adult and Continuing Education	Graduate	Shortage	Surplus
Support Services – Instructional Coordinators	Graduate	Significant Surplus	Significant Surplus

All occupations require bachelor’s or graduate degrees. Shortages of trained personnel exist for librarians, interpreters and translators, and adult and continuing education teachers. However, with available claimants considered, adequate numbers of adult and continuing education teachers are probably available to meet the demand.

All Other Teaching and Training Services

Cluster	TN Educational Completers	Expected Outlook	Expected Outlook Including Claimants
Elementary Teachers, Except Special Education	Bachelor’s Degree	Shortage	Shortage
Middle, Secondary, and Vocational Education Teachers	Bachelor’s Degree	Shortage	Shortage tending toward balance
Elementary, Middle, and Secondary Special	Bachelor’s and Graduate Degrees	Shortage	Shortage tending toward Balance

Education Teachers			
Postsecondary Teachers-English Education	Bachelor's and Graduate Degrees	Significant Surplus	Significant Surplus
Postsecondary Teachers-Foreign Language Education	Graduate Degree	Surplus	Surplus
Postsecondary Teachers-Teacher Education	Graduate Degree	Surplus	Surplus (review problems with this data)

As in the previous section, teaching occupations here require bachelor's or graduate-level degrees. According to available data, shortages of teachers are found at the elementary level, with lesser shortages of middle school and special education teachers. More than adequate numbers of postsecondary English, foreign language, and education teachers are available to meet demand.

Teacher Training Services- Pre-K and Early Childhood Education Program of Study

Cluster	TN Educational Completers	Expected Outlook	Expected Outlook Including Claimants
Teacher Training Services-Pre-K Early Childhood Education	Bachelor's Degree	Shortage	Shortage

The program of study for pre-kindergarten and early childhood education teachers will likely show a shortage of personnel until wages are raised to levels more comparable with other teachers. Current average salaries statewide are about \$24,000.

6.0 Finance

Jobs and training related to financial and investment planning, banking, insurance, and business financial management are found in the Finance Cluster. The secondary programs of study include **Financial Planning** and **Banking and Finance**, the latter of which encompasses both professional and support services.

Cluster	TN Educational Completers	Expected Outlook	Expected Outlook Including Claimants
Financial Planning	Bachelor's Degree	Surplus	Significant Surplus
Banking and Finance	Bachelor's Degree	Shortage	Balance tending toward Surplus
Banking and Finance Support Services	Short term on-the-job training only	Shortage	Shortage to Balance

A surplus of candidates is currently available to fill available professional jobs in financial planning, with some opportunities available in banking. Jobs in support services, including tellers, credit authorizers and insurance

claims clerks, generally require a high school degree and short term on-the-job training. There is no formal training for banking support personnel available in Tennessee educational institutions; however, the number of claimants is about equal to the number of job openings, creating some opportunities for new entrants.

7.0 Government and Public Administration

Careers in Government and Public Administration in the United States may be at the local, state, or national level or in the international arena. Related jobs are found in the nonprofit sector. The jobs and training opportunities include governance, security, planning, revenue and taxation, regulation, and administration, among other opportunities. Of the two secondary programs of study, only **Public/Nonprofit Management** will be discussed; information on **National Security** jobs and training is not available.

Public/Nonprofit Management and Administration and Related Areas

Cluster	TN Educational Completers	Expected Outlook	Expected Outlook Including Claimants
Compliance Officers	N/A (no training available)	Shortage	Shortage
Urban Planning	Graduate Degree	Shortage	Shortage (small)
Revenue and Taxation	(no training available)	Shortage	Shortage
Eligibility Interviewers, Government Programs	(no training available)	Shortage	Shortage
Public and Nonprofit Management and Administration	Bachelor's Degree	Balance tending to Surplus	Surplus (needs allocation)

Information on the supply of personnel for several of the regulatory jobs listed above is not readily available, because much of the training is done by governments on their specific state and local procedures, rather than relying on generic educational courses. Tax and financial examiners usually require a bachelor's degree, but courses just for government employees in these fields are not offered by Tennessee's universities and colleges. Therefore shortages of personnel are shown for compliance officers, revenue and taxation employees, and eligibility interviewers. Also, the number of claimants is not sufficient to fill expected openings.

8.0 Health Sciences

Jobs and training in the health sciences include the planning, management, and provision of a variety of health-related services, including therapeutic, diagnostic, and support services, health informatics, and biotechnology research and development.

Cluster	TN Educational Completers	Expected Outlook	Expected Outlook Including Claimants
Therapeutic Services			
Nursing (RN)	Range	Balance tending to Surplus	Surplus
Occupational Therapy Assistant	Associate's Degree	Balance tending to Surplus	Surplus
Physical Therapy Assistant	Associate's Degree	Balance	Surplus
Practical Nurse (LPN)	Certificate	Shortage	Balance
Dieticians and Nutritionists	Bachelor's Degree	Surplus	Surplus
Occupational Therapy	Graduate Degree	Surplus	Surplus
Physical Therapy	Graduate Degree	Shortage	Shortage
Surgical Technologist	Certificate	Surplus	Surplus
Emergency Medical Tech.	Certificate	Surplus	Surplus
Recreation Therapists	Bachelor's Degree	Shortage	Shortage
Respiratory Therapy	Associate's Degree	Surplus	Surplus
Psychiatric Tech and Aides	No training available	Shortage	Shortage
Massage Therapy	Range	Surplus	Surplus
Physician Assisting	Graduate Degree	Shortage	Shortage
Physicians and Surgeons	Professional	Shortage	Shortage
Audiology and Speech Pathology	Graduate Degree	Surplus	Surplus
Optometry	Graduate Degree	Surplus	Surplus (check supply)
Dentistry	Professional	Surplus	Surplus
Podiatrists	Professional	Shortage (only 5)	Shortage (only 5)
Pharmacy Assisting	Certificate	Shortage	Surplus
Pharmacists	Professional	Shortage	Shortage (discuss new programs)
Dental Assistants	Certificate	Surplus	Surplus
Dental Hygiene	Range	Shortage	Shortage
Radiation Therapy	Range	Surplus	Significant Surplus
Alternative Medical Systems	No info 8.137		
Chiropractor	Professional Degree (no training available)	Shortage (only 5)	Surplus
Health Specialists Teachers, Postsecondary	No info 8.139		Add UI claimants p. 67, 251071, Health Specialties Teachers

Therapeutic Occupations Requiring a Bachelor's or Higher Degree:

Several occupational clusters requiring a bachelor's degree or more are currently experiencing shortages (more demand than can be filled by trained personnel). These include physical therapists, whose educational qualifications are increasing; recreational therapists, physician assistants, physicians and surgeons, and pharmacists (another area with increasing specialization and additional education requirements). Training for podiatrists is not found in Tennessee; however, the amount of demand is less than 10 positions, so it would not be considered a shortage occupation.

Occupations requiring a bachelor's degree or more for which there appear to be a surplus of trained candidates include dietitians and nutritionists; occupational therapists; audiologists and speech pathologists; optometrists; dentists; and chiropractors.

Therapeutic Occupations Requiring Less Than a Bachelor's Degree:

Occupations initially showing a **shortage to balance** of workers in the Health Sciences include licensed practical nurses (LPNs), who earn certificates; psychiatric aides and technicians; pharmacy assistants; and dental hygienists. There is no formal training for psychiatric aides and technicians in Tennessee. Among physical therapy assistants, usually requiring an associate's degree, the number of program completers and demand for workers is in balance; but if the claimants are considered in supply, the situation tends toward a surplus. The situation is similar for pharmacy assistants; unemployed job seekers can fill the demand. Dental hygienists, who may earn an associate's or a bachelor's degree, however, have fewer program completers than needed to fill the demand.

Registered nurses in Tennessee may receive an associate's or a bachelor's degree. Other degree options with more advanced degrees are for advanced practice nurses and nursing clinical instructors. Currently, the demand and number of completers are about balanced; however, with 450 claimants available, the balance is tending toward a surplus. Hospitals will have to balance the increasing need for care among the aging U.S. population with tighter reimbursement policies and changes brought about by the Affordable Care Act.

Several occupational areas requiring a certificate or associate's degree appear to have a surplus of workers in the state, even before the number of claimants are added into the supply total. These include surgical technology; emergency medical technician; respiratory therapy; massage therapy; dental assistants; and radiation therapy. The supply, demand, and placement situation within an LWIA should be examined carefully before additional training is offered or undertaken in these occupational areas.

Diagnostic Services:

The only occupation in this group requiring a bachelor's degree, medical and clinical laboratory technologists, shows a shortage of trained personnel. Of those occupations requiring a certificate or associate's degree, ultrasonic and medical and clinical laboratory technicians are facing shortages of personnel. Medical imaging and cardiovascular technologists are in short supply or in balance until the number of unemployed in these occupations is considered.

Cluster	TN Educational Completers	Expected Outlook	Expected Outlook Including Claimants
Diagnostic Services			
Ultrasonic Technician	Certificate	Shortage	Balance tending toward surplus
Medical Imaging-Radiology	Associate's Degree	Shortage	Surplus
Medical and Clinical Laboratory Technologists	Bachelor's Degree	Shortage	Shortage
Medical and Clinical Laboratory Technicians	Range	Shortage	Shortage
Cardiovascular Technologists and Technicians	Associate's Degree	Balance	Surplus
Nuclear Medicine Technology	Certificate	Surplus	Surplus

Health Informatics: Health informatics careers are at the intersection of the fields of information science, computer science and health care. They involve determining the best place and methods to create, use, store, and retrieve information in health and biomedicine. The largest number of completers are those with certificates in health information and medical records technology; about half as many have associate degrees. Besides medical records, additional openings are expected to be in related fields such as training in the use of new systems.

Cluste	TN Educational Completers	Expected Outlook	Expected Outlook Including Claimants
Health Informatics			
Medical Records Technology	Certificate	Surplus	Surplus
Administrative Support (double listed as 4.6)	Certificate	Shortage	Surplus

At present, the number of trained personnel exceeds the number of openings currently identified in the field. For more routine medical clerical personnel in general administrative support positions, fewer people are being trained than job demand, but if claimants are added to supply there is a surplus of trained workers.

Support Services:

Cluster	TN Educational Completers	Expected Outlook	Expected Outlook Including Claimants
Support Services			
Dispensing Optician	Associate’s Degree	Shortage	Shortage
Health Education	Graduate Degree	Balance	Surplus
Industrial Hygiene	Bachelor’s Degree (no training available)	Shortage	Surplus
Dietician Assistance	Certificate	Surplus	Surplus
Medical Assistants	Certificate	Surplus	Significant Surplus
Nursing Assistants and Home Health	Range	Shortage	Surplus
Orthotics/Prosthetics	Bachelor’s Degree	N/A	N/A

Support services in the health sciences range from medical and nursing assistants with less than a year’s required training to occupations such as industrial hygiene, health education, and orthotics/prosthetics. Occupations requiring certificate level training, such as medical and dietician assistants, generally are oversupplied. The rapid growth of home health employment and increasing need for nursing aides and assistants as the population ages has increased job openings at a greater pace than training; however, many trained workers are still unemployed. The support occupations requiring advanced degrees, particularly opticians and health educators, have fewer training opportunities than demand, but there are claimants with those skills.

Biotechnology Research and Development:

With approximately twice as many graduate degree recipients as openings, and some claimants as well, supply should be adequate for current needs.

Cluster	TN Educational Completers	Expected Outlook	Expected Outlook Including Claimants
Biotechnology Research and Development			
Biological/Life Science	Graduate Degree	Surplus	Surplus

9.0 Hospitality and Tourism

Jobs and training in hospitality and tourism include management, marketing, and operations of restaurants and other food services, lodging, recreation events, attractions, and travel-related services.

Cluster	TN Educational Completers	Expected Outlook	Expected Outlook Including Claimants
Restaurants and Food and Beverage Services Pathway	Secondary	Shortage	Shortage
Lodging Pathway	Bachelor's Degree	Shortage	Surplus
Travel and Tourism Pathway	Range	Shortage	Shortage
Recreation, Amusements and Attractions Pathway	Bachelor's Degree	Balance tending to Surplus	Surplus

Pay in the tourism industry tends to be lower than that in other clusters, so some labor market shortages do exist. Shortages of food service managers and cooks exist, as do individuals involved in travel planning and as tour guides. However, jobs such as travel agent are declining as profit margins for airlines decrease, fuel prices increase, and the internet allows individuals to do travel planning and find discounts themselves.

10.0 Human Services

Those seeking careers in human services may work in planning, managing and providing human services including social and community-related services that relate to families and human needs.

Cluster	TN Educational Completers	Expected Outlook	Expected Outlook Including Claimants
Early Childhood Development and Services			
Early Childhood Development and Services	Certificate	Shortage	Shortage
Counseling and Mental Health Services			
Psychology	Graduate Degree	Surplus	Surplus
Educational Counseling	Graduate Degree	Shortage	Surplus
Human Services	Bachelor's Degree	Shortage	Shortage
Family and Community Services			
Social Work	Social Work	Shortage	Shortage
Religion	Graduate Degree	Shortage (not usually covered under UI)	Shortage (not usually covered under UI)

Religious Activities and Education	Bachelor's Degree	Shortage (not usually covered under UI)	Shortage (not usually covered under UI)
Social Sciences	Graduate	Surplus	Surplus
Personal Care Services			
Cosmetology and Barbering	Certificate	Significant Surplus	Significant Surplus
Funeral Services	Associate Degree	Shortage	Shortage
Personal and Home Care	High School Degree or Equivalent (no training available)	Shortage	Shortage
Consumer Services			
Consumer Services	Bachelor's Degree	Surplus	Surplus

Early Childhood Development: Due to the economic and social challenges faced by families in the last few years, the need for human services workers has increased. Nearly 2000 openings annually are expected for child care workers and teacher assistants, with half that number being trained or currently on unemployment. However, with wages averaging \$16,700 for child care workers, shortages are expected to persist.

Counseling and Mental Health Services: Shortages are expected for substance abuse, mental health, and rehabilitation counselors, as well as residential advisors. These jobs do not usually require graduate degrees. Without considering the unemployed, there is a shortage of educational, vocational, and school counselors, individuals much needed in today's volatile economy. However, a surplus of psychologists exists, with more than three times the number of graduate degree completers as positions available. In addition, with 1500 or more bachelor's degree recipients in a recent year, competition will be stiff for those planning to enter the profession.

Family and Community Services: Shortages appear to exist for social workers, including those in medical and public health settings, as well as for individuals pursuing advanced social science degrees at a time when postsecondary teaching positions are fewer. The number of religious institutions signals a potential shortage of clergy and religious educators. Average earnings information for clergy is not readily available, as many are not covered by unemployment insurance.

Personal care services: A significant surplus of completers exists in cosmetology and barbering services, with nearly 12 times as many completers as expected openings. Funeral services will have opportunities. One of the most rapidly growing occupations, personal and home care aides, requires only a high school degree or the equivalent and could experience a shortage of workers. However, the median income was \$18,040 in 2011, making it one of the lower paid occupations.

11.0 Information Technology

Careers in the information technology area relate to designing, developing, and supporting hardware, software, multimedia, and systems integration services.

Cluster	TN Educational Completers	Expected Outlook	Expected Outlook Including Claimants
Network Systems	Range	Shortage	Shortage
Interactive Media	Certificate	Shortage	Shortage (very few openings)
Electronic Publishing	Secondary	Surplus	Surplus
Web Design and Other Computer Specialists	Secondary	Surplus	Significant Surplus
Web/Multimedia Management, Programming	Bachelor's Degree	Shortage	Shortage

Occupational descriptions in this rapidly-evolving field will be changing with a future set of projections. The following comments are applicable to current job descriptions.

Network systems: A significant shortage exists of training programs and completers in the area of network systems. Nearly 400 job openings were expected, but less than 25 individuals could be identified receiving formal institutional training. More than 100 claimants had network administrator or analyst titles, still leaving a considerable shortage of workers. Training was available at the certificate and associate's and bachelor's degree levels.

Multimedia Artists and Animators: In this relatively new field, very few jobs or training completers could be identified.

Electronic Publishing: Due to changing technology and migration of information delivery from paper to the internet, projections are for this occupation to decline. A very small number of replacement openings are expected.

Web Design and Other Computer Specialties: This program of study encompasses individuals receiving computer training at the secondary and certificate level. Most occupational demand for computer systems and programming identified at present has been for completers at the associate, bachelor's, or graduate degree level.

Web/Multimedia Management, Programming: Expected strong demand for many computer occupations requiring associate's degrees and above, such as computer and information systems managers, computer software engineers, computer systems analysts, and database administrators foreshadow a shortage of qualified workers.

Even with more than a thousand claimants in the labor market, demand is expected to create openings for most workers, and additional personnel especially with bachelor’s degrees will likely be needed.

12.0 Law, Public Safety, Corrections, and Security

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Jobs and training in this cluster include planning, managing, and providing legal, public safety, and protective services and homeland security at the professional and technical support level.

Cluster	TN Educational Completers	Expected Outlook	Expected Outlook Including Claimants
Security and Protective Services Pathway	Secondary	Shortage	Shortage
Legal Assisting	Associate Degree	Shortage	Significant Surplus
Law	Professional Degree	Surplus	Surplus
Law Enforcement	Bachelor’s Degree	Shortage	Shortage
Fire Fighting	Associate Degree	Shortage	Shortage

The majority of openings in the **security and protective services** pathway are for correctional officers and private investigators. Correctional officers’ jobs can be filled by those with high school degrees. The outlook currently is a shortage.

Two programs of study usually require associate’s degrees- **legal assisting** and **fire fighting**. Comparing the number of recent graduates to expected openings, a shortage of workers exists, but with hundreds of law clerks and paralegals currently in claimant status, the labor market outlook could better be characterized as a surplus. However, in fire fighting, training has not kept up with demand, and claimants are relatively few.

Law enforcement includes occupations ranging from police patrol officers to forensic science technicians to detectives to police dispatchers. There are a sufficient number of four-year college graduates to fill 3 out of 5 positions; completers also receive associate degrees or certificates. Even when including claimants in the supply of workers, the outlook is for a shortage of workers; opportunities exist.

Summing the number of professional job openings in the field of **law**, including lawyers, judges, law clerks, and professors of law, about twice as many individuals are receiving graduate degrees as there are openings, creating significant competition.

13.0 Manufacturing

In the manufacturing career cluster, jobs and training involve planning, managing, and performing the processing of materials into intermediate or final products and related professional and technical support activities, including production planning and control, maintenance, and manufacturing/process engineering.

Cluster	TN Educational Completers	Expected Outlook	Expected Outlook Including Claimants
Precision Production	Certificate	Shortage	Surplus
Dental Laboratory Technician	Certificate	Shortage	Shortage
Production, Moderate Skill	Secondary (training not available) (declining occupations)	Shortage	Shortage
Production Design	Some college (training not available)	Shortage	Shortage
Operations and Maintenance	Certificate	Shortage	Surplus
Electrical, Electronic Equip. Repairers	Certificate	Balance tending to Surplus	Significant Surplus

The primary path for job readiness beyond high school is a certificate or associate's degree, although individuals in a few selected jobs may have a four year college degree. In **precision production**, encompassing nearly 40 occupations, a very limited number of training programs exist, primarily in machine tool technology. (Information on apprenticeships is not available). Considering current completers, there is a shortage of applicants to fill the thousands of available jobs. However, more than 4,000 claimants were also vying for jobs, creating significant competition.

With regard to **production** jobs requiring a **moderate amount of training** (high school), formal training programs have not been identified in Tennessee. Nearly 800 job openings were expected, with fewer registered claimants, creating a shortage of available workers. However, many high school graduates would be qualified to apply for these jobs.

Production design jobs – cost estimators, and wood model makers and patternmakers, usually require some college. Formal training for these jobs has not been found, creating a shortage of workers even when claimants are taken into consideration.

For **production operations and maintenance** employment opportunities, the modal completer type is certificate. Considering these completers only, a shortage of workers would be expected. However, more than 3,000 individuals were receiving claims at the time these data were prepared, creating a surplus of available employees.

The outlook for **electrical and electronic equipment repairers** depends on the type of equipment being repaired. Opportunities are declining for telecommunications equipment installers and repairers, as fewer land lines are installed for telephones, but opportunities are increasing for cable and electronic home entertainment equipment installers. The number of individuals earning certificates is nearly twice the number of job openings; the supply of workers, including claimants, is nearly four times the number of expected openings. The small number of individuals receiving certificates in **dental laboratory technology** is closely matched by the number of openings.

14.0 Marketing Sales and Service

The jobs and training in this cluster involve planning, managing, and performing marketing activities to reach organizational objectives.

Cluster	TN Educational Completers	Expected Outlook	Expected Outlook Including Claimants
Marketing Management	Bachelor's Degree	Significant Surplus	Significant Surplus
Selling and Sales Management	Range	Shortage	Shortage
Merchandising	Range	Shortage	Shortage
Marketing Communication (Refer to 11.32 Electronic Publishing)	Secondary	Surplus	Surplus
Marketing Research (Refer to 06.311 Banking and Finance)	Bachelor's Degree	Shortage	Balance
Channel Management	Secondary (training not available)	Shortage	Shortage
Financial Services Marketing (Refer to 06.100 Financial Planning)	Bachelor's Degree	Surplus	Significant Surplus

Three programs of study generally require bachelors' degrees: **marketing management, marketing research, and financial services marketing**. In marketing management, the number of openings for advertising and marketing managers has been growing more slowly than the economy as a whole. The number of completers of marketing degrees at the bachelor's degree level is eight times the number of expected openings, causing intense competition in this field.

Marketing research requires a bachelor's degree and an economics background. The occupation of market research analyst is included in the Finance Cluster in the Banking and Finance program of study. As mentioned previously, comparing new program completers to expected openings shows a shortfall of completers; including

claimants, there is an approximate balance of supply and demand in the banking and finance program of study which includes marketing research.

Financial Services Marketing occupations and completers are discussed in the Finance Cluster in the Financial Planning program of study. The number of degrees completed is about double the number of openings expected, although demand for personal financial advisors is growing faster than the economy as a whole due to the aging of the population.

The **Selling and Sales Management, Merchandising, and Channel Management** programs of study have a range of completer types; selling and sales management has completers from the secondary to bachelor's level; merchandising has both associate's and bachelor's degree completers; and channel management has no identified instructional programs. All three programs are expected to experience shortages of employees, at a range of skill and salary levels.

15.0 Science, Technology, Engineering, and Mathematics (STEM)

Jobs and training in the science, technology, engineering, and mathematics cluster include planning, managing, and providing scientific research and professional and technical services, with laboratory and testing services and research and development services.

Cluster	TN Educational Completers	Expected Outlook	Expected Outlook Including Claimants
Aerospace Engineering	Bachelor's Degree	Surplus	Surplus
Chemical Engineering	Bachelor's Degree	Significant Surplus	Significant Surplus
Civil Engineering	Bachelor's Degree	Significant Surplus	Significant Surplus
Electrical/Computer Engineering	Bachelor's Degree	Significant Surplus	Surplus
Mechanical Engineering	Bachelor's Degree	Significant Surplus	Significant Surplus
Industrial Engineering	Bachelor's Degree	Shortage	Shortage
Materials Engineering	Graduate Degree	Surplus (small)	Surplus (small)
Nuclear Engineering	Bachelor's Degree	Significant Surplus	Significant Surplus
All Other Engineers	Bachelor's Degree	Surplus	Surplus
Agricultural Engineering	Graduate Degree	Surplus (small)	Surplus (small)
Biomedical Engineering	Bachelor's Degree	Surplus	Significant Surplus

Environmental Engineering	Graduate Degree	Shortage	Shortage
Engineering Technology	Range	Surplus	Surplus
Surveying and Civil Technology	Range	Shortage	Shortage
Drafting and Design Technology	Certificate	Surplus	Significant Surplus
Electronic/Computer Engineering Tech.	Associate Degree	Significant Surplus	Significant Surplus
Mechanical Engineering Technology	Associate Degree	Balance	Surplus (small)
Nuclear Technicians/Technologists	Graduate Degree	Surplus (small)	Surplus (small)
Chemical Technology	Range (no training available as of supply date)	Shortage	Shortage
Life Science (Refer to 08.5110000 Biological/Life Science)	Graduate Degree	Surplus	Significant Surplus
Physics/Astronomy	Graduate Degree	Shortage	Balance tending to surplus
Earth Science	Graduate Degree	Surplus	Surplus
Chemistry	Bachelor's Degree	Significant Surplus	Significant Surplus
Science Technologies	Associate Degree	Balance tending to Surplus	Surplus
Mathematics, Actuarial Science	Bachelor's Degree	Significant Surplus	Significant Surplus

The **STEM** disciplines encompass the occupational areas of **engineering, engineering technology, life and physical scientists and technicians, and mathematics**. Many of these occupational areas have been related to manufacturing, construction, the military, and space exploration. Tennessee lost more than 150,000 manufacturing jobs between 2000 and 2009, which has decreased openings for graduates of many engineering and engineering technology programs. The resurgence of investment in manufacturing in the last two years is beginning to create more openings, but program completers in many engineering disciplines outnumber job openings by factors of two to five or more. These are shown with an expected outlook of “surplus” or “significant surplus” in the table above. However, there are a few bright spots. **In engineering, shortages are evident in industrial and environmental engineering.** Health and safety engineers and postsecondary engineering teachers are experiencing some growth as well.

Surveying and civil technology, mechanical engineering technology, and chemical technology are experiencing some shortages of completers at the associate degree and related levels. Among the physical sciences, **physics and astronomy** are experiencing some shortages of personnel as the issues of climate change continue to affect individuals and the economy.

Science technologies and mathematics at the bachelor’s degree level have more individuals graduating than positions. If a shortage, it would be at the graduate level, with a slight shortage of graduate degree recipients of advanced mathematics and statistical degrees compared to the number of openings for mathematicians, statisticians, and mathematical science teachers at the postsecondary level.

16.0 Transportation, Distribution and Logistics

Jobs and training in this cluster involve the planning, management, and movement of people, materials, and goods by air, rail, water, road, and pipeline as well as professional and technical support services such as transportation infrastructure planning and management, logistics services, and mobile equipment and facility maintenance.

Cluster	TN Educational Completers	Expected Outlook	Expected Outlook Including Claimants
Aviation Flight	Bachelor’s Degree	Balance (very mixed cluster)	Surplus
Transportation Operations Pathway – Transportation Systems (Logistics)	Bachelor’s Degree	Surplus	Surplus
Truck, Bus, Rail, Water Transportation, and Heavy Equipment Operation	WIA	Shortage	Surplus
Bicycle Repair	Secondary (no training provided)	N/A (very small occupation- no supply or demand)	N/A (very small number)
Automotive Technology	Certificate	Surplus	Surplus
Collision Repair Technology	Certificate	Shortage	Surplus
Diesel Technology	Certificate	Shortage	Surplus
Aviation Maintenance	Certificate	Significant Surplus	Significant Surplus
Leisure Craft/Small Engine Technology	Secondary	Balance	Surplus

Tennessee is a transportation hub for air, rail, trucking, water, and auto travel and freight movement, which provides opportunities for employment. Growth in these industries is tied closely to growth in the overall economy, which has been seriously slowed during 2008-2010 in the throes of the Great Recession.

The aviation flight program of study primarily shows demand for airline pilots and air traffic controllers. No formal institutional training is available at Tennessee colleges or universities for these occupations; there appears an approximate balance of demand and supply between the number of expected openings and the unemployed in these occupations.

The occupations most prominent in the **Transportation and Heavy Equipment Operation** program of study are heavy and tractor-trailer truck drivers and transit and intercity bus drivers. Average openings for heavy truck drivers are expected to be about 1900 annually; of bus drivers, about 100 openings per year. About 1100 certificates are issued annually for the commercial operation of these vehicles, which reflects a shortage. However, the labor market also included more than 3500 tractor-trailer truck drivers and 300 bus drivers who were unemployed.

Far-reaching and historic changes in automobile engines are creating new opportunities for technicians and repair personnel. In **Automotive Technology**, at the same time, many individuals are seeking training and obtaining certificates, including those for alternative fuel technology which are creating a surplus of completers compared to expected openings.

For **Collision Repair and Diesel Technology**, comparing the number of expected openings to the number of completers of secondary and certificate programs, both programs of study showed a shortage of completers. If the number of claimants are included, there will be quite sufficient personnel to fill the openings in the labor market.

Aviation Maintenance is another program of study with significant numbers of individuals earning certificates, at least four times as many as expected openings. **Leisure Craft/Small Engine Technology** is closer to a balance between the number of secondary completers and the number of openings projected. Including claimants with these skills, a significant surplus of individuals are expected to be available to fill these jobs.

Conclusion

The purpose of this analysis has been to compare currently available information on the number of completers in the secondary career and technical and wide variety of post secondary institutions in Tennessee and the unemployed with expected demand based on occupational projections done by the Department of Labor and Workforce Development. The analysis is meant to inform educators, economic development personnel, policy makers, and students of program areas where additional training focus may be needed, as well as areas where a surplus of trained personnel are appearing. We hope it is useful as a decision making tool and welcome comments and discussion on its improvement.

Appendix A

Programs of Study with Significant Surplus

(Four times more completers plus claimants than demand- last column in tables)

1.0 Agriculture, Food, and Natural Resources

Zoology and Wildlife Biology

Power Structural and Technical Systems Pathway

2.0 Architecture and Construction

Architecture

Interior Design

Construction Plumbing

Construction HVAC/R

Construction Carpentry

3.0 Arts, A/V Technology and Communications

Audio and Video Technologies

Fine Arts

Journalism and Broadcasting

4.0 Business, Management and Administration

Business Management

5.0 Education and Training

Educational Administration

Instructional Coordinators

English Education Teachers

6.0 Finance

Financial Planning

7.0 Government and Public Administration

8.0 Health Science

Optometry

Radiation Therapy

Massage Therapy

Medical Assistants

9.0 Hospitality and Tourism

10.0 Human Services

Cosmetology and Barbering

11.0 Information Technology

Web Design and other Computer Specialists (certificate and secondary only)

12.0 Public Safety, Corrections, and Security

Legal Assisting

13.0 Manufacturing

Electrical and Electronic Equipment Repairers

14.0 Marketing, Sales, and Service

Marketing Management

Financial Services Marketing

15.0 Science, Technology, Engineering, and Mathematics

Chemical Engineering

Civil Engineering

Mechanical Engineering

Nuclear Engineering

Biomedical Engineering

Drafting and Design Technology

Electronic/ Computer Engineering Technology

Chemistry

Mathematics, Actuarial Science

16.0 Transportation, Distribution, and Logistics

Aviation Maintenance