Overview

Each spring, all Tennessee school districts receiving Perkins funds are required to select their career and technical education (CTE) programs of study for the upcoming school year in eTIGER. In preparation for this year’s open enrollment window (Feb. 8–March 8) we have designed this guide to share important information about our 2019-20 courses and programs of study. Please review the following information on each career cluster prior to making your final program of study selections. If you have additional questions, please reach out to the appropriate program manager listed below or Deborah.Knoll@tn.gov. If you have questions regarding eTIGER, please contact CTE.eTIGER@tn.gov.

<table>
<thead>
<tr>
<th>Career Cluster</th>
<th>Manager</th>
<th>Email</th>
<th>Phone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced Manufacturing</td>
<td>John Mummert</td>
<td><a href="mailto:John.Mummert@tn.gov">John.Mummert@tn.gov</a></td>
<td>(615) 532-2835</td>
</tr>
<tr>
<td>Agriculture, Food, &amp; Natural Resources</td>
<td>Steve Gass</td>
<td><a href="mailto:Steven.Gass@tn.gov">Steven.Gass@tn.gov</a></td>
<td>(615) 532-2847</td>
</tr>
<tr>
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<td>(615) 532-2835</td>
</tr>
<tr>
<td>Arts, Audio/Visual Technology, &amp; Communications</td>
<td>Bryant Nall</td>
<td><a href="mailto:Bryant.Nall@tn.gov">Bryant.Nall@tn.gov</a></td>
<td>(615) 532-6248</td>
</tr>
<tr>
<td>Business Management &amp; Administration</td>
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<td>(615) 532-2844</td>
</tr>
<tr>
<td>Education &amp; Training</td>
<td>Elizabeth Rafferty</td>
<td><a href="mailto:Elizabeth.Rafferty@tn.gov">Elizabeth.Rafferty@tn.gov</a></td>
<td>(615) 532-2840</td>
</tr>
<tr>
<td>Finance</td>
<td>Deborah Knoll</td>
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<td>(615) 532-2844</td>
</tr>
<tr>
<td>Government &amp; Public Administration</td>
<td>Sloan Hudson</td>
<td><a href="mailto:Sloan.Hudson@tn.gov">Sloan.Hudson@tn.gov</a></td>
<td>(615) 532-2839</td>
</tr>
<tr>
<td>Health Science</td>
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<td>(615) 532-2839</td>
</tr>
<tr>
<td>Hospitality &amp; Tourism</td>
<td>Elizabeth Rafferty</td>
<td><a href="mailto:Elizabeth.Rafferty@tn.gov">Elizabeth.Rafferty@tn.gov</a></td>
<td>(615) 532-2840</td>
</tr>
<tr>
<td>Human Services</td>
<td>Elizabeth Rafferty</td>
<td><a href="mailto:Elizabeth.Rafferty@tn.gov">Elizabeth.Rafferty@tn.gov</a></td>
<td>(615) 532-2840</td>
</tr>
<tr>
<td>Information Technology</td>
<td>Bryant Nall</td>
<td><a href="mailto:Bryant.Nall@tn.gov">Bryant.Nall@tn.gov</a></td>
<td>(615) 532-6248</td>
</tr>
<tr>
<td>Law, Public Safety, Corrections, &amp; Security</td>
<td>Sloan Hudson</td>
<td><a href="mailto:Sloan.Hudson@tn.gov">Sloan.Hudson@tn.gov</a></td>
<td>(615) 532-2839</td>
</tr>
<tr>
<td>Marketing, Distribution, &amp; Logistics</td>
<td>Deborah Knoll</td>
<td><a href="mailto:Deborah.Knoll@tn.gov">Deborah.Knoll@tn.gov</a></td>
<td>(615) 532-2844</td>
</tr>
<tr>
<td>STEM</td>
<td>Bryant Nall</td>
<td><a href="mailto:Bryant.Nall@tn.gov">Bryant.Nall@tn.gov</a></td>
<td>(615) 532-6248</td>
</tr>
<tr>
<td>Transportation</td>
<td>John Mummert</td>
<td><a href="mailto:John.Mummert@tn.gov">John.Mummert@tn.gov</a></td>
<td>(615) 532-2835</td>
</tr>
</tbody>
</table>
Making Your Program of Study Selections

Before you login to eTIGER to make your program of study selections for 2019-20, it is important that you take the time to review the following information and materials. This selection process should go hand-in-hand with your preparation for (1) developing your 2019-20 local plan, (2) determining your staffing decisions, and (3) building education-to-career learning pathways for your students. As you prepare to select your programs of study, we recommend having the following resource materials available:

- Definition of CTE concentrator; a student who completes three or more courses within a program of study. (To access the CTE Concentrator FAQ, click here.)
- Career Cluster Considerations (pages 4-28 in this guide)
- ESSA Industry Certification Conversion Table
- 2019-20 Programs of Study (POS)
- 2019-20 POS and course revisions document
- 2019-20 Open Enrollment Instructions for eTIGER
- 2019 Tennessee Department of Economic and Community Development's LEAP Report
- Labor market/industry data for your city, county, and region
  - Useful resources for labor data:
    - Drive to 55: Pathways to Postsecondary reports
    - Local chamber of commerce
    - Tennessee Department of Labor and Workforce Development's Jobs 4 TN portal
- Available postsecondary program offerings and early postsecondary opportunities at local or regional postsecondary schools
  - Useful resources for postsecondary:
    - University of Tennessee system
    - Tennessee Board of Regents system
    - CollegeforTN web portal
- Input from local business and industry advisory council
- Department-promoted industry certifications, embedded within the 2019-20 programs of study and aligned to specific courses
- List of your district’s current CTE staff, including licensure, endorsements, and training of each and the 2019-20 Course Codes
After collecting and reviewing this information, it is important that you have meaningful conversations with your teachers to ensure the selections of all of the programs of study for your district meet the following criteria:

- encourage and support active industry involvement in student learning;
- allow for postsecondary credit and industry certifications while progressing through a course sequence outlined in the 2019-20 programs of study (including capstone experiences upon program of study completion);
- transition seamlessly from secondary to postsecondary;
- have multiple entry and exit points, providing a clear pathway to available employment and postsecondary training in your region; and
- have regional workforce relevance.
Career Cluster Considerations
For more information on the following career clusters, please visit our website at: https://www.tn.gov/education/career-and-technical-education.html.

Advanced Manufacturing
There are no changes to programs of study within this career cluster based on the 2019-20 program of study justification process. Program of study justifications for Advanced Manufacturing can also be found on the career cluster website. Questions about courses and programs of study within this career cluster can be directed to John.Mummert@tn.gov.

Additional Considerations

- We are seeing an increase in the use of the Mechatronics program of study based on employer needs in the state. There are some dual enrollment and dual credit opportunities available at select postsecondary institutions, which may allow you to implement this program of study at a lower cost. Reach out to your local community college or college of applied technology to inquire about potential partnerships.

- Advanced Manufacturing Practicum is a customizable course available as a capstone for these programs of study. You can find those standards listed with the corresponding program of study.

- Work-Based Learning: Career Practicum can be used to customize credits for a student toward a concentration in Advanced Manufacturing.

Example program of study with seamless industry and postsecondary alignment:

![Program of Study Diagram]
Agriculture, Food, & Natural Resources

The following are proposed changes to programs of study within this career cluster based on the 2019-20 program of study justification process. Program of study justifications for Agriculture, Food, & Natural Resources can also be found on the career cluster website. Questions about courses and programs of study within this career cluster can be directed to Steven.Gass@tn.gov.

- **Principles of Agribusiness:** Standard 10 was added to put more emphasis on analysis of agriculture processes and trends, including price point and cost projection.

- **Agricultural Business and Finance:** The wording in standard 5 was expanded to provide additional emphasis on key industry expectations, which will increase student mastery of the standard.

- **Agriscience:** With the increased concerns dealing with food quality, safety, and the need to increase the quantity of food to feed our growing population, standard 11 was added to help students build a strong scientific base to further their learning in horticulture science.

- **Principles of Plant Science and Hydroculture:** Standard 1 was reworded to comply with worker protection standards (WPS) change in the age requirements to obtain the WPS certification. Standard 2 was reworded to better align with industry terminology. Standard 16 was added to increase student mastery of the application of current scientific technology within the agricultural industry.

- **Greenhouse Management:** Standard 3 was reworded to comply with the worker protection standards (WPS) change in the age requirement to obtain the WPS certification. The wording in standard 7 was changed to increase the focus on operational equipment within the greenhouse structure.

- **Landscape and Turf Science:** Standard 2 was reworded to comply with the worker protection standards (WPS) change in the age requirement to obtain the WPS certification. The wording in standards 5-8, 12, and 21 were changed to better align to industry expectations to enhance student mastery of standards.

- **Small Animal Science:** Standard 4 was added to clarify instructional gaps dealing with operating a financially sound small animal enterprise, as identified from the TSIC exam. Standard 18 was reworded to include concepts of genomics related to genetically tracing bloodlines and disease mapping.

- **Large Animal Science:** Standard 4 was added to clarify instructional gaps dealing with operating a financially sound large animal enterprise, as identified from the TSIC exam. Standard 18 was added to address the scientific concepts of genomics to improve overall herd genetic traits. There was a content bucket title change from “The Fundamental Care and Health of Sheep and Goats” to “Fundamental Care and Health of Small Ruminants (Sheep, Goats, Alpacas, and Llamas)” along with the language in standard 21. This provided better alignment to postsecondary and with industry standards.
Veterinary Science: Standard 28 was added to address how genomics principles are being used for disease control in the animal science industry. The wording in standard 30 was changed to clarify instructional gaps dealing with operating a financially sound veterinary enterprise, as identified from the TSIC exam.

Additional Considerations

- **Food Science** is a program of study with a positive job outlook. Industry has shown a particular interest in seeing this program of study expand at the secondary level.

- **Veterinary & Animal Science** and **Horticulture Science** have Tennessee Specific Industry Certifications available.

- Both **Work-Based Learning: Career Practicum** and **Supervised Agricultural Experience** can be used to customize credits for a student toward a concentration in Agriculture.

- For those districts with a strong Agriculture program, we recommend offering **Introduction to Agricultural Sciences** at the middle school level.

**Example program of study with seamless industry and postsecondary alignment:**

<table>
<thead>
<tr>
<th>High School Food Science Program of Study</th>
<th>Associates</th>
<th>Bachelors +</th>
</tr>
</thead>
<tbody>
<tr>
<td>CTE &amp; Science Credit</td>
<td>A.A.S. Agriculture</td>
<td>Food Science Degree Programs</td>
</tr>
<tr>
<td>• Agriscience</td>
<td>• Walters State Community College</td>
<td>• University of Tennessee, Knoxville</td>
</tr>
<tr>
<td>Early Postsecondary</td>
<td></td>
<td>• B.S. Animal Science and B.S. Plant Science Degrees</td>
</tr>
<tr>
<td>Dual Enrollment/Dual Credit</td>
<td></td>
<td>• Austin Peay University</td>
</tr>
<tr>
<td>• Tennessee State University</td>
<td></td>
<td>• Middle Tennessee State University</td>
</tr>
<tr>
<td>CTSO Competitive Events</td>
<td></td>
<td>• Tennessee State University</td>
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<tr>
<td>• FFA</td>
<td></td>
<td>• Tennessee Tech University</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• University of Tennessee, Knoxville</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• University of Tennessee, Martin</td>
</tr>
</tbody>
</table>

**High School Diploma**

- Butchers and Meat Cutters ($28,780)

**Associates**

- First-Line supervisor ($39,470)

**Bachelors**

- Front-Line Supervisor or office and support workers ($49,300)
- Food Scientist and Technicians ($55,860)
- Food Scientist and Technicians with advanced degree ($98,490)
Architecture & Construction
There are no changes to programs of study within this career cluster based on the 2019-20 program of study justification process. Program of study justifications for Architecture & Construction can also be found on the career cluster website. Questions about courses and programs of study within this career cluster can be directed to John.Mummert@tn.gov.

Additional Considerations

- *Residential & Commercial Construction* works well in schools or districts that have the capacity to offer only one construction pathway, and/or job outlooks in the community need students with a diverse set of construction skills, as it focuses on basic skills useful in many construction career pathways.

- For schools or districts where two construction programs are feasible and/or job outlooks in the community need a number of students trained in a specific specialized area, *Structural Systems* and *Mechanical, Electrical, & Plumbing Systems* work well. Both allow students to select an area in which to develop a specialized skill.

- Industry certification alignment: There is a desire from industry and postsecondary to see industry certifications in this area exceed the basic NCCER Core Curriculum certification. NCCER certifications in specific content such as the NCCER Construction Technology and NCCER Electrical Level One will allow for students to earn postsecondary credit in addition to industry recognition.

- *Construction Practicum* is a customizable course available as a capstone for these programs of study. You can find those standards listed with the corresponding program of study.

- *Work-Based Learning: Career Practicum* can be used to customize credits for a student toward a concentration in Architecture & Construction.
Example program of study with seamless industry and postsecondary alignment:

High School Residential & Commercial Construction Program of Study

Apprenticeship

Certificate

Building Construction Technology
- TCATs in 10 locations
- Other

Apprenticeship training is available in carpentry, electrical, HVAC, plumbing, and many more areas.

Electrical Engineering Technology
- Nashville State
- Southwest TN

Electrical Technology
- Northeast State
- Chattanooga State

Civil Technology
- Cleveland State

Associates

Construction Management
- MTSU
- University of Tennessee at Chattanooga

Construction Science
- University of Tennessee at Knoxville

Concrete Industry Management
- MTSU

Architecture & Engineering
- Available at many TN universities

Bachelors

Career Opportunities

High School Diploma
- General maintenance & repair workers, $33,740
- Operating engineers and equipment operators, $36,170
- Sheet metal workers, $27,380
- Painters, construction and maintenance, $30,900
- Cement masons and concrete finishers, $31,820
- Roofers, $37,540

Apprenticeship
- Carpenters, $34,080
- Electricians, $48,790
- Plumbers, pipefitters, and steamfitters, $45,860
- Electrical power-line installers and repairers, $68,580
- First-line supervisors of construction trades and extraction workers, $50,350

Certificate
- HVAC technicians, $38,350
- First-line supervisors of mechanics, installers, and repairers, $55,550

Associates
- Electrical and electronics engineering technicians, $53,320
- Civil engineering technicians, $49,920

Bachelors
- Construction managers, $76,040
- Cost estimators, $55,330
- Architecture & engineering occupations, $70,380
- Surveyors, $44,340
Arts, Audio/Visual Technology, & Communications

There are no changes to programs of study within this career cluster based on the 2019-20 program of study justification process. Program of study justifications for Arts, Audio/Visual Technology, & Communications can also be found on the career cluster website. Questions about courses and programs of study within this career cluster can be directed to Bryant.Nall@tn.gov.

Additional Considerations

- **Applied Arts Practicum** is a customizable course available as a capstone for these programs of study. You can find those standards listed with the corresponding program of study.

- **Work-Based Learning: Career Practicum** can be used to customize credits for a student toward a concentration in Arts, Audio/Visual Technology, & Communications.

Example program of study with seamless industry and postsecondary alignment:
Business Management & Administration

There are no changes to programs of study within this career cluster based on the 2019-20 program of study justification process. Program of study justifications for Business Management & Administration can also be found on the career cluster website. Questions about courses and programs of study within this career cluster can be directed to Deborah.Knoll@tn.gov.

Additional Considerations

- **Business Management** works well in schools or districts that are looking for a pathway into postsecondary business programs and/or have successful capstone business programs already in place, such as Virtual Enterprise International.

- For those districts looking for industry certifications in software applications that are valued by industry and prepare students for both immediate employment and matriculation to postsecondary programs (available through Advanced Computer Applications), we recommend offering the Office Management program of study.

- For those districts with a strong Business Management & Administration program, we recommend offering Computer Applications at the middle school level to ensure students are entering the program with the appropriate technical expertise to move effectively through the program's advanced courses. Students who have taken Computer Applications in middle school may move directly into the second-level course in the Office Management program of study.

- **Business & Entrepreneurship Practicum** is a customizable course available as a capstone for these programs of study. You can find those standards listed with the corresponding program of study.

- **Work-Based Learning: Career Practicum** can be used to customize credits for a student toward a concentration in Business Management & Administration.
Example program of study with seamless industry and postsecondary alignment:

High School Human Resources Program of Study

Early Postsecondary
Dual credit/enrollment
Motlow State Community College
TN College of Applied Technology
Vol State Community College

Certificate
Administrative Office Technology
Select TCAT's

Administrative Assistant
Nashville State Community College

Office Systems Specialist
Chattanooga State Community College

Associate's
A.A.S. Business Administration
A.S. Business Administration
Nashville State Community College
Northeast State Community College
Volunteer State Community College
Cleveland State Community College
Motlow State Community College
Chattanooga State Community College

Bachelors
B.S. Business Administration (Human Resources Concentration)
University of Tennessee
Austin Peay State University
Middle Tennessee State University
University of Tennessee Chattanooga

High School
• General Office Clerk ($29,650)

Certificate
• Office and Administrative Support Workers ($30,420)

Associates
• Human Resources Assistant ($37,700)

Bachelors
• Human Resources Manager ($48,690)
• Labor Relations Specialist ($63,750)
• Training and Development Specialists ($52,650)
• Compensation and Benefits Manager ($32,220)
Education & Training

The following are **proposed changes** to programs of study within this career cluster based on the 2019-20 program of study justification **process**. Program of study justifications for Education & Training can also be found on the **career cluster website**. Questions about courses and programs of study within this career cluster can be directed to Elizabeth.Rafferty@tn.gov.

- **Teaching as a Profession**: The Level 4 course name changed from “Teaching as a Profession III” to “Teaching as a Profession Practicum.”

- **Early Childhood Education (ECE) Careers**: Level 1, 2, 3, and 4 courses in the program of study course standards were revised and reordered to provide proper alignment to the careers and early postsecondary opportunities in ECE.

**Example program of study with seamless industry and postsecondary alignment:**

<table>
<thead>
<tr>
<th>High School Teaching as a Profession Program of Study</th>
<th>High School Diploma</th>
</tr>
</thead>
<tbody>
<tr>
<td>CTSO Competitive Events</td>
<td>• Teacher Assistants, $19,493</td>
</tr>
<tr>
<td>• FCCLA/Advocacy, Career Investigation, Early Childhood Education, Focus on Children, Teach and Train</td>
<td></td>
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<tr>
<td>• SkillsUSA: Career Pathways</td>
<td></td>
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<tr>
<td>• Showcase, Early Childhood Education</td>
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<tr>
<td>• Educator’s Rising Work-Based Learning Practicum</td>
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<tr>
<td>TAP III internship</td>
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<tr>
<td>Certificate</td>
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<tr>
<td>Early Childhood Education-TCAT</td>
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<tr>
<td>Associates</td>
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<tr>
<td>A.A.S. Early Childhood Education</td>
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<tr>
<td>A.S.T. Associate of Science in Teaching K-6 Elementary Education &amp; Early Childhood Education (Pre-K-3)</td>
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</tr>
<tr>
<td>Nashville State Community College</td>
<td></td>
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<tr>
<td>Child Development Associate (CDA) Credential</td>
<td></td>
</tr>
<tr>
<td>Bachelors</td>
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<tr>
<td>B.S. in Education Subject(s): Arts, English/Language Arts, Foreign Languages, History/Social Studies, Math, Music, Physical Education/Health, Science, Special Ed, Speech/Communications</td>
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<tr>
<td>• Austin Peay State University</td>
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<td>• Belmont University</td>
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<td>• Carson-Newman College</td>
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<td>• Lipscomb University</td>
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<td>• Middle Tennessee State University</td>
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<td>• Tennessee State University</td>
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<td>• Tennessee Tech University</td>
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<tr>
<td>• The University of Tennessee</td>
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<tr>
<td>• University of Memphis</td>
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<tr>
<td>• Vanderbilt University</td>
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<tr>
<td>High School Diploma</td>
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<tr>
<td>Certificate</td>
<td></td>
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<tr>
<td>• Preschool Teachers, $24,770</td>
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<tr>
<td>Associates</td>
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<tr>
<td>Bachelors</td>
<td></td>
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<tr>
<td>• Elementary School Teachers, $46,344</td>
<td></td>
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<tr>
<td>• Kindergarten Teachers, $46,160</td>
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<tr>
<td>• Middle School Teachers, $46,573</td>
<td></td>
</tr>
<tr>
<td>• Secondary School Teachers, $47,778</td>
<td></td>
</tr>
<tr>
<td>• Career and Technical Education Teachers, $46,240</td>
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<tr>
<td>• Special Education Teachers, $59,629</td>
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</table>
Finance

There are no changes to programs of study within this career cluster based on the 2019-20 program of study justification process. Program of study justifications for Finance can also be found on the career cluster website. Questions about courses and programs of study within this career cluster can be directed to Deborah.Knoll@tn.gov.

Additional Considerations

- Work-Based Learning: Career Practicum can be used to customize credits for a student toward a concentration in Finance.

Example program of study with seamless industry and postsecondary alignment:
Government & Public Administration

The following are proposed changes to programs of study within this career cluster based on the 2019-20 program of study justification process. Program of study justifications for Government & Public Administration can also be found on the career cluster website. Questions about courses and programs of study within this career cluster can be directed to Sloan.Hudson@tn.gov.

- **Leadership in Government:** This is a new program of study created to support junior officer reserve training corps (JROTC) courses available in Tennessee.

**Additional Considerations**

- **Work-Based Learning: Career Practicum** can be used to customize credits for a student toward a concentration in Government & Public Administration.

**Example program of study with seamless industry and postsecondary alignment:**

<table>
<thead>
<tr>
<th>High School Public Management Program of Study</th>
<th>Dual Enrollment/High School Diploma</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Public Management and Administration Program of Study</strong></td>
<td>• Court Clerk ($25,750-$39,270)</td>
</tr>
<tr>
<td><strong>Work-Based Learning</strong></td>
<td><strong>Associate Degree</strong></td>
</tr>
<tr>
<td><strong>Early Postsecondary</strong></td>
<td>• Social and Human Services Assistants ($21,620-$36,370)</td>
</tr>
<tr>
<td>Government, political science, sociology courses</td>
<td>• Eligibility Interviewers ($31,300-$42,900)</td>
</tr>
<tr>
<td><strong>Associate Degree</strong></td>
<td><strong>Bachelor's Degree</strong></td>
</tr>
<tr>
<td>A.A. Political Science</td>
<td>• Social and Community Service Managers ($38,000-$75,530)</td>
</tr>
<tr>
<td>Pellissippi State Community College</td>
<td>• Compliance Officer ($29,400-$100,650)</td>
</tr>
<tr>
<td>A.S. Political Science</td>
<td>• Urban Planner ($33,810-$85,020) w/ Master's Degree</td>
</tr>
<tr>
<td>Nashville State Community College</td>
<td><strong>Bachelor's Degree</strong></td>
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<tr>
<td>Southwest Tennessee Community College</td>
<td><strong>Sociology</strong></td>
</tr>
<tr>
<td><strong>Bachelor's Degree</strong></td>
<td>University of Tennessee Knoxville</td>
</tr>
<tr>
<td>University of Tennessee</td>
<td>Middle Tennessee State University</td>
</tr>
<tr>
<td>University of Memphis</td>
<td>University of Memphis</td>
</tr>
<tr>
<td><strong>Urban Planning Master's Degree</strong></td>
<td><strong>Urban Planning Master's Degree</strong></td>
</tr>
<tr>
<td>University of Memphis</td>
<td>University of Memphis</td>
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</table>
Health Science

The following are proposed changes to programs of study within this career cluster based on the 2019-20 program of study justification process. Program of study justifications for Health Science can also be found on the career cluster website. Questions about courses and programs of study within this career cluster can be directed to Sloan.Hudson@tn.gov.

- **Nursing Education**: Standards were revised to ensure alignment with industry.

- **Behavioral & Community Health**: Standard 2 was changed from “physically locate care providing organizations” to “identify organizations” to improve clarity.

- **Cardiovascular Services**: Standard 14 a. “axis determination and implications” was removed based on recommendations from industry that this content was too rigorous for high school students and that removing this content would allow teachers and students to focus on more important foundational content.

- **Dental Science**: In standard 2, “forensic odontology” was replaced with “endodontics” to more closely align with industry.

- **Emergency Medical Services**: Standard 11 was revised to increase rigor and remove a reference to the Emergency Preparedness course, which has been retired.

- **Rehabilitation Careers**: The phrase “or 14” was added to Rehabilitation Careers standard 20 to clarify a reference to standard 14.

- **Health Science Education**: Standards were added to include content surrounding soft skills, legal/ethical issues, health insurance terms, and communication. Standards regarding health care systems, human growth and development, and innovations in health care were combined and revised to improve clarity. Foundational standards were added to support the pharmacy technician and ECG technician industry certifications.

- **Anatomy & Physiology**: This course was heavily revised using the science department’s new Anatomy & Physiology course as a framework. The courses now contain the same content, but our course is written in the format our teachers understand and are comfortable with, and our standards include application along with the foundational content, thus aligning our standards with industry.

**Additional Considerations**

- For those districts with a strong Health Science program, we recommend offering *Introduction to Health Science* at the middle school level.

- *Work-Based Learning: Career Practicum* can be used to customize credits for a student toward a concentration in Health Science.
Example program of study with seamless industry and postsecondary alignment:

**High School Nursing Services Program of Study**
- Nursing Services Program of Study
- Nursing Education
- CNA Licensure
- Early Postsecondary (Dual credit/enrollment may be established with local postsecondary institutions in Anatomy & Physiology and Medical Terminology.)

**Postsecondary Certificate**
- Practical Nursing
  - Most TCATs offer this training

**Associate Degree**
- A.S.N. Nursing
  - Available at most community colleges
- Surgical Technology
  - Chattanooga State
  - Crossville State, Jackson State
  - Nashville State Community College

**Bachelor’s Degree**
- B.S.N. Nursing
  - Austin Peay State University
  - UT Martin
  - Tennessee Tech
  - Tennessee State University
  - East Tennessee State University
- Advanced Degrees:
  - M.S.N. Nurse Practitioner
    - offered at universities listed above

**High School Diploma**
- Certified Nursing Assistant ($19,350-$26,090)
- Home Health Aide ($17,240-$22,370)
- Personal Care Aide ($17,210-$20,710)

**Certificate**
- Licensed Practical Nurse ($31,440-$41,160)

**Associate Degree**
- Registered Nurse ($44,030-$65,590)

**Bachelor’s Degree**
- Registered Nurse ($44,030-$65,590)
- Nurse Practitioner ($71,210-$105,080) with master’s degree
Hospitality & Tourism

There are no changes to programs of study within this career cluster based on the 2019-20 program of study justification process. Program of study justifications for Hospitality & Tourism can also be found on the career cluster website. Questions about courses and programs of study within this career cluster can be directed to Elizabeth.Rafferty@tn.gov.

Additional Considerations

- The Hospitality and Tourism Management program of study is highly customizable based on local community needs. It can be used to address not only available employment opportunities, but also continued postsecondary training in the hospitality and hotel management, sports, and entertainment fields of study. The Event Planning & Management course is designed to build on partnerships with local businesses and organizations and includes flexibility to focus on a particular area of interest for your students.

- Work-Based Learning: Career Practicum can be used to customize credits for a student toward a concentration in Hospitality & Tourism.

Example program of study with seamless industry and postsecondary alignment:
Human Services

There are no changes to programs of study within this career cluster based on the 2019-20 program of study justification process. Program of study justifications for Human Services can also be found on the career cluster website. Questions about courses and programs of study within this career cluster can be directed to Elizabeth.Rafferty@tn.gov.

Additional Considerations

- If you are currently offering the Cosmetology or Barbering programs of study, we recommend that you build relationships with your local postsecondary institution to ensure appropriate transition of student hours toward a license. This is also a good area to establish a dual enrollment program.

- There are Tennessee Specific Industry Certifications in the Human and Social Sciences and Dietetics & Nutrition programs of study. For more information, contact Elizabeth.Rafferty@tn.gov.

- For those districts with a strong Human Services program, we recommend offering Introduction to Social Health at the middle school level.

- Work-Based Learning: Career Practicum can be used to customize credits for a student toward a concentration in Human Services.

Example program of study with seamless industry and postsecondary alignment:
Information Technology
There are no changes to programs of study within this career cluster based on the 2019-20 program of study justification process. Program of study justifications for Information Technology can also be found on the career cluster website. Questions about courses and programs of study within this career cluster can be directed to Bryant.Nall@tn.gov.

Additional Considerations

- For those districts with a strong Information Technology program, we recommend offering Computer Applications at the middle school level to ensure students are entering the program with the appropriate technical expertise to move effectively through the advanced courses.

- Coding Practicum and Web Design Practicum are customizable courses available as capstones for these programs of study. You can find those standards listed with the corresponding program of study.

- Work-Based Learning: Career Practicum can be used to customize credits for a student toward a concentration in Information Technology.

Example program of study with seamless industry and postsecondary alignment:
Law, Public Safety, Corrections, & Security

There are no changes to programs of study within this career cluster based on the 2019-20 program of study justification process. Program of study justifications for Law, Public Safety, Corrections, & Security can also be found on the career cluster website. Questions about courses and programs of study within this career cluster can be directed to Sloan.Hudson@tn.gov.

Additional Considerations

- **Work-Based Learning: Career Practicum** can be used to customize credits for a student toward a concentration in Law, Public Safety, Corrections, & Security.

Example program of study with seamless industry and postsecondary alignment:
Marketing, Distribution, & Logistics
The following are proposed changes to programs of study within this career cluster based on the 2019-20 program of study justification process. Program of study justifications for Marketing, Distribution, & Logistics can also be found on the career cluster website. Questions about courses and programs of study within this career cluster can be directed to Deborah.Knoll@tn.gov.

- **Social Media Marketing and Analytics Course:** This is a new course that was created to help increase the number of students with a foundational knowledge of social media marketing and analytics, with the goal of creating a ready workforce for the social media marketing and/or analytics jobs in Tennessee.

- **Entrepreneurship:** An additional standard was added requiring students to identify and research local businesses/government agencies designed to assist small business owners in the areas of business development, financing, permit acquisition, resources, and networking.

Additional Considerations

- A capstone course, *Business & Entrepreneurship Practicum*, is available to further customize the experience for students in the *Entrepreneurship* program of study. Students now have an additional year to work on ideas for start-up business ventures while earning credit toward a concentration.

- *Work-Based Learning: Career Practicum* can be used to customize credits for a student toward a concentration in Marketing.

**Example program of study with seamless industry and postsecondary alignment:**
Science, Technology, Engineering, & Mathematics (STEM)
The following are proposed changes to programs of study within this career cluster based on the 2019-20 program of study justification process. Program of study justifications for STEM can also be found on the career cluster website. Questions about courses and programs of study within this career cluster can be directed to Bryant.Nall@tn.gov.

- **BioSTEM Program of Study:** Through the justifications process and subsequent discussions with CTE directors and teachers, it was realized that there was a need for students to acquire lab skills and have the ability to apply it to many different STEM industries in Tennessee.
  - **BioSTEM I** is a foundational course in the STEM cluster for students interested in learning more about careers in science, technology, engineering, and mathematics with emphasis in biotechnology. This course covers basic skills required for BioSTEM fields of study.
  - **BioSTEM II** is a project-based learning experience for students who wish to further explore the dynamic range of BioSTEM fields introduced in BioSTEM I. Building on the content and critical thinking frameworks of BioSTEM I, this course asks students to apply the scientific inquiry and engineering design processes to a course-long project selected by the instructor with the help of student input.
  - **BioSTEM III** is an applied course in the STEM career cluster which allows students to work in groups to solve a problem or answer a scientific question drawn from real-world scenarios within their schools or communities. This course builds on BioSTEM I and BioSTEM II by applying scientific knowledge and skills to a team project.
  - **BioSTEM Practicum** is the fourth course in the STEM cluster for students interested in learning more about careers in science, technology, engineering and mathematics with emphasis in biotechnology. This course provides opportunity for students to use skills and content learned during the first three courses in a real-world university or industry lab setting.

**Additional Considerations**

- For districts with excelling STEM programs, the department, in conjunction with Tennessee STEM Innovation Network, offers a STEM School Designation.
- For those districts with a strong STEM program, we recommend offering the suite of available middle school STEM courses between sixth and eighth grade in order to prepare students for advancement in high school.
- **STEM Practicum** is a customizable course available as a capstone for these programs of study. You can find those standards listed with the corresponding program of study.
- **Work-Based Learning: Career Practicum** can be used to customize credits for a student toward a concentration in STEM.
Examples of programs of study with seamless transitions to industry and postsecondary:
Transportation

There are **no changes** to programs of study within this career cluster based on the 2019-20 program of study justification process. Program of study justifications for Transportation can also be found on the career cluster website. Questions about courses and programs of study within this career cluster can be directed to John.Mummert@tn.gov.

**Additional Considerations**

- *Work-Based Learning: Career Practicum* can be used to customize credits for a student toward a concentration in Transportation, Distribution, & Logistics.

**Examples of programs of study with seamless transitions to industry and postsecondary:**