

# Proposed 2019-20 CTE Programs of Study & Course Revisions

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The following are proposed revisions to the 2019-20 programs of study based on the annual program of study justification process conducted by the department. In addition to new courses and programs of study offerings, these revisions update course codes and early postsecondary opportunities to existing courses and programs of study.

New and revised CTE courses will be reviewed on second and final reading by the Tennessee State Board of Education during the February 2019 meeting. If approved, these changes will take effect for the 2019-20 school year.

For additional information on courses or programs of study in the 16 career clusters, please reach out to the appropriate career cluster consultant or visit our web page at <https://tn.gov/education/topic/career-clusters>.

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# 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](mailto:John.Mummert@tn.gov).

Program of Study	Level 1	Level 2	Level 3	Level 4
<b>Machining Technology</b>	Principles of Manufacturing (C13H05)	Principles of Machining I (C13H09)	Principles of Machining II (C13H06) -or- <b>Dual Enrollment</b> Machining Technology (C13H01)	Manufacturing Practicum (C13H08) -or- <b>Dual Enrollment</b> Machining Technology (C13H01)
	<b>Industry Certification:</b> Machining Level I - Measurement, Materials, and Safety Certification (NIMS) -and/or- OSHA 10 -and/or- Precision Measurement Instruments Certification (includes all subtests)	<b>Industry Certification:</b> Production Certification (CPT) Safety Module	<b>Industry Certification:</b> Production Certification (CPT) Quality Practices and Measurement Module -and/or- OSHA 30 General Industry	<b>Industry Certification:</b> Production Certification (CPT) Manufacturing Processes and Production Module and Maintenance Awareness Module -and/or- OSHA 30 General Industry
<b>Electromechanical Technology</b>	Principles of Manufacturing (C13H05)	Introduction to Electromechanical (C13H14)	Advanced Electromechanical Technology (C13H13) -or- <b>Dual Enrollment</b> Electromechanical Technology (C13H02)	Manufacturing Practicum (C13H08) -or- <b>Dual Enrollment</b> Electromechanical Technology (C13H02)
	<b>Industry Certification:</b> Machining Level I - Measurement, Materials, and Safety Certification (NIMS) -and/or- OSHA 10 -and/or- Precision Measurement Instruments Certification (includes all subtests)	<b>Industry Certification:</b> Production Certification (CPT) Safety Module	<b>Industry Certification:</b> OSHA 30 General Industry	<b>Industry Certification:</b> OSHA 30 General Industry

<b>Mechatronics</b>	Principles of Manufacturing (C13H05)	Digital Electronics (C13H07) -or- Robotics & Automated Systems (C13H15) -or- Project Lead the Way (PLTW) Computer Integrated Manufacturing (C13H11)	Mechatronics I <sup>1</sup> (C13H16) -or- <b>Dual Enrollment</b> Mechatronics (C13H04)	Mechatronics II <sup>1</sup> (C13H17) -or- Manufacturing Practicum (C13H08) -or- <b>Dual Enrollment</b> Mechatronics (C13H04)
	<b>Industry Certification:</b> Machining Level I - Measurement, Materials, and Safety Certification (NIMS) -and/or- OSHA 10 -and/or- Precision Measurement Instruments Certification (includes all subtests)	<b>Industry Certification:</b> FANUC only with Robotics & Automated Systems (C13H15)	<b>Industry Certification:</b> OSHA 30 General Industry	<b>Industry Certification:</b> Level 1 Siemens Certified Mechatronic Systems Assistant -and/or- OSHA 30 General Industry
<b>Welding</b>	Principles of Manufacturing (C13H05)	Welding I (C13H12)	Welding II <sup>2</sup> (C13H10) -or- <b>Dual Enrollment</b> Welding (C13H03)	Manufacturing Practicum (C13H08) -or- <b>Dual Enrollment</b> Welding (C13H03)
	<b>Industry Certification:</b> Machining Level I - Measurement, Materials, and Safety Certification (NIMS) -and/or- OSHA 10 -and/or- Precision Measurement Instruments Certification (includes all subtests)	<b>Industry Certification:</b> AWS SENSE Entry Level Welder -and/or- NCCER Core Curriculum	<b>Industry Certification:</b> AWS SENSE Advanced Level Welder or American Welding Society Certified Welder -and/or- OSHA 30 General Industry	<b>Industry Certification:</b> OSHA 30 General Industry

<sup>1</sup> Local dual credit and/or dual enrollment opportunities exist for this course.

<sup>2</sup> May be taught for 1 or 2 credits.

**Available courses for elective credit in this cluster:**

- **Work-Based Learning: Career Practicum** (C20H17) course may substitute for the Level 4 offering in all programs of study.

# 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](#).

**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.

Questions about courses and programs of study within this career cluster can be directed to [Steven.Gass@tn.gov](mailto:Steven.Gass@tn.gov).

Program of Study	Level 1	Level 2	Level 3	Level 4
Agribusiness	Agriscience <sup>1</sup> (C18H19)	Principles of Agribusiness (C18H14)	Organizational Leadership and Communications (C18H18) -or- <b>Dual Enrollment</b> Agribusiness (C18H03)	Agricultural Business and Finance <sup>2</sup> (C18H11) -or- <b>Statewide Dual Credit</b> Intro to Agribusiness (C18H10) -or- <b>Dual Enrollment</b> Agribusiness (C18H03)
	<b>Industry Certification:</b> OSHA - 10		<b>Industry Certification:</b> OSHA 30 General Industry	<b>Industry Certification:</b> OSHA 30 General Industry
	Supervised Agricultural Experience (C18H23)			
Horticulture Science	Agriscience <sup>1</sup> (C18H19)	Principles of Plant Science and Hydroculture (C18H30)	Greenhouse Management (C18H17) -or- <b>Statewide Dual Credit Course</b> Introduction to Plant Science (C18H09) -or- <b>Dual Enrollment</b> Horticulture Science (C18H05)	Landscaping and Turf Science (C18H16) -or- <b>Dual Enrollment</b> Horticulture Science (C18H05)
	<b>Industry Certification:</b> OSHA - 10		<b>Industry Certification:</b> OSHA 30 General Industry	<b>Industry Certifications:</b> Tennessee Specific Industry Certification for Horticulture Science  Commercial Applicators Certification (03)
	Supervised Agricultural Experience (C18H23)			
Veterinary and Animal Science	Agriscience <sup>1</sup> (C18H19)	Small Animal Science (C18H20)	Large Animal Science (C18H27) -or- <b>Dual Enrollment</b> Veterinary & Animal Science (C18H01)	Veterinary Science <sup>1</sup> (C18H21) -or- <b>Dual Enrollment</b> Veterinary & Animal Science (C18H01)

	<b>Industry Certification:</b> OSHA - 10		<b>Industry Certification:</b> OSHA 30 General Industry	<b>Industry Certifications:</b> TN Specific Industry Certification Animal Science  OSHA 30 General Industry
	Supervised Agricultural Experience (C18H23)			
<b>Agricultural Engineering and Applied Technologies</b>	Agriscience <sup>1</sup> (C18H19)	Principles of Agricultural Mechanics (C18H12)	Agricultural Power and Equipment (C18H13) -or- <b>Dual Enrollment</b> Agricultural Engineering & Applied Technologies (C18H02)	Agricultural and Biosystems Engineering (C18H22) -or- <b>Dual Enrollment</b> Agricultural Engineering & Applied Technologies (C18H02)
	<b>Industry Certification:</b> OSHA - 10	<b>Industry Certification:</b> Precision Measurement Instruments Certification	<b>Industry Certification:</b> OSHA 30 General Industry -or- Briggs and Stratton Basic Small Engine Certification	<b>Industry Certification:</b> OSHA 30 General Industry -or- Briggs and Stratton Master Service Technician
	Supervised Agricultural Experience (C18H23)			
<b>Environmental and Natural Resource Management</b>	Agriscience <sup>1</sup> (C18H19)	Applied Environmental Science <sup>1</sup> (C18H25) -or- <b>Cambridge IGCSE</b> Environmental Management (C18H07)	Plant and Soil Science (C18H15) -or- <b>Dual Enrollment</b> Environmental & Natural Resources Management (C18H06)	Natural Resources Management (C18H28) -and/or- AP Environmental Science (G03H25) -or- <b>Dual Enrollment</b> Environmental & Natural Resources Management (C18H06) -or- <b>Cambridge Course</b> Environmental Management (AS Level Only) (C18H08)
	<b>Industry Certification:</b> OSHA - 10		<b>Industry Certification:</b> OSHA 30 General Industry	<b>Industry Certification:</b> OSHA 30 General Industry
	Supervised Agricultural Experience (C18H23)			

<b>Food Science</b>	Agriscience <sup>1</sup> (C18H19)	Principles of Food Production (C18H29)	Food Science and Safety (C18H26) -or- <b>Dual Enrollment</b> Food Science (C18H04)	Advanced Food Science (C18H24) -or- <b>Dual Enrollment</b> Food Science (C18H04)
	<b>Industry Certification:</b> OSHA - 10		<b>Industry Certification:</b> OSHA 30 General Industry	<b>Industry Certification:</b> OSHA 30 General Industry
	Supervised Agricultural Experience (C18H23)			

<sup>1</sup> Satisfies one lab science credit required for graduation. <sup>2</sup> Satisfies ½ credit of Personal Finance required for graduation.

**Available courses for elective credit in this cluster:**

- **Work-Based Learning: Career Practicum** (C20H17) course may substitute for the Level 4 offering in all programs of study.
- **Introduction to Geographic Information Systems** (C03H14) is a supplemental course which can be offered in addition to courses within the Agricultural Engineering and Applied Technologies program of study but does not count toward concentrator status.

## 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](mailto:John.Mummert@tn.gov).

Program of Study	Level 1	Level 2	Level 3	Level 4
<b>Architectural &amp; Engineering Design</b>	Architectural & Engineering Design I (C17H13)	Architectural & Engineering Design II (C17H14)	Architectural & Engineering Design III <sup>1</sup> (C17H10) -or- <b>Dual Enrollment</b> Architectural & Engineering Design (C17H04)	Engineering Practicum (C17H21) -and/or- AP Calculus (G02H24 or G02H25) -and/or- AP Physics (G03H27, G03H28, G03H24, or G03H29) -or- <b>Dual Enrollment</b> Architectural & Engineering Design (C17H04)
			<b>Industry Certification:</b> Certified Solidworks Associate -and/or- AutoCAD User	
<b>Interior Design</b>	Foundations of Interior Design (C17H12)	Residential Interior Design (C17H11)	Commercial Interior Design (C17H20) -or- <b>Dual Enrollment</b> Interior Design (C17H05)	Advanced Interior Design (C17H19) -or- <b>Dual Enrollment</b> Interior Design (C17H05)
<b>Residential &amp; Commercial Construction</b>	Fundamentals of Construction (C17H15)	Residential & Commercial Construction I (C17H24)	Residential & Commercial Construction II <sup>1</sup> (C17H25) -or- <b>Dual Enrollment</b> Residential & Commercial Construction (C17H01)	Construction Practicum (C17H22) -or- <b>Dual Enrollment</b> Residential & Commercial Construction (C17H01)
	<b>Industry Certification:</b> NCCER Core Curriculum -and/or- OSHA 10	<b>Industry Certification:</b> NCCER Construction Technology	<b>Industry Certification:</b> OSHA 30 Construction	



<b>Structural Systems</b>	Fundamentals of Construction (C17H15)	Structural Systems I (C17H26)	Structural Systems II <sup>1</sup> (C17H27) -or- <b>Dual Enrollment</b> Structural Systems (C17H02)	Construction Practicum (C17H22) -or- <b>Dual Enrollment</b> Structural Systems (C17H02)
	<b>Industry Certification:</b> NCCER Core Curriculum -and/or- OSHA 10	<b>Industry Certification:</b> NCCER Carpentry Level One -and/or- Precision Measurement Instruments Certification (includes all subtests)	<b>Industry Certification:</b> NCCER Carpentry Level Two -and/or- OSHA 30 Construction	
<b>Mechanical, Electrical, &amp; Plumbing (MEP) Systems</b>	Fundamentals of Construction (C17H15)	MEP Systems (C17H23)	HVAC (C17H17) -and/or- Electrical Systems (C17H16) -and/or- Plumbing Systems (C17H18) -or- <b>Dual Enrollment</b> Mechanical, Electrical, & Plumbing Systems (C17H03)	Construction Practicum (C17H22) -or- <b>Dual Enrollment</b> Mechanical, Electrical, & Plumbing Systems (C17H03)
	<b>Industry Certification:</b> NCCER Core Curriculum -and/or- OSHA 10	<b>Industry Certification:</b> Precision Measurement Instruments Certification (includes all subtests)	<b>Industry Certifications for C17H17:</b> HVAC Excellence, Heating, Electrical, Air Conditioning Technology (H.E.A.T.) -and/or- HVAC Excellence Employment Ready Certifications -and/or- Universal R-410A EPA Section 608 Universal <b>Industry Certification for C17H16:</b> NCCER Electrical Level One -and/or- OSHA 30 Construction <b>Industry Certification for C17H18:</b> NCCER Plumbing Level One	

**Available courses for elective credit in this cluster:**

- **Work-Based Learning: Career Practicum** (C20H17) may substitute for the Level 4 offering in all programs of study.
- **Introduction to Geographic Information Systems** (C03H14) is a supplemental course which can be offered in addition to courses within the Architectural and Engineering Design program of study but does not count toward concentrator status.
- **Welding I** (C13H12) is a supplemental course which can be offered in addition to courses within the MEP, Residential & Commercial Construction, and Structural Systems programs of study but does not count toward concentrator status.

## 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](mailto:Bryant.Nall@tn.gov).

Program of Study	Level 1	Level 2	Level 3	Level 4
<b>Digital Arts &amp; Design</b>	Digital Arts & Design I (C05H07)	Digital Arts & Design II (C05H08)	Digital Arts & Design III (C05H09) -or- <b>Dual Enrollment</b> Arts & Design (C05H01)  <b>Industry Certification:</b> Adobe Certified Associate	Applied Arts Practicum (C05H11) -and/or- AP Studio Art: 2-D Design (G05H30) -or- <b>Dual Enrollment</b> Arts & Design (C05H01)
<b>Audio/Visual Production</b>	A/V Production I (C11H01)	A/V Production II (C11H02)	A/V Production III (C11H03) -or- <b>Dual Enrollment</b> Audio/Visual Production (C11H00)	Applied Arts Practicum (C05H11) -and/or- AP English Language and Composition (G01H17) -or- <b>Dual Enrollment</b> Audio/Visual Production (C11H00)
<b>Fashion Design</b>	Visual Art I (G05H08)	Foundations of Fashion Design (C05H10)	Fashion Design (C05H05) -or- <b>Dual Enrollment</b> Fashion Design (C05H02) -or- <b>Cambridge International AS Level</b> <u>Art &amp; Design</u> (C05H04)	Advanced Fashion Design (C05H06) -or- <b>Dual Enrollment</b> Fashion Design (C05H02)

### Available courses for elective credit in this cluster:

- **Work-Based Learning: Career Practicum** (C20H17) may substitute for the Level 4 offering in all programs of study.
- **Journalism** (G01H15) is a supplemental course which can be offered in addition to courses within the Audio/Visual Production program of study but does not count toward concentrator status.

## 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](mailto:Deborah.Knoll@tn.gov).

Program of Study	Level 1	Level 2	Level 3	Level 4
<b>Business Management</b>	Introduction to Business & Marketing (C12H26)	Business Communications (C12H16) -or- Accounting I (C12H27) -or- <b>Cambridge IGCSE Accounting (C12H10)</b>	Business Management (C12H17) -or- <b>Statewide Dual Credit</b> Introduction to Business (C12H44) -or- <b>Dual Enrollment</b> Business Management (C12H01) -and/or- <b>Principles of Management CLEP</b> -or- <b>Cambridge AS Business (C12H14)</b>	Business & Entrepreneurship Practicum (C12H35) -and/or- Virtual Enterprise International <sup>1</sup> (C12H23) -or- <b>Dual Enrollment</b> Business Management (C12H01) -and/or- <b>Principles of Management CLEP</b>
			<b>Industry Certification:</b> Google Suite	
<b>Office Management</b>	Computer Applications (C12H19)	Business Communications (C12H16)	Business Management (C12H17) -or- <b>Statewide Dual Credit</b> Introduction to Business (C12H48) -or- <b>Dual Enrollment</b> Business Management (C12H01) -and/or- <b>Principles of Management CLEP</b> -or- <b>Cambridge AS Business (C12H14)</b>	Advanced Computer Applications (C12H25) -or- <b>Dual Enrollment</b> Office Management (C12H02) -and/or- <b>Information Systems CLEP</b>

			<b>Industry Certification:</b> Google Suite	<b>Industry Certification:</b> Microsoft Office Specialist: (Excel) (PowerPoint) (Word) -and/or- Microsoft Office Expert -and/or- Microsoft Officer Master
<b>Health Services Administration</b>	Introduction to Business & Marketing (C12H26) -or- Health Science Education (C14H14)	Health Information Technology (C12H34)	Business Management (C12H17) -or- <b>Statewide Dual Credit</b> Introduction to Business (C12H44) -or- <b>Dual Enrollment</b> Health Services Administration (C12H03) -or- <b>Cambridge AS Business (C12H14)</b>	Health Services Administration Practicum (C12H38) -or- <b>Dual Enrollment</b> Health Services Administration (C12H03)
			<b>Industry Certification:</b> Google Suite	
<b>Human Resources Management</b>	Introduction to Business & Marketing (C12H26)	Business Communications (C12H16)	Human Resources Management (C12H36) -or- <b>Dual Enrollment</b> Human Resources Management (C12H39)	Human Resources Management Practicum (C12H37) -or- <b>Dual Enrollment</b> Human Resources Management (C12H39)
			<b>Industry Certification:</b> Google Suite	

<sup>1</sup> Satisfies ½ credit of Economics required for graduation.

**Available courses for elective credit in this cluster:**

- **Work-Based Learning: Career Practicum** (C20H17) may substitute for the Level 4 offering in all programs of study.
- **American Business Legal Systems** (C12H20) and **Business Economics** (C12H21) are supplemental courses which can be offered in addition to courses within the Business Management and Human Resources Management programs of study but do not count toward concentrator status.

## 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](#).

**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 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.

Questions about courses and programs of study within this career cluster can be directed to [Elizabeth.Rafferty@tn.gov](mailto:Elizabeth.Rafferty@tn.gov).

Program of Study	Level 1	Level 2	Level 3	Level 4
<b>Teaching as a Profession (K-12)</b>	Fundamentals of Education (C25H05)	Teaching as a Profession I (C25H04)	Teaching as a Profession II (C25H06) -or- <b>Dual Enrollment</b> Teaching as a Profession (K-12) (C25H02)	Teaching as a Profession Practicum (C25H07) -or- <b>Dual Enrollment</b> Teaching as a Profession (K-12) (C25H02)
<b>Early Childhood Education Careers</b>	Early Childhood Education Careers I (C23H01)	Early Childhood Education Careers II (C23H02)	Early Childhood Education Careers III (C23H03) -or- <b>Dual Enrollment</b> Early Childhood Education Careers (C23H00)	Early Childhood Education Careers IV (C23H04) -or- <b>Dual Enrollment</b> Early Childhood Education Careers (C23H00)
	TECTA Center-Based Orientation Certificate			<b>Industry Certification:</b> Child Development Associate (CDA)
<b>Educational Therapy and Support</b>	Educational Therapy and Support I (C25H10)	Educational Therapy and Support II (C25H11)	Educational Therapy and Support III (C25H12) -or- <b>Dual Enrollment</b> Educational Therapy and Support (C25H14)	Educational Therapy and Support Practicum (C25H13) -or- <b>Dual Enrollment</b> Educational Therapy and Support (C25H14)

### Available courses for elective credit in this cluster:

- **Work-Based Learning: Career Practicum** (C20H17) may substitute for the Level 4 offering in all programs of study.
- **Lifespan Development** (C19H17) is a supplemental course which can be offered in addition to courses within the Early Childhood Education Careers program of study but does not count toward concentrator status.

## 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 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](mailto:Deborah.Knoll@tn.gov).

Program of Study	Level 1	Level 2	Level 3	Level 4
<b>Accounting</b>	Introduction to Business & Marketing (C12H26)	Accounting I (C12H27) -or- <b>Cambridge IGCSE Accounting (C12H10)</b>	Accounting II (C12H28) -or- <b>Dual Enrollment Accounting (C12H05)</b> -or- <b>Cambridge AS/A Accounting (C12H11)</b>	Financial Planning (C12H18) -or- Statistics (G02H37) -or- AP Statistics (G02H26) -and/or- <b>Dual Enrollment Accounting (C12H05)</b> -and/or- <b>Financial Accounting CLEP</b>
			<b>Industry Certification:</b> Quick Books Certified User	
<b>Banking and Finance</b>	Introduction to Business & Marketing (C12H26)	Accounting I (C12H27) -or- <b>Cambridge IGCSE Accounting (C12H10)</b>	Banking and Finance (C12H22) -or- <b>Dual Enrollment Banking &amp; Finance (C12H06)</b>	Financial Planning (C12H18) -or- <b>Dual Enrollment Banking &amp; Finance (C12H06)</b>

### Available courses for elective credit in this cluster:

- **Work-Based Learning: Career Practicum** (C20H17) may substitute for the Level 4 offering in all programs of study.
- **Personal Finance** (C12H24) is a course required for graduation but does not count toward concentrator status in a program of study.

## 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](#).

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

Questions about courses and programs of study within this career cluster can be directed to [Sloan.Hudson@tn.gov](mailto:Sloan.Hudson@tn.gov).

Program of Study	Level 1	Level 2	Level 3	Level 4
<b>Public Management and Administration</b>	Principles of Public Service (C15H14)	Public Management and Administration (C15H16)	Public Law and Budgeting (C15H15) -or- <b>Dual Enrollment</b> Public Management & Administration (C15H06)	AP US Government & Politics (G04H26) -or- Success Skills Through Service Learning (C15H13) -or- <b>Dual Enrollment</b> Public Management & Administration (C15H06)
<b>Leadership in Government</b>	JROTC I (G08H04)	JROTC II (G08H05)	U.S. Government and Civics (G04H12) -or- JROTC III (G08H06)	Success Skills in Service Learning (C15H13) -or- JROTC IV (G08H07)

### Available courses for elective credit in this cluster:

- Work-Based Learning: Career Practicum** (C20H17) may substitute for the Level 4 offering in all programs of study.



# 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](#).

**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.

Questions about courses and programs of study within this career cluster can be directed to [Sloan.Hudson@tn.gov](mailto:Sloan.Hudson@tn.gov).

Program of Study	Level 1	Level 2	Level 3	Level 4
Public Health	Health Science Education (C14H14)	Behavioral and Community Health (C14H17)	Global Health and Epidemiology (C14H19) -or- <b>Dual Enrollment</b> Public Health (C14H01)	Public Health Practicum (C14H23) -or- <b>Dual Enrollment</b> Public Health (C14H01)
			<b>Industry Certification:</b> OSHA 10 General Industry	

<b>Diagnostic Services</b>	Health Science Education (C14H14)	Anatomy and Physiology <sup>1</sup> (G03H31 or C14H09) -or- Diagnostic Medicine (C14H12) -or- <b>Dual Enrollment</b> Anatomy and Physiology (G03H43)	Diagnostic Medicine (C14H12) -or- Anatomy and Physiology <sup>1</sup> (G03H31 or C14H09) -or- <b>Dual Enrollment</b> Diagnostic Services (C14H02) -or- <b>Dual Enrollment</b> Anatomy and Physiology (G03H43)	Cardiovascular Services (C14H18) -and/or- Clinical Internship (C14H11) -or- <b>Dual Enrollment</b> Diagnostic Services (C14H02)
			<b>Industry Certification:</b> OSHA 10 General Industry	<b>Industry Certification following C14H18 AND C14H11:</b> Certified EKG Technician
<b>Nursing Services</b>	Health Science Education (C14H14)	Anatomy and Physiology <sup>1</sup> (G03H31 or C14H09) -or- Medical Therapeutics (C14H15) -or- <b>Dual Enrollment</b> Anatomy and Physiology (G03H43)	Medical Therapeutics (C14H15) -or- Anatomy and Physiology <sup>1</sup> (G03H31 or C14H09) -or- <b>Dual Enrollment</b> Nursing Services (C14H03) -or- <b>Dual Enrollment</b> Anatomy and Physiology (G03H43)	Nursing Education (C14H16) -and/or- Clinical Internship (C14H11) -or- <b>Dual Enrollment</b> Nursing Services (C14H03)
			<b>Industry Certification:</b> OSHA 10 General Industry	<b>Industry Certification:</b> Certified Nursing Assistant (CNA) -and/or- <b>Industry Certification following C14H16 AND C14H11:</b> Certified Patient Care Technician (CPCT)
<b>Emergency Services</b>	Health Science Education (C14H14)	Anatomy and Physiology <sup>1</sup> (G03H31 or C14H09) -or- Medical Therapeutics (C14H15) -or- <b>Dual Enrollment</b> Anatomy and Physiology (G03H43)	Medical Therapeutics (C14H15) -or- Anatomy and Physiology <sup>1</sup> (G03H31 or C14H09) -or- <b>Dual Enrollment</b> Emergency Services (C14H04) -or- <b>Dual Enrollment</b> Anatomy and Physiology (G03H43)	Emergency Medical Services <sup>1</sup> (C14H13) -or- Emergency Medical Services Practicum (C14H24) -or- <b>Dual Enrollment</b> Emergency Services (C14H04)

			<b>Industry Certification:</b> OSHA 10 General Industry	<b>Industry Certification:</b> Emergency Medical Responder
<b>Therapeutic Services</b>	Health Science Education (C14H14)	Anatomy and Physiology <sup>1</sup> (G03H31 or C14H09) -or- One option from Level 3 -or- <b>Dual Enrollment</b> Anatomy and Physiology (G03H43)	Anatomy and Physiology <sup>1</sup> (G03H31 or C14H09) if the student did not take it as Level 2, he/she must take it as Level 3 course. For students who took Level 2 A&P, choices include: Dental Science (C14H21) -or- Pharmacological Science (C14H20) -or- Nutrition Science and Diet Therapy <sup>1</sup> (C19H16) -or- Medical Therapeutics (C14H15) -or- <b>Dual Enrollment</b> Therapeutic Services (C14H05) -or- <b>Dual Enrollment</b> Anatomy and Physiology (G03H43)	Clinical Internship (C14H11) -or- <b>Dual Enrollment</b> Therapeutic Services (C14H05)
			<b>Industry Certification following C14H20 AND C14H11:</b> Certified Pharmacy Technician <b>Industry Certification following C14H21 AND C14H11:</b> National Entry Level Dental Assistant (NELDA)	<b>Industry Certification following C14H15 AND C14H11:</b> Certified Clinical Medical Assistant  <b>Industry Certification:</b> OSHA 10 General Industry
<b>Sport and Human Performance</b>	Health Science Education (C14H14)	Anatomy and Physiology <sup>1</sup> (G03H31 or C14H09) -or- Rehabilitation Careers (C14H08) -or- <b>Dual Enrollment</b> Anatomy and Physiology (G03H43)	Anatomy and Physiology <sup>1</sup> (G03H31 or C14H09) if the student did not take it as Level 2, he/she must take it as Level 3 course. For students who took Level 2 A&P, choices include: Rehabilitation Careers (C14H08) -or- Medical Therapeutics (C14H15) -or- <b>Dual Enrollment</b>	Exercise Science (C14H22) -or- Clinical Internship (C14H11) -or- <b>Dual Enrollment</b> Exercise Physiology (C14H06)

			Exercise Physiology (C14H06) -or- <b>Dual Enrollment</b> Anatomy and Physiology (G03H43)	
			<b>Industry Certification:</b> OSHA 10 General Industry	<b>Industry Certification following C14H22 <u>AND</u> C14H11:</b> Certified Personal Trainer

<sup>1</sup> Satisfies one lab science credit for graduation.

**Available courses for elective credit in this cluster:**

- **Work-Based Learning: Career Practicum** (C20H17) may substitute for the Level 4 offering in all programs of study.
- **Medical Terminology** (C14H07) is a supplemental course which can be offered in addition to courses within the Health Science career cluster but does not count toward concentrator stat

## 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](mailto:Elizabeth.Rafferty@tn.gov).

Program of Study	Level 1	Level 2	Level 3	Level 4
<b>Culinary Arts</b>	Culinary Arts I (C16H06)	Culinary Arts II (C16H07)	Culinary Arts III (C16H08) -or- <b>Dual Enrollment</b> Culinary Arts (C16H01)	Culinary Arts IV (C16H09) -or- <b>Dual Enrollment</b> Culinary Arts (C16H01)
			<b>Industry Certification:</b> ServSafe Food Manager -and/or- Certified Fundamentals Cook (CFC)	
<b>Hospitality and Tourism Management</b>	Hospitality & Tourism Exploration (C16H10) -or- <b>Cambridge IGCSE</b> <u>Travel &amp; Tourism</u> (C16H03)	Hospitality Marketing (C16H13) -or- <b>Cambridge</b> <b>International AS Level</b> <u>Travel &amp; Tourism</u> (C16H04)	Hospitality Management (C16H11) -or- <b>Dual Enrollment</b> Hospitality & Tourism Management (C16H02)	Event Planning & Management (C16H12) -or- <b>Dual Enrollment</b> Hospitality & Tourism Management (C16H02)
			<b>Industry Certification:</b> Certified Hospitality & Tourism Management Professional (CHTMP)	

### Available courses for elective credit in this cluster:

- Work-Based Learning: Career Practicum** (C20H17) may substitute for the Level 4 offering in all programs of study.

## 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](mailto:Elizabeth.Rafferty@tn.gov).

Program of Study	Level 1	Level 2	Level 3	Level 4
<b>Human and Social Sciences</b>	Introduction to Human Studies (C19H19)	Lifespan Development (C19H17)	Family Studies (C19H18) -or- <b>Dual Enrollment</b> Human and Social Sciences (C19H02) -or- <b>Cambridge IGCSE</b> <u>Sociology</u> (G04H65) -or- <b>Human Growth and Development</b> CLEP	Human Services Practicum (C19H20) -and/or- Psychology (G04H15) -and/or- Sociology (G04H14) -or- <b>Dual Enrollment</b> Human and Social Sciences (C19H02)
			<b>Industry Certification:</b> Tennessee Specific Industry Certification for Human and Social Sciences (in pilot)	
<b>Dietetics and Nutrition</b>	Introduction to Human Studies (C19H19)	Nutrition Across the Lifespan (C19H15) -or- <b>Cambridge IGCSE</b> <u>Food &amp; Nutrition</u> (C19H08)	Nutrition Science and Diet Therapy (C19H16) -or- <b>Dual Enrollment</b> Dietetics & Nutrition (C19H03)	Human Services Practicum (C19H20) -and/or- Psychology (G04H15) -and/or- Sociology (G04H14) -or- <b>Dual Enrollment</b> Dietetics & Nutrition (C19H03)
			<b>Industry Certification:</b> Tennessee Specific Industry Certification for Dietetics & Nutrition (in pilot)	

<b>Cosmetology</b>	Cosmetology I (C19H12)	Cosmetology II (C19H14)	Cosmetology III (C19H13) -or- <b>Dual Enrollment</b> Cosmetology (C19H04)	Cosmetology IV (C19H21) -or- <b>Dual Enrollment</b> Cosmetology (C19H04)
				<b>Industry Certification:</b> TN Cosmetology & Barber Examiners— TN Cosmetologist 1010
<b>Barbering</b>	Barbering I (C19H09)	Barbering II (C19H10)	Barbering III (C19H11) -or- <b>Dual Enrollment</b> Barbering (C19H05)	Entrepreneurship <sup>1</sup> (C12H31) -or- <b>Dual Enrollment</b> Barbering (C19H05)
			<b>Industry Certification:</b> TN Cosmetology & Barber Examiners— TN Master Barber 1010	

<sup>1</sup> Satisfies ½ credit of Economics required for graduation.

**Available courses for elective credit in this cluster:**

- **Work-Based Learning: Career Practicum** (C20H17) may substitute for the Level 4 offering in all programs of study.

# 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](mailto:Bryant.Nall@tn.gov).

Program of Study	Level 1	Level 2	Level 3	Level 4
<b>Coding</b>	Computer Science Foundations (C10H11) -or- <b>Cambridge IGCSE Computer Science</b> (C10H07)	Coding I (C10H14) -or- AP Computer Science Principles (G02H44)	Coding II (C10H15) -or- Mobile App Development (C10H22) -or- AP Computer Science Principles (G02H44) -or- <b>Dual Enrollment</b> Coding (C10H01)	Coding Practicum (C10H08) -and/or- AP Computer Science A (G02H45) -and/or- AP Computer Science Principles (G02H44) -or- <b>Dual Enrollment</b> Coding (C10H01) -or- <b>Cambridge International AS Level Computer Science</b> (C10H25)
	<b>Industry Certification:</b> CompTIA IT Fundamentals		<b>Industry Certification:</b> Microsoft Technology Associate Software Development Fundamentals -and/or- CIW Web Foundation -and/or- JavaScript Specialist -and/or- Advanced HTML5/CSS3	
<b>Networking Systems</b>	Computer Science Foundations (C10H11)	Computer Systems (C10H10)	Networking (C10H13) -or- <b>Dual Enrollment</b> Networking Systems (C10H02)	Cabling and Internetworking (C10H09) -and/or- IT Clinical Internship (C10H12) -or- <b>Dual Enrollment</b> Networking Systems (C10H02)
	<b>Industry Certification:</b> CompTIA IT Fundamentals	<b>Industry Certification:</b> Comp TIA A+ -and/or- Cisco Certified Entry Network Tech (CCENT)	<b>Industry Certification:</b> CompTIA Network + -and/or- Microsoft Technology Associate Infrastructure	



			-and/or- Cisco IT Essentials PC Hardware & Software Certification -and/or- Cisco Certified Network Associate (CCNA)	
<b>Web Design</b>	Computer Science Foundations (C10H11) -or- <b>Cambridge IGCSE Information and Communication Technology</b> (C10H26)	Web Design Foundations (C10H16) -and/or- AP Computer Science Principles (G02H44)	Web Site Development (C10H17) -and/or- AP Computer Science Principles (G02H44) -or- <b>Dual Enrollment</b> Web Design (C10H03)	Web Design Practicum (C10H18) -and/or- AP Computer Science Principles (G02H44) -or- <b>Dual Enrollment</b> Web Design (C10H03)
	<b>Industry Certification:</b> CompTIA IT Fundamentals		<b>Industry Certification:</b> CIW Web Design Specialist -and/or- CIW Web Foundation -and/or- JavaScript Specialist -and/or- Advanced HTML5/CSS3	
<b>Cybersecurity</b>	Computer Science Foundations (C10H11)	Cybersecurity I (C10H19) -and/or- AP Computer Science Principles (G02H44)	Cybersecurity II (C10H20) -and/or- AP Computer Science Principles (G02H44) -or- <b>Dual Enrollment</b> Cybersecurity (C10H24)	Cybersecurity Practicum (C10H21) -and/or- AP Computer Science Principles (G02H44)  <b>Dual Enrollment</b> Cybersecurity (C10H24)
	<b>Industry Certification:</b> CompTIA IT Fundamentals	<b>Industry Certification:</b> CompTIA A+	<b>Industry Certification:</b> CompTIA Network +	<b>Industry Certification:</b> CompTIA Security + -and/or- Associate of ISC2

**Available courses for elective credit in this cluster:**

- **Work-Based Learning: Career Practicum** (C20H17) may substitute for the Level 4 offering in all programs of study.
- **Introduction to Geographic Information Systems** (C03H14) is a supplemental course which can be offered in addition to courses within the Cybersecurity program of study but does not count toward concentrator status.

## 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](mailto:Sloan.Hudson@tn.gov).

Program of Study	Level 1	Level 2	Level 3	Level 4
<b>Criminal Justice and Correction Services</b>	Criminal Justice I (C15H10)	Criminal Justice II (C15H11)	Criminal Justice III: Forensic Criminal Investigations (C15H12) -or- <b>Statewide Dual Credit:</b> Criminal Justice (C15H21) <sup>1</sup> -or- <b>Dual Enrollment</b> Criminal Justice and Correction Services (C15H08)	Criminal Justice Practicum (C15H17) -or- <b>Dual Enrollment</b> Criminal Justice and Correction Services (C15H08)
<b>Fire Management Services</b>	Principles of Fire and Emergency Services (C15H03)	Fire Prevention (C15H04)	Fire Science I (C15H01) -or- <b>Dual Enrollment</b> Fire Management Services (C15H00)	Fire Science II (C15H02) -or- <b>Dual Enrollment</b> Fire Management Services (C15H00)
<b>Pre-Law</b>	Pre-Law I (C15H18)	Pre-Law II (C15H19)	Pre-Law III (C15H20) -or- <b>Dual Enrollment</b> Pre-Law (C15H09)	Success Skills in Service Learning (C15H13) -or- AP U.S. Government and Politics (G04H26) -or- <b>Dual Enrollment</b> Pre-Law (C15H09)

<sup>1</sup> Statewide Dual Credit Criminal Justice **requires** Criminal Justice I **and** Criminal Justice II as prerequisite courses. Students cannot take Statewide Dual Credit Criminal Justice without having already completed the first two courses in the program of study.

### Available courses for elective credit in this cluster:

- **Work-Based Learning: Career Practicum** (C20H17) may substitute for the Level 4 offering in all programs of study.
- **American Business Legal Systems** (C12H20) is a supplemental course which can be offered in addition to courses within the Legal and Correction Services program of study but does not count toward concentrator status.

## 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](#).

**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.

Questions about courses and programs of study within this career cluster can be directed to [Deborah.Knoll@tn.gov](mailto:Deborah.Knoll@tn.gov).

Program of Study	Level 1	Level 2	Level 3	Level 4
<b>Marketing Management</b>	Introduction to Business & Marketing (C12H26)	Marketing and Management I: Principles <sup>1</sup> (C12H29)	Marketing and Management II: Advanced Strategies (C12H30) -or- Social Media Marketing and Analytics ( C12H46 ) -or- <b>Dual Enrollment</b> Marketing Management (C12H08) -and/or- <b>Principles of Marketing CLEP</b>	Advertising and Public Relations (C12H32) -or- Retail Operations <sup>1</sup> (C12H33) -or- Event Planning & Management (C16H12) -or- <b>Dual Enrollment</b> Marketing Management (C12H08) -and/or- <b>Principles of Marketing CLEP</b>
			<b>Industry Certifications:</b> Hootsuite Platform Certification -and/or- Hootsuite Social Marketing Certification	

<b>Entrepreneurship</b>	Introduction to Business & Marketing (C12H26)	Marketing and Management I: Principles <sup>1</sup> (C12H29)	Entrepreneurship <sup>1</sup> (C12H31) -or- <b>Dual Enrollment</b> Entrepreneurship (C12H09) -or- <b>Cambridge IGCSE Enterprise (C12H45)</b>	Business & Entrepreneurship Practicum (C12H35) -or- Virtual Enterprise International <sup>1</sup> (C12H23) -or- <b>Dual Enrollment</b> Entrepreneurship (C12H09)
<b>Supply Chain Management</b>	Introduction to Business & Marketing (C12H26) -or- Marketing and Management I: Principles <sup>1</sup> (C12H29)	Foundations of Supply Chain Management (C12H40)	Supply Chain Management I (C12H41) -or- Dual Enrollment Supply Chain Management (C20H05)	Supply Chain Management II (C12H42) -or- Supply Chain Management Practicum (C12H43) Dual Enrollment Supply Chain Management (C20H05)
		Industry Certification: Microsoft Office Specialist (Excel)	Industry Certification: Certified Logistics Technician	

<sup>1</sup> Satisfies ½ credit of Economics required for graduation.

**Available courses for elective credit in this cluster:**

- **Work-Based Learning: Career Practicum** (C20H17) may substitute for the Level 4 offering in all programs of study.
- **Business Communications** (C12H16) is a supplemental course which can be offered in addition to courses within these programs of study but does not count toward concentrator status.

# 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](#).

**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.

Questions about courses and programs of study within this career cluster can be directed to [Bryant.Nall@tn.gov](mailto:Bryant.Nall@tn.gov).

Program of Study	Level 1	Level 2	Level 3	Level 4
Engineering	Principles of Engineering and Technology (C21H04)	Engineering Design I (C21H05) -or- AP Computer Science Principles (G02H44) -or- <b>Cambridge IGCSE</b> Design and Technology (C21H03)	Engineering Design II (C21H06) -or- AP Computer Science Principles (G02H44) -or- <b>Dual Enrollment</b> Engineering (C21H00)	Engineering Practicum (C17H21) -and/or- AP Physics (G03H27, G03H28, G03H24, or G03H29) -or- AP Computer Science A (G02H45) -or- <b>Dual Enrollment</b> Engineering (C21H00) -or- <b>Cambridge International AS</b> <u>Design and Technology</u> (C10H05)
	<b>Industry Certification:</b> Precision Measurement Instruments Certifications (Snap-On)	<b>Industry Certification:</b> Certified Solidworks Associate (CSWA)- Academic -and/or- Autodesk Inventor Certified User		

<b>Technology</b>	Principles of Engineering and Technology (C21H04)	Digital Electronics (C13H07) -or- AP Computer Science Principles (G02H44)	Robotics & Automated Systems (C13H15) -or- AP Computer Science Principles (G02H44) -or- <b>Dual Enrollment</b> Technology (C21H01)	Engineering Practicum (C17H21) -and/or- AP Physics (G03H27, G03H28, G03H24, or G03H29) -or- AP Computer Science A (G02H45) -or- <b>Dual Enrollment</b> Technology (C21H01)
	<b>Industry Certification:</b> Precision Measurement Instruments Certifications (Snap-On)	<b>Industry Certification:</b> Certified Solidworks Associate (CSWA)- Academic -and/or- Autodesk Inventor Certified User	<b>Industry Certification:</b> FANUC	<b>Industry Certification:</b> Certified Solidworks Associate (CSWA)- Academic -and/or- Autodesk Inventor Certified User
<b>Advanced STEM Applications</b>	STEM I: Foundation (C03H15)	STEM II: Applications (C03H16) -or- AP Computer Science Principles (G02H44)	STEM III: STEM in Context (C03H17) -or- AP Computer Science Principles (G02H44) -or- <b>Dual Enrollment</b> Advanced STEM Applications (C03H01)	STEM IV: STEM Practicum (C03H18) -and/or- AP Calculus AB (G02H24) -or- AP Calculus BC (G02H25) -or- AP Computer Science A (G02H45) -or- AP Biology (G03H10) -or- AP Chemistry (G03H16) -or- AP Physics (G03H27, G03H28, G03H24, or G03H29) -or- <b>Dual Enrollment</b> Advanced STEM Applications (C03H01)

	<b>Industry Certification:</b> Precision Measurement Instruments Certifications (Snap-On)	<b>Industry Certification:</b> Certified Solidworks Associate (CSWA)- Academic -and/or- Autodesk Inventor Certified User		
<b>BioSTEM</b>	BioSTEM I (C21H07)	BioSTEM II (C21H08)	BioSTEM III (C21H09)	BioSTEM Practicum (C21H10)
	<b>Industry Certification:</b> Precision Measurement Instruments Certifications (Snap-On)	<b>Industry Certification:</b> Certified Solidworks Associate (CSWA)- Academic -and/or- Autodesk Inventor Certified User		
<b>Project Lead the Way</b>	Introduction to Engineering (PLTW) (C03H09)	Principles of Engineering (PLTW) (C03H07)	Choice of the following: Aerospace Engineering (PLTW) (C03H11) -or- Civil Engineering & Architecture (PLTW) (C03H10) -or- Biotechnical Engineering (PLTW) (C03H12) -or- Digital Electronics (PLTW) (C03H08) -or- Computer Integrated Manufacturing (PLTW) (C13H11)	Engineering Design and Development (PLTW) (C03H13)
<b>Engineering by Design</b>	Foundations of Technology (EBD) (C03H03)	Technological Design (EBD) (C03H02)	Advanced Design Applications (EBD) (C03H05) -and/or- Advanced Technological Applications (EBD) (C03H04)	Engineering Design (EBD) (C03H06)

**Note:** Courses marked (EBD) are part of the *Engineering by Design* curriculum package and may require additional costs and training to implement. Courses marked (PLTW) are part of the *Project Lead the Way* curriculum package and may require additional costs and training to implement.

**Available courses for elective credit in this cluster:**

- **Work-Based Learning: Career Practicum** (C20H17) may substitute for the Level 4 offering in all programs of study.
- **Introduction to Geographic Information Systems** (C03H14) is a supplemental course which can be offered in addition to courses within these programs of study but does not count toward concentrator status.

# 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](mailto:John.Mummert@tn.gov).

Program of Study	Level 1	Level 2	Level 3	Level 4
<b>Automotive Maintenance and Light Repair</b>	Maintenance and Light Repair I (C20H09)	Maintenance and Light Repair II (C20H10)	Maintenance and Light Repair III (C20H11) -or- <b>Dual Enrollment</b> Automotive Maintenance & Light Repair (C20H01)	Maintenance and Light Repair IV (C20H12) -or- <b>Dual Enrollment</b> Automotive Maintenance & Light Repair (C20H01)
			<b>Industry Certification:</b> Precision Measurement Instruments Certification (includes all subtests)	<b>Industry Certification:</b> Automotive Service Excellence Student Certification: Maintenance & Light Repair
<b>Automotive Collision Repair</b>	Introduction to Collision Repair (C20H20)	Collision Repair: Non-Structural <sup>1</sup> (C20H13) -or- Collision Repair: Painting & Refinishing <sup>1</sup> (C20H14)	Collision Repair: Non-Structural <sup>1</sup> (C20H13) -or- Collision Repair: Painting & Refinishing <sup>1</sup> (C20H14) -or- <b>Dual Enrollment</b> Automotive & Collision Repair (C20H02)	Collision Repair: Non-Structural <sup>1</sup> (C20H13) -or- Collision Repair: Painting & Refinishing <sup>1</sup> (C20H14) -or- Collision Repair: Damage Analysis, Estimating, & Customer Service (C20H19) -or- <b>Dual Enrollment</b> Automotive & Collision Repair (C20H02)
			<b>Industry Certification for C20H13:</b> I-CAR Refinish Technician ProLevel 1 or I-CAR Non-Structural Technician ProLevel 1 or Automotive Service Excellence Student Certification: Nonstructural Analysis/Repair  <b>Industry Certification for C20H14:</b> Automotive Service Excellence Student Certification: Painting and Refinishing	



Program of Study	Level 1	Level 2	Level 3	Level 4
<b>Aviation Flight</b>	Introduction to Aerospace (C20H15)	Aviation I: Principles of Flight (C20H16)	Aviation II: Advanced Flight (C20H18) -or- <b>Dual Enrollment</b> Aviation Flight (C20H03)	Work-Based Learning: Career Practicum (C20H17) -or- <b>Dual Enrollment</b> Aviation Flight (C20H03)

<sup>1</sup> May be taught for up to three credits. Implementation options vary; contact the career cluster consultant for more information.

**Available courses for elective credit in this cluster:**

- **Work-Based Learning: Career Practicum** (C20H17) may substitute for the Level 4 offering in all programs of study.
- **Welding I** (C13H12) and **Welding II** (C13H10) are supplemental courses which can be offered in addition to courses within the Automotive Collision Repair program of study but do not count toward concentrator status.
- **Structural** may be taken at a participating postsecondary institution as a third- or fourth-level course within the Automotive Collision Repair program of study.
- Programs of study in the areas of *Aviation Maintenance* and *Diesel Technology* can be found at a Tennessee College of Applied Technology. Please look at regional campus to determine course offerings. The following dual enrollment course codes apply: **Dual Enrollment Aviation Maintenance** (C20H04) and **Dual Enrollment Diesel Technology** (C20H06).

## Middle School

Career Cluster(s)	Grade 6	Grade 7	Grade 8
<ul style="list-style-type: none"> <li>Agriculture, Food, &amp; Natural Resources</li> </ul>		Introduction to Agricultural Sciences (C03X02)	Introduction to Agricultural Sciences (C03X02) Career Exploration* (C25H08)
<ul style="list-style-type: none"> <li>Arts, A/V Technology, &amp; Communications</li> <li>Business Management &amp; Administration</li> <li>Finance</li> <li>Information Technology</li> <li>Marketing</li> </ul>	Keyboarding <sup>1</sup> (G10600)	Keyboarding (G10700)	Keyboarding (G10800) Computer Applications (C12H19) Career Exploration* (C25H08)
<ul style="list-style-type: none"> <li>Education &amp; Training</li> <li>Human Services</li> </ul>	Introduction to Social Health <sup>2</sup> (C19X00)	Introduction to Social Health (C19X00)	Introduction to Social Health (C19X00) Career Exploration* (C25H08)
<ul style="list-style-type: none"> <li>Advanced Manufacturing</li> <li>Architecture &amp; Construction</li> <li>STEM</li> <li>Transportation, Distribution, &amp; Logistics</li> </ul>	Exploring Technology (EBD) (C25X00)	Inventions and Innovations (EBD) (C03700)	Technological Systems (EBD) (C03801) Career Exploration* (C25H08)
<ul style="list-style-type: none"> <li>Advanced Manufacturing</li> <li>Architecture &amp; Construction</li> <li>Information Technology</li> <li>STEM</li> <li>Transportation, Distribution, &amp; Logistics</li> </ul>	STEM Explorers (C03600)	STEM Innovators (C03701)	STEM Designers (C03800) Career Exploration* (C25H08)
<ul style="list-style-type: none"> <li>Health Science</li> </ul>		Introduction to Health Science (C14800)	Introduction to Health Science (C14800) Medical Detectives (PLTW) (C03806) Career Exploration* (C25H08)
<ul style="list-style-type: none"> <li>Advanced Manufacturing</li> <li>Architecture &amp; Construction</li> <li>Arts, A/V Technology, &amp; Communications</li> <li>Information Technology</li> <li>STEM</li> <li>Transportation, Distribution, &amp; Logistics</li> </ul>	Design and Modeling (PLTW) (C03X00)	Automation and Robotics (PLTW) (C03X01)	Energy and the Environment (PLTW) (C03802) Flight and Space (PLTW) (C03803) Green Architecture (PLTW) (C03804) Magic of Electrons (PLTW) (C3805) Science and Technology (PLTW) (C03807) Career Exploration* (C25H08)

<sup>1</sup> *Keyboarding* may also be used with fourth and fifth grade students (G10400, G10500). <sup>2</sup> *Introduction to Social Health* may also be used with fifth grade students (C19X00).

**Note:** Courses marked (EBD) are part of the *Engineering by Design* curriculum package and may require additional costs and training to implement. Courses marked (PLTW) are part of the *Project Lead the Way* curriculum package and may require additional costs and training to implement.