

# 2018-19 CTE Programs of Study & Proposed Course Revisions

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The following charts list revisions to programs of study based on the annual [program of study justification process](#). We have also added industry certifications and early postsecondary courses to show alignment within courses and programs of study.

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:

Revisions to programs of study and courses are based on the 2018-19 [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 [Deborah.Knoll@tn.gov](mailto:Deborah.Knoll@tn.gov).

**Principles of Manufacturing Course Standard Revised:** Processes including stamping and injection molds are widely used in industry; however, these skills were not represented in current course standards.

**Welding I Course Standards Added:** Knowledge requirements of welding procedure specifications are widely used in industry; however, these skills were not represented in current course standards.

**Welding II Course Standards Added:** Elements which impact welding efficiency, such as wire feed speed and electrode efficiency, need to be in a student's troubleshooting skillset; however, these elements were not represented in current course standards.

Program of Study	Level 1	Level 2	Level 3	Level 4
<b>Machining Technology</b>	Principles of Manufacturing (5922)  <b>*Standard Revised</b>	Principles of Machining I (5929)	Principles of Machining II (5923) -or- <b>Dual Enrollment</b> Machining Technology (4060)	Manufacturing Practicum (5926) -or- <b>Dual Enrollment</b> Machining Technology (4060)
	<b>Industry Certification:</b> Machining Level I - Measurement, Materials, and Safety Certification (NIMS) -and/or- Snap-On Precision Measurement	<b>Industry Certification:</b> Production Certification (CPT) Safety Module	<b>Industry Certification:</b> Production Certification (CPT) Quality Practices and Measurement Module	<b>Industry Certification:</b> Production Certification (CPT) Manufacturing Processes and Production Module and Maintenance Awareness Module
<b>Electromechanical Technology</b>	Principles of Manufacturing (5922)  <b>*Standard Revised</b>	Introduction to Electromechanical (6091)	Advanced Electromechanical Technology (6090) -or- <b>Dual Enrollment</b> Electromechanical Technology (4061)	Manufacturing Practicum (5926) -or- <b>Dual Enrollment</b> Electromechanical Technology (4061)
	<b>Industry Certification:</b> Machining Level I - Measurement, Materials, and Safety Certification (NIMS) -and/or- Snap-On Precision Measurement			

Program of Study	Level 1	Level 2	Level 3	Level 4
Mechatronics	Principles of Manufacturing (5922)  <b>*Standard Revised</b>	Digital Electronics (5925) Or Robotics & Automated Systems (6143) Or Project Lead the Way (PLTW) Computer Integrated Manufacturing (6055)	Mechatronics I <sup>1</sup> (6156) -or- <b>Dual Enrollment</b> Mechatronics (4063)	Mechatronics II <sup>1</sup> (6157) -or- Manufacturing Practicum (5926) -or- <b>Dual Enrollment</b> Mechatronics (4063)
	<b>Industry Certification:</b> Machining Level I - Measurement, Materials, and Safety Certification (NIMS) -and/or- Snap-On Precision Measurement	<b>Industry Certification:</b> FANUC only with Robotics & Automated Systems (6143)		<b>Industry Certification:</b> Level 1 Siemens Certified Mechatronic Systems Assistant
Welding	Principles of Manufacturing (5922)  <b>*Standard Revised</b>	Welding I (6078)  <b>*Standards Added</b>	Welding II <sup>2</sup> (6033) <b>*Standards Added</b> -or- <b>Dual Enrollment</b> Welding (4062)	Manufacturing Practicum (5926) -or- <b>Dual Enrollment</b> Welding (4062)
	<b>Industry Certification:</b> Machining Level I - Measurement, Materials, and Safety Certification (NIMS) -and/or- Snap-On Precision Measurement	<b>Industry Certification:</b> AWS SENSE Entry Level Welder	<b>Industry Certification:</b> AWS SENSE Advanced Level Welder or American Welding Society Certified Welder	

<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** (6105) course may substitute for the Level 4 offering in all programs of study.

## Agriculture, Food, & Natural Resources (AFNR):

There are **no changes** to programs of study within this career cluster based on the 2018-19 [program of study justification process](#). Program of study justifications for AFNR 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](mailto:Steven.Gass@tn.gov).

Program of Study	Level 1	Level 2	Level 3	Level 4
<b>Veterinary and Animal Science</b>	Agriscience <sup>1</sup> (5957)	Small Animal Science (5958)	Large Animal Science (6116) -or- <b>Dual Enrollment</b> Veterinary & Animal Science (4065)	Veterinary Science <sup>1</sup> (5961) -or- <b>Dual Enrollment</b> Veterinary & Animal Science (4065)
				<b>Industry Certification:</b> TN Specific Industry Certification Animal Science
	Supervised Agricultural Experience (5964)			
<b>Agricultural Engineering and Applied Technologies</b>	Agriscience <sup>1</sup> (5957)	Principles of Agricultural Mechanics (5944)	Agricultural Power and Equipment (5945) -or- <b>Dual Enrollment</b> Agricultural Engineering & Applied Technologies (4066)	Agricultural and Biosystems Engineering (5963) -or- <b>Dual Enrollment</b> Agricultural Engineering & Applied Technologies (4066)
	Supervised Agricultural Experience (5964)			
	Supervised Agricultural Experience (5964)			
<b>Agribusiness</b>	Agriscience <sup>1</sup> (5957)	Principles of Agribusiness (5946)	Organizational Leadership and Communications (5956) -or- <b>Dual Enrollment</b> Agribusiness (4067)	Agricultural Business and Finance <sup>2</sup> (5943) -or- <b>Statewide Dual Credit</b> Intro to Agribusiness <sup>2</sup> (4270) -or- <b>Dual Enrollment</b> Agribusiness (4067)
	Supervised Agricultural Experience (5964)			
	Supervised Agricultural Experience (5964)			

Program of Study	Level 1	Level 2	Level 3	Level 4
<b>Food Science</b>	Agriscience <sup>1</sup> (5957)	Principles of Food Production (6118)	Food Science and Safety (6115) -or- <b>Dual Enrollment</b> Food Science (4068)	Advanced Food Science (6113) -or- <b>Dual Enrollment</b> Food Science (4068)
	Supervised Agricultural Experience (5964)			
<b>Horticulture Science</b>	Agriscience <sup>1</sup> (5957)	Principles of Plant Science and Hydroculture (6119)	Greenhouse Management (5954) -or- <b>Statewide Dual Credit Course</b> Introduction to Plant Science (4269) -or- <b>Dual Enrollment</b> Horticulture Science (4069)	Landscaping and Turf Science (5951) -or- <b>Dual Enrollment</b> Horticulture Science (4069)
				<b>Industry Certification:</b> TN Specific Industry Certification Horticulture -and/or- Commercial Pesticide Certification
	Supervised Agricultural Experience (5964)			
<b>Environmental and Natural Resource Management</b>	Agriscience <sup>1</sup> (5957)	Applied Environmental Science <sup>1</sup> (6114)	Plant and Soil Science (5950) -or- <b>Dual Enrollment</b> Environmental & Natural Resources Management (4070)	Natural Resources Management (6117) -and/or- AP Environmental Science (3236) -or- <b>Dual Enrollment</b> Environmental & Natural Resources Management (4070)
	Supervised Agricultural Experience (5964)			

<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** (6105) course may substitute for the Level 4 offering in all programs of study.

- ***Introduction to Geographic Information Systems*** (6142) 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 2018-19 [program of study justification process](#); however, **Interior Design will likely be revised for 2019-20**. 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 [Candi.Norwood@tn.gov](mailto:Candi.Norwood@tn.gov).

Program of Study	Level 1	Level 2	Level 3	Level 4
<b>Architectural &amp; Engineering Design</b>	Architectural & Engineering Design I (6037)	Architectural & Engineering Design II (6039)	Architectural & Engineering Design III <sup>1</sup> (5927) -or- <b>Dual Enrollment</b> Architectural & Engineering Design (4075)	Engineering Practicum (6141) -and/or- AP Calculus (3127, 3139, or 3128) -and/or- AP Physics (3238, 3239, 3234, or 3240) -or- <b>Dual Enrollment</b> Architectural & Engineering Design (4075)
<b>Interior Design</b>	Foundations of Interior Design (6014)	Residential Interior Design (6006)	Commercial Interior Design (6122) -or- <b>Dual Enrollment</b> Interior Design (4076)	Advanced Interior Design (6121) -or- <b>Dual Enrollment</b> Interior Design (4076)
<b>Residential &amp; Commercial Construction</b>	Fundamentals of Construction (6073)	Residential & Commercial Construction I (6162)	Residential & Commercial Construction II <sup>1</sup> (6163) -or- <b>Dual Enrollment</b> Residential & Commercial Construction (4072)	Construction Practicum (6160) -or- <b>Dual Enrollment</b> Residential & Commercial Construction (4072)
	<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	

Program of Study	Level 1	Level 2	Level 3	Level 4
<b>Structural Systems</b>	Fundamentals of Construction (6073)	Structural Systems I (6164)	Structural Systems II <sup>1</sup> (6165) -or- <b>Dual Enrollment</b> Structural Systems (4073)	Construction Practicum (6160) -or- <b>Dual Enrollment</b> Structural Systems (4073)
	<b>Industry Certification:</b> NCCER Core Curriculum -and/or- OSHA 10	<b>Industry Certification:</b> NCCER Carpentry Level One	<b>Industry Certification:</b> NCCER Carpentry Level Two-and/or- OSHA 30 Construction	
<b>Mechanical, Electrical, &amp; Plumbing (MEP) Systems</b>	Fundamentals of Construction (6073)	MEP Systems (6161)	HVAC (6077) -and/or- Electrical Systems (6075) -and/or- Plumbing Systems (6082) -or- <b>Dual Enrollment</b> Mechanical, Electrical, & Plumbing Systems (4074)	Construction Practicum (6160) -or- <b>Dual Enrollment</b> Mechanical, Electrical, & Plumbing Systems (4074)
	<b>Industry Certification:</b> NCCER Core Curriculum -and/or- OSHA 10		<b>Industry Certifications for 6077:</b> HVAC Excellence, Heating, Electrical, Air Conditioning Technology (H.E.A.T.)  HVAC Excellence Employment Ready Certifications  Universal R-410A  EPA Section 608 Universal  <b>Industry Certification for 6075:</b> NCCER Electrical Level One -and/or- OSHA 30 Construction  <b>Industry Certification for 6082:</b> NCCER Plumbing Level	

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

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

- **Work-Based Learning: Career Practicum** (6105) may substitute for the Level 4 offering in all programs of study.



- **Introduction to Geographic Information Systems** (6142) 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** (6078) 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 2018-19 [program of study justification process](#); however, **Fashion Design will likely be revised for 2019-20**. 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 [Candi.Norwood@tn.gov](mailto:Candi.Norwood@tn.gov).

Program of Study	Level 1	Level 2	Level 3	Level 4
<b>Digital Arts &amp; Design</b>	Digital Arts & Design I (6084)	Digital Arts & Design II (6086)	Digital Arts & Design III (6087) -or- <b>Dual Enrollment</b> Arts & Design (4078)	Applied Arts Practicum (6158) -and/or- AP Studio Art: 2-D Design (3545) -or- <b>Dual Enrollment</b> Arts & Design (4078)
<b>Audio/Visual Production</b>	A/V Production I (6049)	A/V Production II (6050)	A/V Production III (6083) -or- <b>Dual Enrollment</b> Audio/Visual Production (4079)	Applied Arts Practicum (6158) -and/or- AP English Language and Composition (3013) -or- <b>Dual Enrollment</b> Audio/Visual Production (4079)
<b>Fashion Design</b>	Visual Art I (3501)	Foundations of Fashion Design (6120)	Fashion Design (6008) -or- <b>Dual Enrollment</b> Fashion Design (4080)	Advanced Fashion Design (6009) -or- <b>Dual Enrollment</b> Fashion Design (4080)

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

- **Work-Based Learning: Career Practicum** (6105) may substitute for the Level 4 offering in all programs of study.
- **Journalism** (3008) 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:

Revisions to programs of study and courses are based on the 2018-19 [program of study justification process](#). Program of study justifications for Business Management & Administration can also be found on the [career cluster website](#).

**Business Management Course Standard Revised:** Management theories of industrial psychology and situational leadership are widely used in industry; however, these theories were not represented in current course standards.

**Business Communications Course Standard Revised:** Spreadsheets are a method of business communications; however, this was not represented in current course standards.

**Accounting I Course Standard Added:** The use of spreadsheet software is imperative for success in accounting; however, this practice was not explicitly represented in current course standards.

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

Program of Study	Level 1	Level 2	Level 3	Level 4
<b>Business Management</b>	Introduction to Business & Marketing (5905)	Business Communications (5888) <b>*Standard Revised</b> -and/or- Accounting I (5910)  <b>*Standard Added</b>	Business Management (5889) <b>*Standard Revised</b>  -or- <b>Dual Enrollment</b> Business Management (4082)	Business & Entrepreneurship Practicum (6159) -and/or- Virtual Enterprise International <sup>1</sup> (5900) -or- <b>Dual Enrollment</b> Business Management (4082)
<b>Office Management</b>	Computer Applications (5891)	Business Communications (5888)  <b>*Standard Revised</b>	Business Management (5889) <b>*Standard Revised</b>  -or- <b>Dual Enrollment</b> Office Management (4083)	Advanced Computer Applications (5904) -or- <b>Dual Enrollment</b> Office Management (4083)
				<b>Industry Certification:</b>  Microsoft Office Specialist: (Excel) (PowerPoint) (Word)  Microsoft Office Expert  Microsoft Officer Master

Program of Study	Level 1	Level 2	Level 3	Level 4
<b>Health Services Administration</b>	Introduction to Business & Marketing (5905) -or- Health Science Education (5998)	Health Information Technology (5997)	Business Management (5889) <b>*Standard Revised</b>  -or- <b>Dual Enrollment</b> Health Services Administration (4084)	Health Services Administration Practicum (6188) -or- <b>Dual Enrollment</b> Health Services Administration (4084)
<b>Human Resources Management</b>	Introduction to Business & Marketing (5905)	Business Communications (5888)  <b>*Standard Revised</b>	Human Resources Management (6186) -or- <b>Dual Enrollment</b> Human Resources Management (6190)	Human Resources Management Practicum (6187) -or- <b>Dual Enrollment</b> Human Resources Management (6190)

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

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

- **Work-Based Learning: Career Practicum** (6105) may substitute for the Level 4 offering in all programs of study.
- **American Business Legal Systems** (5892) and **Business Economics** (5898) 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

There are **no changes** to programs of study within this career cluster based on the 2018-19 [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](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 (6123)	Teaching as a Profession I (6010)	Teaching as a Profession II (6125) -or- <b>Dual Enrollment</b> Teaching as a Profession (K-12) (4086)	Teaching as a Profession III (6126) -or- <b>Dual Enrollment</b> Teaching as a Profession (K-12) (4086)
<b>Early Childhood Education Careers</b>	Early Childhood Education Careers I (6015)	Early Childhood Education Careers II (6016)	Early Childhood Education Careers III (6017) -or- <b>Dual Enrollment</b> Early Childhood Education Careers (4087)	Early Childhood Education Careers IV (6135) -or- <b>Dual Enrollment</b> Early Childhood Education Careers (4087)
				<b>Industry Certification:</b> Child Development Associate (CDA)
<b>Educational Therapy and Support</b>	Educational Therapy and Support I (6180)	Educational Therapy and Support II (6181)	Educational Therapy and Support III (6182) -or- <b>Dual Enrollment</b> Educational Therapy and Support (6192)	Educational Therapy and Support Practicum (6183) -or- <b>Dual Enrollment</b> Educational Therapy and Support (6192)

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

- **Work-Based Learning: Career Practicum** (6105) may substitute for the Level 4 offering in all programs of study.
- **Lifespan Development** (6013) 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

Revisions to programs of study and courses are based on the 2018-19 [program of study justification process](#). Program of study justifications for Finance can also be found on the [career cluster website](#).

**Accounting I Course Standard Added:** The use of spreadsheet software is imperative for success in accounting; however, this practice was not explicitly represented in current course standards.

**Accounting II Course Standard Revised:** Analysis of a business' annual reports is a needed skillset; however, this practice was not explicitly represented in current course standards.

**Course Added to Accounting Program of Study:** *Financial Planning* will count as a capstone course in the Accounting program of study.

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

Program of Study	Level 1	Level 2	Level 3	Level 4
<b>Accounting</b>	Introduction to Business & Marketing (5905)	Accounting I (5910) <b>*Standard Added</b>	Accounting II (5911) -or- <b>Dual Enrollment</b> Accounting (4090)	Statistics (3136) -or- AP Statistics (3129) -and/or- Financial Planning (5890) <b>* New Course Added for Concentration Dual Enrollment</b> Accounting (4090) and/or- Financial Accounting CLEP
<b>Banking and Finance</b>	Introduction to Business & Marketing (5905)	Accounting I (5910) <b>* Standard Added</b>	Banking and Finance (5899) -or- <b>Dual Enrollment</b> Banking & Finance (4091)	Financial Planning (5890) -or- <b>Dual Enrollment</b> Banking & Finance (4091)

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

- **Work-Based Learning: Career Practicum** (6105) may substitute for the Level 4 offering in all programs of study.
- **Personal Finance** (5901) is a course required for graduation but does not count toward concentrator status in a program of study.

## Government & Public Administration

There are **no changes** to programs of study within this career cluster based on the 2018-19 [program of study justification process](#); however, **changes are expected for the 2019-20 school year**. 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](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 (6127)	Public Management and Administration (6129)	U.S. Government and Civics <sup>1</sup> (3417)  Public Law and Budgeting (6128)  -or- <b>Dual Enrollment</b> Public Management & Administration (4093)	Public Law and Budgeting (6128)  AP U.S. Government & Politics (3445) -or- <b>Dual Enrollment</b> Public Management & Administration (4093)

<sup>1</sup> Satisfies ½ credit of U.S. Government required for graduation.

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

- **Work-Based Learning: Career Practicum** (6105) may substitute for the Level 4 offering in all programs of study.
- **Court Systems and Practices** (6150) is a supplemental course which can be offered in addition to courses within this program of study but does not count toward concentrator status.

# Health Science

Revisions to programs of study and courses are based on the 2018-19 [program of study justification process](#). Program of study justifications for Health Science can also be found on the [career cluster website](#).

**Diagnostic Medicine Course Standards Revised:** The word *radiology* has been changed to *medical imaging* in all standards to reflect current terminology.

**Exercise Physiology Program of Study Name Change:** The name of this program will be changed to Sport and Human Performance in order to reflect industry phrasing.

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 Health</b>	Health Science Education (5998)	Behavioral and Community Health (6130)	Global Health and Epidemiology (6132) -or- <b>Dual Enrollment</b> Public Health (4096)	Public Health Practicum (6184) -or- <b>Dual Enrollment</b> Public Health (4096)
<b>Diagnostic Services</b>	Health Science Education (5998)	Anatomy and Physiology <sup>2</sup> (3251 or 5991) -or- Diagnostic Medicine (5994)  <b>*Standards Revised</b>	Diagnostic Medicine (5994) <b>*Standards Revised</b> -or- Anatomy and Physiology <sup>2</sup> (3251 or 5991) -or- <b>Dual Enrollment</b> Diagnostic Services (4097)	Cardiovascular Services (6131) -and/or- Clinical Internship (5993) -or- <b>Dual Enrollment</b> Diagnostic Services (4097)
				<b>Industry Certification for 6131:</b> Certified EKG Technician
<b>Nursing Services</b>	Health Science Education (5998)	Anatomy and Physiology <sup>2</sup> (3251 or 5991) -or- Medical Therapeutics (5999)	Medical Therapeutics (5999) -or- Anatomy and Physiology <sup>2</sup> (3251 and 5991) -or- <b>Dual Enrollment</b> Nursing Services (4099)	Nursing Education (6000) -or- <b>Dual Enrollment</b> Nursing Services (4099)
				<b>Industry Certification:</b> Certified Nursing Assistant (CNA)



Program of Study	Level 1	Level 2	Level 3	Level 4
<b>Emergency Services</b>	Health Science Education (5998)	Anatomy and Physiology <sup>2</sup> (3251 or 5991) -or- Medical Therapeutics (5999)	Medical Therapeutics (5999) -or- Anatomy and Physiology <sup>2</sup> (3251 or 5991) -or- <b>Dual Enrollment</b> Emergency Services (4100)	Emergency Medical Services <sup>1</sup> (5995) -or- Emergency Medical Services Practicum (6185) -or- <b>Dual Enrollment</b> Emergency Services (4100)
				<b>Industry Certification:</b> Emergency Medical Responder
<b>Therapeutic Services</b>	Health Science Education (5998)	Anatomy and Physiology <sup>2</sup> (3251 or 5991) -or- One option from Level 3	Anatomy and Physiology <sup>2</sup> (3251 or 5991) 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 (6134) -or- Pharmacological Science (6133) -or- Nutrition Science and Diet Therapy <sup>2</sup> (6007) -or- Medical Therapeutics (5999) -or- <b>Dual Enrollment</b> Therapeutic Services (4101)	Clinical Internship (5993) -or- <b>Dual Enrollment</b> Therapeutic Services (4101)
			<b>Industry Certification following 6133 AND 5993:</b> Certified Pharmacy Technician	<b>Industry Certification following 5999 AND 5993:</b> Certified Clinical Medical Assistant
<b>Sport and Human Performance</b>  <i>*Program of Study Name Change</i>	Health Science Education (5998)	Anatomy and Physiology <sup>2</sup> (3251 or 5991) -or- Rehabilitation Careers (5990)	Rehabilitation Careers (5990) -or- Anatomy and Physiology <sup>2</sup> (3251 or 5991) <b>Dual Enrollment</b> Exercise Physiology (4102)	Exercise Science (6170) -or- Clinical Internship (5993) -or- <b>Dual Enrollment</b> Exercise Physiology (4102)

**Industry Certification  
following 6170 AND  
5993:  
Certified Personal Trainer**

<sup>1</sup> Local dual credit and/or dual enrollment opportunities exist for this course. <sup>2</sup> Satisfies one lab science credit for graduation.

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

- **Work-Based Learning: Career Practicum** (6105) may substitute for the Level 4 offering in all programs of study.
- **Medical Terminology** (5883) is a supplemental course which can be offered in addition to courses within the Health Science career cluster but does not count toward concentrator status.

# Hospitality & Tourism

There are **no changes** to programs of study within this career cluster based on the 2018-19 [program of study justification process](#); however, **changes are expected in Hospitality and Tourism Management for the 2019-20 school year.**

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 (5979)	Culinary Arts II (5980)	Culinary Arts III (5981) -or- <b>Dual Enrollment</b> Culinary Arts (4104)	Culinary Arts IV (6167) -or- <b>Dual Enrollment</b> Culinary Arts (4104)
			<b>Industry Certification:</b> ServSafe Food Manager	
<b>Hospitality and Tourism Management</b>	Hospitality & Tourism Exploration (5933)	Hospitality Marketing (6169)	Hospitality Management (5940) -or- <b>Dual Enrollment</b> Hospitality & Tourism Management (4105)	Event Planning & Management (6168) -or- Advertising and Public Relations (5936) -or- <b>Dual Enrollment</b> Hospitality & Tourism Management (4105)

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

- **Work-Based Learning: Career Practicum** (6105) may substitute for the Level 4 offering in all programs of study.

# Human Services

Revisions to programs of study and courses are based on the 2018-19 [program of study justification process](#). Program of study justifications for Human Services can also be found on the [career cluster website](#).

**Social Health Services Name Change:** This program of study will now be called Human and Social Sciences to employ industry phrasing.

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>  <i>*Program of Study Name Change</i>	Introduction to Human Studies (6137)	Lifespan Development (6013)	Family Studies (6136) -or- <b>Dual Enrollment</b> Social Health Services (4108)	Human Services Practicum (6138) -and/or- Psychology (3433) -and/or- Sociology (3432) -or- <b>Dual Enrollment</b> Social Health Services (4108)
				<b>Industry Certification:</b> Tennessee Specific Industry Certification for Social Health Services (in pilot)
<b>Dietetics and Nutrition</b>	Introduction to Human Studies (6137)	Nutrition Across the Lifespan (6005)	Nutrition Science and Diet Therapy <sup>2</sup> (6007) -or- <b>Dual Enrollment</b> Dietetics & Nutrition (4109)	Human Services Practicum (6138) -and/or- Psychology (3433) -and/or- Sociology (3432) -or- <b>Dual Enrollment</b> Dietetics & Nutrition (4109)
				<b>Industry Certification:</b> Tennessee Specific Industry Certification for Dietetics & Nutrition (in pilot)

Program of Study	Level 1	Level 2	Level 3	Level 4
<b>Cosmetology</b>	Cosmetology I (5983)	Cosmetology II (5986)	Cosmetology III (5984) -or- <b>Dual Enrollment</b> Cosmetology (4110)	Cosmetology IV (6179) -or- <b>Dual Enrollment</b> Cosmetology (4110)
				<b>Industry Certification:</b> TN Cosmetology & Barber Examiners— TN Cosmetologist 1010
<b>Barbering</b>	Barbering I (5972)	Barbering II (5973)	Barbering III (5974) -or- <b>Dual Enrollment</b> Barbering (4111)	Entrepreneurship <sup>1</sup> (5934) -or- <b>Dual Enrollment</b> Barbering (4111)
			<b>Industry Certification:</b> TN Cosmetology & Barber Examiners— TN Master Barber 1010	

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

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

- **Work-Based Learning: Career Practicum** (6105) may substitute for the Level 4 offering in all programs of study.

# Information Technology

Revisions to programs of study and courses are based on the 2018-19 [program of study justification process](#). Program of study justifications for Information Technology can also be found on the [career cluster website](#).

**Computer Science Foundations Standards Added:** Emerging technologies such as cloud technology, Internet of Things (IoT), and data analytics were not represented in current standards.

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>Coding</b>	Computer Science Foundations (6095)  <b>*Standards Added</b>	Coding I (6098) -or- AP Computer Science Principles (3634)	Coding II (6099) -or- Mobile App Development (6178) -or- AP Computer Science Principles (3634) -or- <b>Dual Enrollment</b> Coding (4113)	Coding Practicum (5908) -and/or- AP Computer Science A (3635) -and/or- AP Computer Science Principles (3634) -or- <b>Dual Enrollment</b> Coding (4113)
	<b>Industry Certification:</b> CompTIA IT Fundamentals		<b>Industry Certification:</b> Microsoft Technology Associate Software Development Fundamentals	
<b>Networking Systems</b>	Computer Science Foundations (6095)  <b>*Standards Added</b>	Computer Systems (6094)	Networking (6097) -or- <b>Dual Enrollment</b> Networking Systems (4114)	Cabling and Internetworking (6093) -and/or- IT Clinical Internship (6096) -or- <b>Dual Enrollment</b> Networking Systems (4114)
	<b>Industry Certification:</b> CompTIA IT Fundamentals	<b>Industry Certification:</b> Comp TIA A+  Cisco Certified Entry Network Tech (CCENT)	<b>Industry Certification:</b> CompTIA Network +  Cisco Certified Network Associate (CCNA)	

Program of Study	Level 1	Level 2	Level 3	Level 4
Web Design	Computer Science Foundations (6095)  <b>*Standards Added</b>	Web Design Foundations (6100)	Web Site Development (6101) -or- <b>Dual Enrollment</b> Web Design (4115)	Web Design Practicum (6171) -and/or- AP Computer Science (3635) -and/or- AP Computer Science Principles (3634) -or- <b>Dual Enrollment</b> Web Design (4115)
	<b>Industry Certification:</b> CompTIA IT Fundamentals		<b>Industry Certification:</b> CIW Web Design Specialist	
Cybersecurity	Computer Science Foundations (6095)  <b>*Standards Added</b>	Cybersecurity I (6175)	Cybersecurity II (6176) -or- <b>Dual Enrollment</b> Cybersecurity (TBD)	Cybersecurity Practicum (6177) -and/or- AP Computer Science (3635) -or- <b>Dual Enrollment</b> Cybersecurity (61916191)
	<b>Industry Certification:</b> CompTIA IT Fundamentals	<b>Industry Certification:</b> CompTIA A+	<b>Industry Certification:</b> CompTIA Security +	<b>Industry Certification:</b> CompTIA Security + -and/or- Associate of ISC2

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

- **Work-Based Learning: Career Practicum** (6105) may substitute for the Level 4 offering in all programs of study.
- **Introduction to Geographic Information Systems** (6142) 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

Revisions to programs of study and courses are based on the 2018-19 [program of study justification process](#). Program of study justifications for Law, Public Safety, Corrections, & Security can also be found on the [career cluster website](#).

**Criminal Justice Program of Study Revised:** Due to feedback from educators and industry, the Criminal Justice program of study is being completely revised. Changes will include the merging of *Principles of Law* and *Criminal Justice I*, better alignment to statewide dual credit, and the addition of a practicum.

**Legal and Correction Services Program of Study Revised:** This program of study will be completely revised to focus on pre-law content. There will be a service learning capstone opportunity in which students will be asked to partner with local government for service project(s).

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 (5987)	Criminal Justice II (5988)	Criminal Justice III: Investigation (5989) -or- <b>Statewide Dual Credit:</b> Criminal Justice <sup>3</sup> -or- <b>Dual Enrollment</b> Law Enforcement Services (4117)	Criminal Justice Practicum (TBD) -or- <b>Dual Enrollment</b> Law Enforcement Services (4117)
<b>Fire Management Services</b>	Principles of Fire and Emergency Services (6154) <b>** adding a portfolio component to standards</b>	Fire Prevention (6173) <b>** adding a portfolio component to standards</b>	Fire Science I (6152) <b>** adding a portfolio component to standards</b> -or- <b>Dual Enrollment</b> Fire Management Services (4118)	Fire Science II (6153) <b>** adding a portfolio component to standards</b> -or- <b>Dual Enrollment</b> Fire Management Services (4118)
<b>Pre-Law</b>	Principles of Law (6155)	Court Systems and Practices I (6150)	Court Systems and Practices II (TBD) -or- <b>Dual Enrollment</b> Legal & Correction Services (4119)	Success Skills in Service Learning (6104) -or- AP U.S. Gov't and Politics (3445) -or- <b>Dual Enrollment</b> Legal & Correction Services (4119)

<sup>1</sup> Satisfies ½ credit of U.S. Government required for graduation. <sup>2</sup> Local dual credit and/or dual enrollment opportunities exist for this course. <sup>3</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*** (6105) may substitute for the Level 4 offering in all programs of study.
- ***American Business Legal Systems*** (5892) 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

Revisions to programs of study and courses are based on the 2018-19 [program of study justification process](#). Program of study justifications for Marketing can also be found on the [career cluster website](#).

**Entrepreneurship Standard Revised:** Not-for-profit and franchising ownership options were not reflected in standards.

**Addition of Supply Chain Management Program of Study:** The Distribution and Logistics program of study has been moved from the Transportation career cluster to Marketing because of the focus on distribution and sales principles. The name has been changed to Supply Chain Management to reflect industry phrasing. The program of study has been rewritten to contain additional marketing standards. Marketing teachers will receive additional training at the Institute for CTE Educators to be prepared to teach this program of study.

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

Program of Study	Level 1	Level 2	Level 3	Level 4
<b>Marketing Management</b>	Introduction to Business & Marketing (5905)	Marketing and Management I: Principles <sup>1</sup> (5931)	Marketing and Management II: Advanced Strategies (5932) -or- <b>Dual Enrollment</b> Marketing Management (4121)	Advertising and Public Relations (5936) -or- Retail Operations <sup>1</sup> (5938) -or- Event Planning & Management (6168) -or- <b>Dual Enrollment</b> Marketing Management (4121) -and/or- Principles of Marketing CLEP
<b>Entrepreneurship</b>	Introduction to Business & Marketing (5905)	Marketing and Management I: Principles <sup>1</sup> (5931)	Entrepreneurship <sup>1</sup> (5934) <b>*Standard Revised</b> -or- <b>Dual Enrollment</b> Entrepreneurship (4122)	Business & Entrepreneurship Practicum (6159) -or- Virtual Enterprise International <sup>1</sup> (5900) -or- <b>Dual Enrollment</b> Entrepreneurship (4122)

Program of Study	Level 1	Level 2	Level 3	Level 4
<b>Supply Chain Management</b>  <i>*New Program of Study</i>	Foundations of Transportation, Distribution, and Logistics (6069)	Supply Chain Management I (6072)	Supply Chain Management II (6024) -or- <b>Dual Enrollment</b> Supply Chain Management (4132)	Work-Based Learning: Career Practicum (6105) -or- <b>Dual Enrollment</b> Supply Chain Management (4132)

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

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

- **Work-Based Learning: Career Practicum** (6105) may substitute for the Level 4 offering in all programs of study.
- **Business Communications** (5888) 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

Revisions to programs of study and courses are based on the 2018-19 [program of study justification process](#). Program of study justifications for STEM can also be found on the [career cluster website](#).

**Courses Added to STEM Program of Study:** Additional AP course options have been added to STEM: *AP Calculus AB* and *BC*, *AP Biology*, *AP Chemistry*, and *AP Physics*.

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>Engineering</b>	Principles of Engineering and Technology (5924)	Engineering Design I (6139) -or- AP Computer Science Principles (3634)	Engineering Design II (6140) -or- AP Computer Science Principles (3634) -or- <b>Dual Enrollment</b> Engineering (4124)	Engineering Practicum (6141) -and/or- AP Physics (3238, 3239, 3234, or 3240) -or- <b>Dual Enrollment</b> Engineering (4124)
		<b>Industry Certification:</b> Certified Solidworks Associate (CSWA)-Academic -and/or- Autodesk Inventor Certified User		
<b>Technology</b>	Principles of Engineering and Technology (5924)	Digital Electronics (5925) -or- AP Computer Science Principles (3634)	Robotics & Automated Systems (6143) -or- AP Computer Science Principles (3634) -or- <b>Dual Enrollment</b> Technology (4125)	Engineering Practicum (6141) -and/or- AP Physics (3238, 3239, 3234, or 3240) -or- <b>Dual Enrollment</b> Technology (4125)
		<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

Program of Study	Level 1	Level 2	Level 3	Level 4
STEM	STEM I: Foundation (6144)	STEM II: Applications (6145) -or- AP Computer Science Principles (3634)	STEM III: STEM in Context (6146) -or- AP Computer Science Principles (3634) -or- <b>Dual Enrollment</b> STEM (4126)	STEM IV: STEM Practicum (6147) -and/or- AP Calculus AB (3127) -or- AP Calculus BC (3128) -or- AP Computer Science A (3635) -or- AP Biology (3117) -or- AP Chemistry (3225) -or- AP Physics (3238, 3239, 3234, or 3240) -or- <b>Dual Enrollment</b> STEM (4126)
		<b>Industry Certification:</b> Certified Solidworks Associate (CSWA)-Academic -and/or- Autodesk Inventor Certified User		
Project Lead the Way	Introduction to Engineering (PLTW) (6054)	Principles of Engineering (PLTW) (6052)	Choice of the following: Aerospace Engineering (PLTW) (6057) Civil Engineering & Architecture (PLTW) (6056) Biotechnical Engineering (PLTW) (6058) Digital Electronics (PLTW) (6053) Computer Integrated Manufacturing (PLTW) (6055)	Engineering Design and Development (PLTW) (6059)
Engineering by Design	Foundations of Technology (EBD) (5917)	Technological Design (EBD) (5885)	Advanced Design Applications (EBD) (5920) -and/or- Advanced Technological Applications (EBD) (5919)	Engineering Design (EBD) (5921)

**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** (6105) may substitute for the Level 4 offering in all programs of study.
- **Introduction to Geographic Information Systems** (6142) 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, Distribution, & Logistics

Revisions to programs of study and courses are based on the 2018-19 [program of study justification process](#). Program of study justifications for Transportation, Distribution, & Logistics can also be found on the [career cluster website](#).

**Distribution and Logistics Program of Study Moved:** Due to content, this program of study has been revised and moved to the Marketing career cluster and the name has been changed to Supply Chain Management.

Questions about courses and programs of study within this career cluster can be directed to [Candi.Norwood@tn.gov](mailto:Candi.Norwood@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 (5879)	Maintenance and Light Repair II (5880)	Maintenance and Light Repair III (5881) -or- <b>Dual Enrollment</b> Automotive Maintenance & Light Repair (4128)	Maintenance and Light Repair IV (5882) -or- <b>Dual Enrollment</b> Automotive Maintenance & Light Repair (4128)
				<b>Industry Certification:</b> Automotive Service Excellence Student Certification: Maintenance & Light Repair
<b>Automotive Collision Repair</b>	Introduction to Collision Repair (6172)	Collision Repair: Non-Structural <sup>1</sup> (6062) -or- Collision Repair: Painting & Refinishing <sup>1</sup> (6063)	Collision Repair: Non-Structural <sup>1</sup> (6062) -or- Collision Repair: Painting & Refinishing <sup>1</sup> (6063) -or- <b>Dual Enrollment</b> Automotive & Collision Repair (4129)	Collision Repair: Non-Structural <sup>1</sup> (6062) -or- Collision Repair: Painting & Refinishing <sup>1</sup> (6063) -or- Collision Repair: Damage Analysis, Estimating, & Customer Service (6149) -or- <b>Dual Enrollment</b> Automotive & Collision Repair (4129)

Program of Study	Level 1	Level 2	Level 3	Level 4
<b>Aviation Flight</b>	Introduction to Aerospace (6068)	Aviation I: Principles of Flight (6070)	Aviation II: Advanced Flight (6148) -or- <b>Dual Enrollment</b> Aviation Flight (4130)	Work-Based Learning: Career Practicum (6105) -or- <b>Dual Enrollment</b> Aviation Flight (4130)
<b>Distribution and Logistics</b>  <i>*Program moved to Marketing career cluster</i>	Foundations of Transportation, Distribution, and Logistics (6069)	Distribution and Logistics I (6072)	Distribution and Logistics II: Management (6024) -or- <b>Dual Enrollment</b> Distribution & Logistics (4132)	Work-Based Learning: Career Practicum (6105) -or- <b>Dual Enrollment</b> Distribution & Logistics (4132)

<sup>1</sup> May be taught for up to 3 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** (6105) may substitute for the Level 4 offering in all programs of study.
- **Welding I (6078)** and **Welding II (6033)** 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 Systems** may be taken at a participating postsecondary institution as a third- or fourth-level course within the Automotive Collision Repair program of study. Districts should use the course: **Dual Enrollment Automotive & Collision Repair** (4129)
- **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* (4131) and *Dual Enrollment Diesel Technology* (4133)



## Middle School

Career Cluster(s)	6 <sup>th</sup> Grade	7 <sup>th</sup> Grade	8 <sup>th</sup> Grade
<ul style="list-style-type: none"> <li>Agriculture, Food, &amp; Natural Resources</li> </ul>		Introduction to Agricultural Sciences (0885)	Introduction to Agricultural Sciences (0885) Career Exploration* (6166)
<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> (0610)	Keyboarding (0710)	Keyboarding (0810) Computer Applications (5891 or 3638) Career Exploration* (6166)
<ul style="list-style-type: none"> <li>Education &amp; Training</li> <li>Human Services</li> </ul>	Introduction to Social Health <sup>2</sup> (0562)	Introduction to Social Health (0562)	Introduction to Social Health (0562) Career Exploration* (6166)
<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) (6047)	Inventions and Innovations (EBD) (0782)	Technological Systems (EBD) (0882) Career Exploration* (6166)
<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 (0649)	STEM Innovators (0749)	STEM Designers (0849) Career Exploration* (6166)
<ul style="list-style-type: none"> <li>Health Science</li> </ul>		Introduction to Health Science (0837)	Introduction to Health Science (0837) Medical Detectives (PLTW) (0890) Career Exploration* (6166)
<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) (0783)	Automation and Robotics (PLTW) (0883)	Energy and the Environment (PLTW) (0886) Flight and Space (PLTW) (0887) Green Architecture (PLTW) (0888) Magic of Electrons (PLTW) (0889) Science and Technology (PLTW) (0891) Career Exploration* (6166)

<sup>1</sup> *Keyboarding* may also be used with 4th and 5th grade students (0410, 0510). <sup>2</sup> *Introduction to Social Health* may also be used with 5th grade students (0562).

**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.