

2017-18 CTE Programs of Study & Proposed Course Revisions

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 webpage at: <https://tn.gov/education/topic/career-clusters>.

Table of Contents

Career Cluster	Page
Advanced Manufacturing	2
Agriculture, Food, & Natural Resources	4
Architecture & Construction	6
Arts, Audio/Visual Technology, & Communications	8
Business Management & Administration	9
Education & Training	12
Finance	14
Government & Public Administration	15
Health Science	16
Hospitality & Tourism	20
Human Services	21
Information Technology	23
Law, Public Safety, Corrections, & Security	26
Marketing	28
Science, Technology, Engineering, & Mathematics (STEM)	29
Transportation, Distribution, & Logistics	31
Middle School Courses	33

Advanced Manufacturing:

There are **no changes** to programs of study within this career cluster based on the 2017-18 [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.

Program of Study	Level 1	Level 2	Level 3	Level 4
Machining Technology	Principles of Manufacturing (5922)	Principles of Machining I (5929)	Principles of Machining II (5923) -or- Dual Enrollment Machining Technology (4060)	Manufacturing Practicum (5926) -or- Dual Enrollment Machining Technology (4060)
	Industry Certification: Machining Level I - Measurement, Materials, and Safety Certification (NIMS)	Industry Certification: Production Certification (CPT) Safety Module	Industry Certification: Production Certification (CPT) Quality Practices and Measurement Module	Industry Certification: Production Certification (CPT) Manufacturing Processes and Production Module and Maintenance Awareness Module
Electromechanical Technology	Principles of Manufacturing (5922)	Introduction to Electromechanical (6091)	Advanced Electromechanical Technology (6090) -or- Dual Enrollment Electromechanical Technology (4061)	Manufacturing Practicum (5926) -or- Dual Enrollment Electromechanical Technology (4061)
	Industry Certification: Machining Level I - Measurement, Materials, and Safety Certification (NIMS)			
Mechatronics	Principles of Manufacturing (5922)	Digital Electronics (5925) Or Robotics & Automated Systems (6143) Or Project Lead the Way (PLTW) Computer Integrated Manufacturing (6055)	Mechatronics I ¹ (6156) -or- Dual Enrollment Mechatronics (4063)	Mechatronics II ¹ (6157) -or- Manufacturing Practicum (5926) -or- Dual Enrollment Mechatronics (4063)
	Industry Certification: Machining Level I - Measurement, Materials, and Safety Certification (NIMS)			Industry Certification: Level 1 Siemens Certified Mechatronic Systems Assistant

Program of Study	Level 1	Level 2	Level 3	Level 4
Welding	Principles of Manufacturing (5922)	Welding I (6078)	Welding II ² (6033) -or- Dual Enrollment Welding (4062)	Manufacturing Practicum (5926) -or- Dual Enrollment Welding (4062)
	Industry Certification: Machining Level I - Measurement, Materials, and Safety Certification (NIMS) -and/or- AWS SENSE Entry Level Welder		Industry Certification: AWS SENSE Advanced Level Welder or American Welding Society Certified Welder	

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

² 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:

There are **no changes** to programs of study within this career cluster based on the 2017-18 [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.

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

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

¹ Satisfies one lab science credit required for graduation. ² 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 2017-18 [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 Gregory.Francescon@tn.gov.

Program of Study	Level 1	Level 2	Level 3	Level 4
Architectural & Engineering Design	Architectural & Engineering Design I (6037)	Architectural & Engineering Design II (6039)	Architectural & Engineering Design III ¹ (5927) -or- Dual Enrollment 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- Dual Enrollment Architectural & Engineering Design (4075)
Interior Design	Foundations of Interior Design (6014)	Residential Interior Design (6006)	Commercial Interior Design (6122) -or- Dual Enrollment Interior Design (4076)	Advanced Interior Design (6121) -or- Dual Enrollment Interior Design (4076)
Residential & Commercial Construction	Fundamentals of Construction (6073)	Residential & Commercial Construction I (6162)	Residential & Commercial Construction II ¹ (6163) -or- Dual Enrollment Residential & Commercial Construction (4072)	Construction Practicum (6160) -or- Dual Enrollment Residential & Commercial Construction (4072)
	Industry Certification: NCCER Core Curriculum	Industry Certification: NCCER Construction Technology		
Structural Systems	Fundamentals of Construction (6073)	Structural Systems I (6164)	Structural Systems II ¹ (6165) -or- Dual Enrollment Structural Systems (4073)	Construction Practicum (6160) -or- Dual Enrollment Structural Systems (4073)
	Industry Certification: NCCER Core Curriculum	Industry Certification: NCCER Carpentry Level One	Industry Certification: NCCER Carpentry Level Two	

Program of Study	Level 1	Level 2	Level 3	Level 4
Mechanical, Electrical, & Plumbing (MEP) Systems	Fundamentals of Construction (6073)	MEP Systems (6161)	HVAC (6077) -and/or- Electrical Systems (6075) -and/or- Plumbing Systems (6082) -or- Dual Enrollment Mechanical, Electrical, & Plumbing Systems (4074)	Construction Practicum (6160) -or- Dual Enrollment Mechanical, Electrical, & Plumbing Systems (4074)
	Industry Certification: NCCER Core Curriculum		Industry Certifications for 6077: HVAC Excellence, Heating, Electrical, Air Conditioning Technology (H.E.A.T.) HVAC Excellence Employment Ready Certifications Universal R-410A EPA Section 608 Universal Industry Certification for 6075: NCCER Electrical Level One Industry Certification for 6082: NCCER Plumbing Level One	

¹ 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 2017-18 [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 Gregory.Francescon@tn.gov.

Program of Study	Level 1	Level 2	Level 3	Level 4
Digital Arts & Design	Digital Arts & Design I (6084)	Digital Arts & Design II (6086)	Digital Arts & Design III (6087) -or- Dual Enrollment Arts & Design (4078)	Applied Arts Practicum (6158) -and/or- AP Studio Art: 2-D Design (3545) -or- Dual Enrollment Arts & Design (4078)
Audio/Visual Production	A/V Production I (6049)	A/V Production II (6050)	A/V Production III (6083) -or- Dual Enrollment Audio/Visual Production (4079)	Applied Arts Practicum (6158) -and/or- AP English Language and Composition (3013) -or- Dual Enrollment Audio/Visual Production (4079)
Fashion Design	Visual Art I (3501)	Foundations of Fashion Design (6120)	Fashion Design (6008) -or- Dual Enrollment Fashion Design (4080)	Advanced Fashion Design (6009) -or- Dual Enrollment 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 2017-18 [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 Added: Management theories of Six Sigma, Theory Z, and others are widely used in industry; however, these theories were not represented in current course standards.

New Health Services Practicum Course: We are adding a practicum course to allow for deeper capstone Work-Based Learning experiences. This course was written with assistance from industry and postsecondary partners in the Health Services Administration field.

Health Informatics program of study: The Health Informatics program of study is being combined with the Health Services Administration program of study within the Business Management & Administration career cluster in order to meet needs of students who are interested in business careers in the health care industry. This better aligns with the occupations in the related field.

New Program of Study for Human Resources Management: Labor market data indicate high growth in the number of jobs in human resources over the next ten years. Currently, skills needed for these specific occupations are not covered in business standards. These courses were written with assistance from industry and postsecondary partners in the human resources field.

Questions about courses and programs of study within this career cluster can be directed to Candi.Norwood@tn.gov.

Program of Study	Level 1	Level 2	Level 3	Level 4
Business Management	Introduction to Business & Marketing (5905)	Business Communications (5888) -and/or- Accounting I (5910)	Business Management (5889) **Added standard to dive deeper into management theories -or- Dual Enrollment Business Management (4082)	Business & Entrepreneurship Practicum (6159) -and/or- Virtual Enterprise International ¹ (5900) -or- Dual Enrollment Business Management (4082)

Program of Study	Level 1	Level 2	Level 3	Level 4
Office Management	Computer Applications (5891)	Business Communications (5888)	Business Management (5889) **Added standard to dive deeper into management theories -or- Dual Enrollment Office Management (4083)	Advanced Computer Applications (5904) -or- Dual Enrollment Office Management (4083)
				Industry Certification: Microsoft Office Specialist: (Excel) (PowerPoint) (Word) Microsoft Office Expert Microsoft Officer Master
Health Services Administration	Introduction to Business & Marketing (5905)	Health Information Technology (5997)	Business Management (5889) **Added standard to dive deeper into management theories -or- Dual Enrollment Health Services Administration (4084)	Business & Entrepreneurship Practicum (6159) -and/or- Virtual Enterprise International ¹ (5900) **New Course Health Services Administration Practicum (6188) -or- Dual Enrollment Health Services Administration (4084)

Program of Study	Level 1	Level 2	Level 3	Level 4
**New Program of Study Human Resources Management	Introduction to Business & Marketing (5905)	Business Communications (5888)	**New Course Human Resources Management (6186) -or- Dual Enrollment Human Resources Management (6190)	**New Course Human Resources Management Practicum (6187) -or- Dual Enrollment Human Resources Management (6190)

¹ 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

Revisions to programs of study and courses are based on the 2017-18 [program of study justification process](#). Program of study justifications for Education & Training can also be found on the [career cluster website](#).

Educational Support Careers program of study: This program of study is being retired due to the addition of a new program of study called Student Development which will encapsulate birth to five years, elementary education, middle school education, and high school education. This program of study will focus on administrative and counseling careers and how these positions affect students' educational development. This aligns better with the needs within the k-12 education system for teacher development and preparation for students to seamlessly enter educator preparation programs. The new courses in the program of study were written with assistance from industry and postsecondary partners in the educator preparation field.

Early Childhood Education (Prek-4) program of study: Early Childhood Education (Prek-4) program of study will be integrated with Childhood Development Services program of study from the Human Services Career Cluster and the name will be changed to Early Childhood Education Careers. This reflects current courses offered within both programs of study and aligns better with industry. The early childhood component should reside in the Education & Training career cluster rather than Human Services in support of better alignment to labor data, and create more streamlined pathways while increasing enrollment numbers.

Questions about courses and programs of study within this career cluster can be directed to Elizabeth.Rafferty@tn.gov.

Program of Study	Level 1	Level 2	Level 3	Level 4
Teaching as a Profession (K-12)	Fundamentals of Education (6123)	Teaching as a Profession I (6010)	Teaching as a Profession II (6125) -or- Dual Enrollment Teaching as a Profession (K-12) (4086)	Teaching as a Profession III (6126) -or- Dual Enrollment Teaching as a Profession (K-12) (4086)
Early Childhood Education (Pre-K-4) Early Childhood Education Careers	Fundamentals of Education (6123) Early Childhood Education Careers I (6015)	Early Childhood Education Careers II (6016) Early Childhood Education Careers II (6016)	Teaching as a Profession II (6125) Early Childhood Education Careers III (6017) -or- Dual Enrollment Early Childhood Education Careers (4107)	Teaching as a Profession III (6126) Early Childhood Education Careers IV (6135) -or- Dual Enrollment Early Childhood Education Careers (4107)
				Industry Certification: Child Development Associate (CDA)

Program of Study	Level 1	Level 2	Level 3	Level 4
Educational Support Careers **Educational Therapy & Support	Fundamentals of Education (6123) **New Course Educational Therapy and Support I (6180)	Teaching as a Profession I (6010) **New Course Educational Therapy and Support II (6181)	School Counseling (6124) **New Course Educational Therapy and Support III (6182) -or- Dual Enrollment Educational Therapy and Support (6192)	Teaching as a Profession III (6126) **New Course Educational Therapy and Support Practicum (6183) -or- Dual Enrollment 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

There are **no changes** to programs of study within this career cluster based on the 2017-18 [program of study justification process](#). Program of study justifications for Finance can also be found on the [career cluster website](#). Questions about courses and programs of study within this career cluster can be directed to Candi.Norwood@tn.gov.

Program of Study	Level 1	Level 2	Level 3	Level 4
Accounting	Introduction to Business & Marketing (5905)	Accounting I (5910)	Accounting II (5911) -or- Dual Enrollment Accounting (4090)	Statistics (3136) -or- AP Statistics (3129) -and/or- Dual Enrollment Accounting (4090)
Banking and Finance	Introduction to Business & Marketing (5905)	Accounting I (5910)	Banking and Finance (5899) -or- Dual Enrollment Banking & Finance (4091)	Financial Planning (5890) -or- Dual Enrollment Banking & Finance (4091)
				Industry Certification: National Certified Compliance Officer (NCCO)

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

Revisions to this program of study and courses are based on the 2017-18 [program of study justification process](#). Program of study justifications for Government & Public Administration can also be found on the [career cluster website](#).

Additional standards to courses: The addition of a portfolio component to each of the courses allows students to demonstrate mastery of content throughout the program of study.

Removing U.S. Government and Civics: Removing this course from the program of study allows for the addition of a more rigorous capstone class, A.P. U.S. Government and Politics. This revision also removes the problem of ½ credit Government courses making it difficult to concentrate in this area.

New capstone course: AP U.S. Government & Politics

Questions about courses and programs of study within this career cluster can be directed to Sloan.Hudson@tn.gov.

Program of Study	Level 1	Level 2	Level 3	Level 4
Public Management and Administration	Principles of Public Service (6127) ** adding standard to address a portfolio component	Public Management and Administration (6129) ** adding standard to address a portfolio component	U.S. Government and Civics¹ (3417) Public Law and Budgeting (6128) ** adding standard to address a portfolio component -or- Dual Enrollment Public Management & Administration (4093)	Public Law and Budgeting (6128) AP U.S. Government & Politics (3445) -or- Dual Enrollment Public Management & Administration (4093)

¹ 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 2017-18 [program of study justification process](#). Program of study justifications for Health Science can also be found on the [career cluster website](#).

Retire Biotechnology Research program of study: Currently the outlook for biotechnology jobs is projected to have an average annual increase of less than one percent. In Tennessee, the majority of the jobs in the biotechnology industry are support jobs that are included in other clusters such as business, marketing, STEM, and information technology. This will be available as a special program of study for LEAs who can support the continuation of the program of study with strong labor data.

Public Health program of study course sequence revisions: Removing the Emergency Preparedness course from this program of study allows for the addition of a more rigorous capstone course: Public Health Practicum. Adding emergency preparedness standards to the Behavioral and Community Health course better replicates the Emergency Preparedness focus of local and state health departments. The addition of the portfolio component to each of the courses allows students to demonstrate mastery of content throughout the program of study.

Health Informatics program of study: The Health Informatics program of study is being combined with the Health Services Administration program of study within the Business Management & Administration career cluster in order to meet needs of students who are interested in business careers in the health care industry. This better aligns with the occupations in the related field.

Therapeutic Nursing Services program of study course sequence revisions: The sequence addresses the program of study's core content, so that students who complete the program in the new order will have a more focused, higher level understanding of nursing services. The name was shortened to Nursing Services to avoid confusion with the Therapeutic Clinical Services. Revision of the Medical Therapeutic standards provides a more seamless pathway for students who are interested in therapeutic or nursing careers. The Medical Therapeutics course was written with assistance from industry and postsecondary partners in the health science field. The addition of the portfolio component to each of the courses allows students to demonstrate mastery of content throughout the program of study.

Emergency Services program of study course sequence revisions: The sequence addresses the program of study's core content, so that students who complete the program in the new order will have a more focused, higher level understanding of emergency services. Moving Anatomy & Physiology to level two allows for the addition a more rigorous capstone course: Emergency Medical Services Practicum. The Emergency Medical Services Practicum was written with assistance from industry and postsecondary partners in the health science field. The addition of the portfolio component to each of the courses allows students to demonstrate mastery of content throughout the program of study.

Therapeutic Clinical Services program of study course sequence revisions: The sequence addresses the program of study's core content, so that students who complete the program in the new order will have a more focused, higher level understanding of therapeutic services. The name was shortened to Therapeutic Services avoid confusion with the Therapeutic Nursing Services. Revision of the Medical Therapeutics standards provides a more seamless pathway for students who are interested in therapeutic or nursing careers. The Medical Therapeutics course was written with assistance from industry and postsecondary partners in the health science field. Some Anatomy & Physiology standards in Dental Services were revised to be more rigorous. Rehabilitation Careers will stay in the Clinical Exercise Physiology program of study. The addition of the portfolio component to each of the courses allows students to demonstrate mastery of content throughout the program of study.

Clinical Exercise Physiology program of study course sequence revisions: The sequence addresses the program of study's core content, so that students who complete the program in the new order will have a more focused, higher level understanding of rehabilitative services. The name change is to avoid confusion with the Therapeutic Clinical Services. Rehabilitation Careers will include revised Anatomy & Physiology revised to be more rigorous. The addition of the portfolio component to each of the courses allows students to demonstrate mastery of content throughout the program of study.

Questions about courses and programs of study within this career cluster can be directed to Sloan.Hudson@tn.gov.

Program of Study	Level 1	Level 2	Level 3	Level 4
Biotechnology Research	Health Science Education (5998)	Diagnostic Medicine (5994)	Anatomy and Physiology ² (3251 or 5991)	Biomedical Applications ² (5992) -and/or- Forensic Science ² (5996)
Public Health	Health Science Education (optional) (5998) ** adding a portfolio component to standards	Emergency Preparedness (6151) Behavioral and Community Health (6130) ** adding Emergency Preparedness standards and a portfolio component	Behavioral and Community Health (6130) Global Health and Epidemiology (6132) -or- Dual Enrollment Public Health (4096)	Global Health and Epidemiology (6132) **New Course Public Health Practicum (6184) -or- Dual Enrollment Public Health (4096)
Diagnostic Services	Health Science Education (5998) ** adding a portfolio component to standards	Diagnostic Medicine (5994) Anatomy and Physiology ² (3251 or 5991) -or- Diagnostic Medicine (5994) ** adding a portfolio component to standards	Medical Terminology ¹ (5883) Diagnostic Medicine (5994) -or- Anatomy and Physiology ² (3251 or 5991) ** adding cardiovascular content to standards -or- Dual Enrollment Diagnostic Services (4097)	Cardiovascular Services (6131) -and/or- Clinical Internship (5993) -or- Dual Enrollment Diagnostic Services (4097) Industry Certification for 6131: Certified EKG Technician

Program of Study	Level 1	Level 2	Level 3	Level 4
Health Informatics	Health Science Education (5998)	Medical Terminology ¹ (5883)	Health Information Technology (5997)	Clinical Internship (5993)
Therapeutic Nursing Services **Name change: Nursing Services	Health Science Education (5998) ** adding a portfolio component to standards	Medical Therapeutics (5999) -or- Anatomy and Physiology ² (3251 or 5991) ** adding a portfolio component to standards	Medical Terminology¹ (5883) Medical Therapeutics (5999) -or- Anatomy and Physiology ² (3251 or 5991) ** standards revised -or- Dual Enrollment Nursing Services (4099)	Nursing Education (6000) -or- Dual Enrollment Nursing Services (4099)
				Industry Certification: Certified Nursing Assistant (CNA)
Emergency Services	Health Science Education (5998) ** adding a portfolio component to standards	Emergency Preparedness (6151) Anatomy and Physiology ² (3251 or 5991) -or- Medical Therapeutics (5999) ** adding a portfolio component to standards	Anatomy and Physiology ² (3251 or 5991) -and/or- Medical Therapeutics (5999) Medical Terminology¹ (5883) ** Anatomy & Physiology standards revised within course -or- Dual Enrollment Emergency Services (4100)	Emergency Medical Services ¹ (5995) -or- ** New Course Emergency Medical Services Practicum (6185) -or- Dual Enrollment Emergency Services (4100)
				Industry Certification: Emergency Medical Responder (First Responder)

Program of Study	Level 1	Level 2	Level 3	Level 4
Therapeutic Clinical Services **Name Change: Therapeutic Services	Health Science Education (5998) ** adding a portfolio component to standards	Medical Therapeutics (5999) Anatomy and Physiology ² (3251 or 5991) ** adding a portfolio component to standards -or- Dental Science (6134) ** Anatomy & Physiology standards revised within course -or- Pharmacological Science (6133) ** adding a portfolio component to standards -or- Nutrition Science and Diet Therapy ² (6007) -or- Medical Therapeutics (5999) ** standards revised	Rehabilitation Careers (5990) -or- Anatomy and Physiology ² (3251 or 5991) -or- Dental Science (6134) ** Anatomy & Physiology standards revised within course -or- Pharmacological Science (6133) ** adding a portfolio component to standards -or- Nutrition Science and Diet Therapy ² (6007) -or- Medical Therapeutics (5999) ** standards revised -or- Dual Enrollment Therapeutic Services (4101)	Anatomy and Physiology ² (3251 or 5991) -and/or- Clinical Internship (5993) -or- Dual Enrollment Therapeutic Services (4101)
Clinical Exercise Physiology	Health Science Education (5998) ** adding a portfolio component to standards	Rehabilitation Careers (5990) Anatomy and Physiology ² (3251 or 5991) -or- Rehabilitation Careers (5990) ** adding a portfolio component to standards	Exercise Science (6170) Rehabilitation Careers (5990) ** Anatomy & Physiology standards revised within course -or- Anatomy and Physiology ² (3251 or 5991) -or- Dual Enrollment Exercise Physiology (4102)	Anatomy and Physiology ² (3251 or 5991) -and/or- Clinical Internship (5993) Exercise Science (6170) ** adding a portfolio component to standards -or- Clinical Internship (5993) -or- Dual Enrollment Exercise Physiology (4102)
				Industry Certification: Certified Personal Trainer

¹ Local dual credit and/or dual enrollment opportunities exist for this course. ² 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 2017-18 [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.

Program of Study	Level 1	Level 2	Level 3	Level 4
Culinary Arts	Culinary Arts I (5979)	Culinary Arts II (5980)	Culinary Arts III (5981) -or- Dual Enrollment Culinary Arts (4104)	Culinary Arts IV (6167) -or- Dual Enrollment Culinary Arts (4104)
Hospitality and Tourism Management	Hospitality & Tourism Exploration (5933)	Hospitality Marketing (6169)	Hospitality Management (5940) -or- Dual Enrollment Hospitality & Tourism Management (4105)	Event Planning & Management (6168) -or- Advertising and Public Relations (5936) -or- Dual Enrollment 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 2017-18 [program of study justification process](#). Program of study justifications for Human Services can also be found on the [career cluster website](#).

Early Childhood Careers program of study: Early Childhood Education (Prek-4) program of study will be integrated with Childhood Development Services program of study from the Human Services career cluster and the name will be changed to Early Childhood Education Careers. This reflects current courses offered within both programs of study and aligns better with industry. The early childhood component should reside in the Education & Training career cluster rather than human services.

Cosmetology new courses: Courses within the Cosmetology program of study have been rewritten to allow better alignment and ensure clock hours articulate to postsecondary. These courses are being written with the assistance of secondary and postsecondary educators, and a representative from the Board of Cosmetology & Barbering examiners.

Questions about courses and programs of study within this career cluster can be directed to Elizabeth.Rafferty@tn.gov.

Program of Study	Level 1	Level 2	Level 3	Level 4
Childhood Development Services	Early Childhood Education Careers I (6015)	Early Childhood Education Careers II (6016)	Early Childhood Education Careers III (6017)	Early Childhood Education Careers IV (6135)
Social Health Services	Introduction to Human Studies (6137)	Lifespan Development (6013)	Family Studies (6136) -or- Dual Enrollment Social Health Services (4108)	Human Services Practicum (6138) -and/or- Psychology (3433) -and/or- Sociology (3432) -or- Dual Enrollment Social Health Services (4108)
Dietetics and Nutrition	Introduction to Human Studies (6137)	Nutrition Across the Lifespan (6005)	Nutrition Science and Diet Therapy ² (6007) -or- Dual Enrollment Dietetics & Nutrition (4109)	Human Services Practicum (6138) -and/or- Psychology (3433) -and/or- Sociology (3432) -or- Dual Enrollment Dietetics & Nutrition (4109)

Program of Study	Level 1	Level 2	Level 3	Level 4
Cosmetology	Principles of Cosmetology (5983) **New Course Cosmetology I (5983)	Design Principles of Cosmetology (5986) **New Course Cosmetology II (5986)	Chemistry of Cosmetology (5984) **New Course Cosmetology III (5984) -or- Dual Enrollment Cosmetology (4110)	Entrepreneurship ¹ (5934) **New Course Cosmetology IV (6179) -or- Dual Enrollment Cosmetology (4110)
				Industry Certification: TN Board of Cosmetology & Barbering— TN Cosmetologist 1010
Barbering	Barbering I (5972)	Barbering II (5973)	Barbering III (5974)	Entrepreneurship ¹ (5934)
			Industry Certification: TN Board of Cosmetology & Barbering— TN Master Barber 1010	

¹ Satisfies ½ credit of Economics required for graduation. ² 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 2017-18 [program of study justification process](#). Program of study justifications for Information Technology can also be found on the [career cluster website](#).

Programming & Software name change: This is reflective of the names used in industry and skills acquired. This will assist in avoiding confusion from districts to create a special course for coding since they did not see the content previously.

Information Technology Foundations name change: This is reflective of the names used in industry.

New course: Creation of the Mobile Apps course is already in demand. Statewide labor data shows high growth in the occupational outlook over the next ten years. This course was created with the assistance of postsecondary educators, industry partners, and the framework from the Utah CTE Mobile Development Fundamentals course.

New program of study: Cybersecurity is an emerging field in Information Technology. Statewide labor data shows high growth in the occupational outlook over the next ten years. These courses were written with the assistance of secondary and postsecondary educators, industry partners, and the Georgia CTE Framework for cybersecurity courses.

Questions about courses and programs of study within this career cluster can be directed to Deborah.Knoll@tn.gov.

Program of Study	Level 1	Level 2	Level 3	Level 4
Programming & Software Development Coding	Information Technology Foundations (6095) Computer Science Foundations (6095)	Programming and Logic ↓ (6098) Coding I (6098)	Programming and Logic ⇄ (6099) Coding II (6099) -or- **New Course Mobile App Development (6178) -or- Dual Enrollment Coding (4113)	Programming & Software Development Practicum (5908) Coding Practicum (5908) -and/or- AP Computer Science A (3635) -and/or- AP Computer Science Principles (3634) -or- Dual Enrollment Coding (4113)
	Industry Certification: CompTIA IT Fundamentals			Industry Certification: Microsoft Technology Associate Developer Certificate

Program of Study	Level 1	Level 2	Level 3	Level 4
Networking Systems	Information Technology Foundations (6095) Computer Science Foundations (6095)	Computer Systems (6094)	Networking (6097) -or- Dual Enrollment Networking Systems (4114)	Cabling and Internetworking (6093) -and/or- IT Clinical Internship (6096) -or- Dual Enrollment Networking Systems (4114)
	Industry Certification: CompTIA IT Fundamentals	Industry Certification: Comp TIA A+ Cisco Certified Entry Network Tech (CCENT)	Industry Certification: CompTIA Network + Cisco Certified Network Associate (CCNA)	
Web Design	Information Technology Foundations (6095) Computer Science Foundations (6095)	Web Design Foundations (6100)	Web Site Development (6101) -or- Dual Enrollment Web Design (4115)	Web Design Practicum (6171) -and/or- AP Computer Science (3635) -and/or- AP Computer Science Principles (3634) -or- Dual Enrollment Web Design (4115)
	Industry Certification: CompTIA IT Fundamentals		Industry Certification: CIW Web Design Specialist	

Program of Study	Level 1	Level 2	Level 3	Level 4
**New Program of Study Cybersecurity	Computer Science Foundations (6095)	**New Course Cybersecurity I (6175)	**New Course Cybersecurity II (6176) -or- Dual Enrollment Cybersecurity (TBD)	**New Course Cybersecurity Practicum (6177) -and/or- AP Computer Science (3635) -or- Dual Enrollment Cybersecurity (61916191)
	Industry Certification: CompTIA IT Fundamentals		Industry Certification: CompTIA Security +	

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 2017-18 [program of study justification process](#). Program of study justifications for Law, Public Safety, Corrections, & Security can also be found on the [career cluster website](#).

Legal and Correction Services program of study: Removing U.S. Government and Civics allows for the addition of a more rigorous capstone class: A.P. U.S. Government and Politics. This addresses the problem of ½ credit Government courses making it difficult to concentrate. The addition of the portfolio component to each of the courses allows students to demonstrate mastery of content throughout the program of study.

Questions about courses and programs of study within this career cluster can be directed to Sloan.Hudson@tn.gov.

Program of Study	Level 1	Level 2	Level 3	Level 4
Law Enforcement Services	Principles of Law, Corrections, and Security (6155) ** adding a portfolio component to standards	Criminal Justice I (5987) ** adding a portfolio component to standards -or- Statewide Dual Credit: Criminal Justice	Criminal Justice II (5988) ** adding a portfolio component to standards -or- Dual Enrollment Law Enforcement Services (4117)	Criminal Justice III: Investigation (5989) ** adding a portfolio component to standards -or- Dual Enrollment Law Enforcement Services (4117)
Fire Management Services	Principles of Fire and Emergency Services (6154) ** adding a portfolio component to standards	Fire Prevention (6173) ** adding a portfolio component to standards	Fire Science I (6152) ** adding a portfolio component to standards -or- Dual Enrollment Fire Management Services (4118)	Fire Science II (6153) ** adding a portfolio component to standards -or- Dual Enrollment Fire Management Services (4118)

Program of Study	Level 1	Level 2	Level 3	Level 4
Legal and Correction Services	Principles of Law, Corrections, and Security (6155) ** adding a portfolio component to standards	Criminal Justice I (5987) ** adding a portfolio component to standards	U.S. Government and Civics¹ (3417) Court Systems and Practices (6150) ** adding a portfolio component to standards -or- Dual Enrollment Legal & Correction Services (4119)	Court Systems and Practices (6150) AP U.S. Gov't and Politics (3445) -or- Dual Enrollment Legal & Correction Services (4119)

¹ Satisfies ½ credit of U.S. Government required for graduation. ² Local dual credit and/or dual enrollment opportunities exist for this course.

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 2017-18 [program of study justification process](#). Program of study justifications for Marketing can also be found on the [career cluster website](#).

Marketing I and II: Social media is a driving force in marketing in 2016. Currently, it is not explicitly studied in marketing standards. These standards were written with assistance from entrepreneurs currently using social media as a selling technique.

Questions about courses and programs of study within this career cluster can be directed to Candi.Norwood@tn.gov.

Program of Study	Level 1	Level 2	Level 3	Level 4
Marketing Management	Introduction to Business & Marketing (5905)	Marketing and Management I: Principles ¹ (5931) ** adding two standards involving sales techniques and social media	Marketing and Management II: Advanced Strategies (5932) **adding social media standard -or- Dual Enrollment Marketing Management (4121)	Advertising and Public Relations (5936) -or- Retail Operations ¹ (5938) -or- Event Planning & Management (6168) -or- Dual Enrollment Marketing Management (4121)
Entrepreneurship	Introduction to Business & Marketing (5905)	Marketing and Management I: Principles ¹ (5931) ** adding two standards involving sales techniques and social media	Entrepreneurship ¹ (5934) -or- Dual Enrollment Entrepreneurship (4122)	Business & Entrepreneurship Practicum (6159) -or- Virtual Enterprise International ¹ (5900) -or- Dual Enrollment Entrepreneurship (4122)

¹ 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

There are **no changes** to programs of study within this career cluster based on the 2017-18 [program of study justification process](#). Program of study justifications for STEM can also be found on the [career cluster website](#).

Questions about courses and programs of study within this career cluster can be directed to Deborah.Knoll@tn.gov.

Program of Study	Level 1	Level 2	Level 3	Level 4
Engineering	Principles of Engineering and Technology (5924)	Engineering Design I (6139)	Engineering Design II (6140) -or- Dual Enrollment Engineering (4124)	Engineering Practicum (6141) -and/or- AP Physics (3238, 3239, 3234, or 3240) -or- Dual Enrollment Engineering (4124)
		Industry Certification: Certified Solidworks Associate (CSWA)- Academic		
Technology	Principles of Engineering and Technology (5924)	Digital Electronics (5925)	Robotics & Automated Systems (6143) -or- Dual Enrollment Technology (4125)	Engineering Practicum (6141) -and/or- AP Physics (3238, 3239, 3234, or 3240) -or- Dual Enrollment Technology (4125)
			Industry Certification: Certified Solidworks Associate (CSWA)- Academic	
STEM Education	STEM I: Foundation (6144)	STEM II: Applications (6145)	STEM III: STEM in Context (6146) -or- Dual Enrollment STEM Education (4126)	STEM IV: STEM Practicum (6147) -or- Dual Enrollment STEM Education (4126)
			Industry Certification: Certified Solidworks Associate (CSWA)- Academic	

Program of Study	Level 1	Level 2	Level 3	Level 4
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

There are **no changes** to programs of study within this career cluster based on the 2017-18 [program of study justification process](#). Program of study justifications for Transportation, Distribution, & Logistics can also be found on the [career cluster website](#). Questions about courses and programs of study within this career cluster can be directed to Gregory.Francescon@tn.gov.

Program of Study	Level 1	Level 2	Level 3	Level 4
Automotive Maintenance and Light Repair	Maintenance and Light Repair I (5879)	Maintenance and Light Repair II (5880)	Maintenance and Light Repair III (5881) -or- Dual Enrollment Automotive Maintenance & Light Repair (4128)	Maintenance and Light Repair IV (5882) -or- Dual Enrollment Automotive Maintenance & Light Repair (4128)
				Industry Certification: Automotive Service Excellence Student Certification: Maintenance & Light Repair
Automotive Collision Repair	Introduction to Collision Repair (6172)	Collision Repair: Non-Structural ¹ (6062) -or- Collision Repair: Painting & Refinishing ¹ (6063)	Collision Repair: Non-Structural ¹ (6062) -or- Collision Repair: Painting & Refinishing ¹ (6063) -or- Dual Enrollment Automotive & Collision Repair (4129)	Collision Repair: Non-Structural ¹ (6062) -or- Collision Repair: Painting & Refinishing ¹ (6063) -or- Collision Repair: Damage Analysis, Estimating, & Customer Service (6149) -or- Dual Enrollment Automotive & Collision Repair (4129)
				Industry Certification for 6062: I-CAR Refinish Technician ProLevel 1 or I-CAR Non-Structural Technician ProLevel 1 or Automotive Service Excellence Student Certification: Nonstructural Analysis/Repair Industry Certification for 6063: Automotive Service Excellence Student Certification: Painting and Refinishing

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

¹ 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 th Grade	7 th Grade	8 th Grade
<ul style="list-style-type: none"> Agriculture, Food, & Natural Resources 		Introduction to Agricultural Sciences (0885)	Introduction to Agricultural Sciences (0885) Career Exploration* (6166)
<ul style="list-style-type: none"> Arts, A/V Technology, & Communications Business Management & Administration Finance Information Technology Marketing 	Keyboarding ¹ (0610)	Keyboarding (0710)	Keyboarding (0810) Computer Applications (5891 or 3638) Career Exploration* (6166)
<ul style="list-style-type: none"> Education & Training Human Services 	Introduction to Social Health ² (0562)	Introduction to Social Health (0562)	Introduction to Social Health (0562) Career Exploration* (6166)
<ul style="list-style-type: none"> Advanced Manufacturing Architecture & Construction STEM Transportation, Distribution, & Logistics 	Exploring Technology (EBD) (6047)	Inventions and Innovations (EBD) (0782)	Technological Systems (EBD) (0882) Career Exploration* (6166)
<ul style="list-style-type: none"> Advanced Manufacturing Architecture & Construction Information Technology STEM Transportation, Distribution, & Logistics 	STEM Explorers (0649)	STEM Innovators (0749)	STEM Designers (0849) Career Exploration* (6166)
<ul style="list-style-type: none"> Health Science 		Introduction to Health Science (0837)	Introduction to Health Science (0837) Medical Detectives (PLTW) (0890) Career Exploration* (6166)
<ul style="list-style-type: none"> Advanced Manufacturing Architecture & Construction Arts, A/V Technology, & Communications Information Technology STEM Transportation, Distribution, & Logistics 	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)

¹ *Keyboarding* may also be used with 4th and 5th grade students (0410, 0510). ² *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.