Career and Technical Education Programs of Study

A comprehensive review of standards, credits, and credentials for each program of study.

MARYLAND STATE DEPARTMENT OF EDUCATION
EQUITY AND EXCELLENCE

Division of Career and College Readiness

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Maryland State Department of Education

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Table of Contents

Introduction 3
Arts, Media, and Communication 5
Business Management and Finance 7
Construction and Development 11
Consumer Services, Hospitality, and Tourism 14
Environmental, Agricultural, and Natural Resources 18
Health and Biosciences 22
Human Resource Services 28
Information Technology 38
Manufacturing, Engineering, and Technology 41
Transportation Technologies 45
Work-based Learning 49
Appendix A: Career Cluster Points of Contact 51
Appendix B: Division of Career and College Readiness Team 53

Introduction

The Maryland State Department of Education's (MSDE) Division of Career and College Readiness in collaboration with stakeholders revised the vision and direction for CTE in Maryland. The vision for CTE is for each student to have access and opportunity to engage in career programs of study that:

- ✓ align to high-skill, high-wage, and/or in-demand careers;
- ✓ lead to earning industry-recognized and/or postsecondary credentials that will allow entrance and/or advancement in a specific career cluster; and
- ✓ provide career-based learning experiences that require the application of academic and technical knowledge and skills in a work setting.

The Division of Career and College Readiness is in the process of engaging in a comprehensive review of each state CTE program of study. CTE programs of study that do not align to the vision of CTE will be revised or phased-out.

This document provides an overview of all state CTE programs of study within each of Maryland's career clusters. CTE programs developed by individual school systems are not included in this document. CTE programs of study contain content aligned to academic standards, industry standards, and employability skills. CTE programs of study provide the opportunity for students to engage in workplace learning experiences and earn postsecondary and/or industry-recognized credentials.

Each career cluster in this document contains a table that outlines:

1. ***Name of CTE Program of Study***
2. ***Required Courses***. This document only identifies required courses in each program of study. CTE programs of study contain additional courses that students have the option to take. Required courses have been identified by industry representatives as the minimum required content necessary for entry into a career field. In order for students to graduate as a CTE completer, they must complete all required courses.
3. ***Minimum Number of Credits*.** CTE programs of study range from three to nine or more credits to complete. On average, most programs of study are four credit programs.
4. ***Standards Used in Courses****.* This section identifies the industry standard(s) used in each program of study.
5. ***Industry Certifications that Students May Earn***. This section identifies industry credentials that student may earn upon completion of required courses and passing technical skill assessments associated with industry credentials. Each program of

study provides the opportunity for students to earn a State Skill Certificate issued by the Maryland Department of Labor if they complete a Youth Apprenticeship Program for their work-based learning experience.

6. ***Postsecondary Credentials that Students May Earn Based on Statewide Articulation Agreements***. This section identifies the number of postsecondary credits that student can earn as part of statewide agreements with postsecondary institutions. Students must complete all requirements identified in that agreement in order to earn postsecondary credits. Local school systems may have additional agreements with postsecondary institutions that are not identified in this document.
7. **Career and Technical Student Organizations that Aligns to Program of Study**. Each program of study provides the opportunity for students to participate in Career and Technical Student Organizations (CTSOs). CTSOs are co-curricular learning experiences that extend course instructional content by engaging students in hands-on learning experience connected to CTE programs of study.

Some columns have not applicable (N/A) written in them for specific programs of study. All programs of study do not have a statewide articulation agreement for students to earn postsecondary credits. Programs without a statewide articulation agreement have N/A written in the column.

All CTE programs of study must provide the opportunity for students to engage in work-based learning experiences. Work-based learning experiences must be coordinated with industry representatives from the identified career cluster. Work-based learning experiences include but are not limited to:

- ✓ Apprenticeships
- ✓ Internships
- ✓ School-based Enterprises
- ✓ Simulated Work Experiences
- ✓ Capstone Projects

This document does not identify the specific type of work-based learning experience offered to students enrolled in each program of study as it can vary by school system.

The ultimate goal of this document is to increase transparency and provide a foundation that informs the continuous improvement process for CTE. This document allows for identification of areas of promise and opportunities for growth as the Division of Career and College Readiness collaborates with stakeholders to implement requirements identified in the Maryland CTE Four-Year State Plan and recommendations identified in the Blueprint for Maryland's Future.

Arts, Media, and Communication

Maryland offers great opportunities for careers in the Arts, Media and Communication Career Cluster. Students interested in this cluster combine creative abilities with technical skills and knowledge that prepare them for careers in: Digital Media Production, Graphic Communications, Web Design, Interactive Media and Game Design. Maryland CTE programs include a focus on communication, graphic communication and multimedia production. Working with employers helps ensure that these programs keep pace with the industry. Students can earn industry certifications and college credit toward advanced study in their career field of interest.

CTE Program of Study	Required Courses	Minimum Number of Credits	Standards Used in Courses	Industry Certifications that Students May Earn	Postsecondary Credentials that Students May Earn Based on Statewide Articulation Agreements	Career and Technical Student Organization (CTSO) that Aligns to Program of Study
Graphic Communications (PrintED)	• Introduction to Graphic Communications and • Advanced Graphic Communications (AGC). The AGC course has five accreditation areas to choose from which are as follows: ○ Digital File Preparation and Output ○ Offset Press Operations/ Binding and Finishing ○ Digital Production Printing ○ Graphic Design	3	Printing & Graphics Association, MidAtlantic (PGAMA).	PrintED National Industry Recognized Certifications & Equivalent of six months on-the-job experience	N/A	SkillsUSA

CTE Program of Study	Required Courses	Minimum Number of Credits	Standards Used in Courses	Industry Certifications that Students May Earn	Postsecondary Credentials that Students May Earn Based on Statewide Articulation Agreements	Career and Technical Student Organization (CTSO) that Aligns to Program of Study
	○ Screen Printing.					
Interactive Media Production	• Principles of Art, Media & Communications • Interactive Media Design I • Interactive Media Design II • Interactive Media Portfolio Capstone	4	National Arts, A/V Technology and Communications Career Cluster	Adobe Creative Suite • Dreamweaver • Illustrate • InDesign • Photoshop • Premiere Pro	N/A	SkillsUSA

Business Management and Finance

Maryland CTE programs include a focus on financial services, accounting and finance, marketing, business management and business administrative support. These programs include options for students to earn industry certifications and college credit in a business-related career field. Students have the opportunity to take the College-Level Examination Program (CLEP) test in the areas of Financial Accounting, Principles of Management and principles of Marketing. The Advanced Placement (AP) Economics course is encouraged as a part of each program.

CTE Program of Study	Required Courses	Minimum Number of Credits	Standards Used in Courses	Industry Certifications that Students May Earn	Postsecondary Credentials that Students May Earn Based on Statewide Articulation Agreements	Career and Technical Student Organization (CTSO) that Aligns to Program of Study
Business Management	• Principles of Business (Management) and Entrepreneurship • Principles of Accounting and Finance • Advanced Business Management	3	MBA Research and Curriculum Center College Board	• Entrepreneurship/ Management A*S*K Certification • Fundamental Business Concepts A*S*K Certification • State Skill Certificate	University of Maryland Eastern Shore - 6 credits	Future Business Leaders of America
Accounting and Finance	• Principles of Business (Management) and Entrepreneurship • Principles of Accounting and Finance	3	MBA Research and Curriculum Center College Board	• Finance A*S*K Certification • Fundamental Business Concepts A*S*K Certification • State Skill Certificate	University of Maryland Eastern Shore - 9 credits	Future Business Leaders of America

CTE Program of Study	Required Courses	Minimum Number of Credits	Standards Used in Courses	Industry Certifications that Students May Earn	Postsecondary Credentials that Students May Earn Based on Statewide Articulation Agreements	Career and Technical Student Organization (CTSO) that Aligns to Program of Study
	• Advanced Accounting					
Academy of Finance (NAF)	• Principles of Finance • Principles of Accounting – OR – CTE- Managerial Accounting • Applied Finance • Business Economics – OR – CTE- Entrepreneurship	4	NAF	• NAF-Track Certification	University of Maryland Eastern Shore - 6 credits	Future Business Leaders of America
Marketing	• Principles of Business (Management) and Entrepreneurship • Principles of Accounting and Finance • Introduction to Marketing	3	MBA Research and Curriculum Center College Board	• Fundamental Marketing Concepts A*S*K Certification • Fundamental Business Concepts A*S*K Certification	University of Maryland Eastern Shore - 6 credits	Future Business Leaders of America

Maryland Career and Technical Education (CTE) Programs of Study

CTE Program of Study	Required Courses	Minimum Number of Credits	Standards Used in Courses	Industry Certifications that Students May Earn	Postsecondary Credentials that Students May Earn Based on Statewide Articulation Agreements	Career and Technical Student Organization (CTSO) that Aligns to Program of Study
Business Administrative Services	• CTE- Principles of Business (Management) and Entrepreneurship • CTE- Principles of Accounting and Finance • CTE- Office Systems Management I/ MOS Certification • CTE - Office Systems Management II/ MOS Certification	4	MBA Research and Curriculum Center Microsoft	• Fundamental Business Concepts A*S*K Certification • Microsoft Office Specialist Certification	University of Maryland Eastern Shore - 9 credits	Future Business Leaders of America
Management Information Systems	• Principles of Business (Management) and Entrepreneurship	3	MBA Research and Curriculum Center NAF	• Microsoft Office Specialist Certification	N/A	Future Business Leaders of America

CTE Program of Study	Required Courses	Minimum Number of Credits	Standards Used in Courses	Industry Certifications that Students May Earn	Postsecondary Credentials that Students May Earn Based on Statewide Articulation Agreements	Career and Technical Student Organization (CTSO) that Aligns to Program of Study
	• Principles of Accounting and Finance • Introduction to programming and applications		College Board Microsoft			
Textile and Fashion Design, Merchandising and Management	• CTE - Textiles & Fashions Careers I • CTE - Textiles & Fashions Careers II • CTE - Textiles & Fashions Careers Capstone	3	Standards in Review by MSDE	State Skill Certificate	N/A	Future Business Leaders of America

Construction and Development

Advances in science and technology will continue to drive innovation in the design, construction and maintenance of buildings. These advances will also impact infrastructure systems, including new design concepts, construction materials and methods and the application of information technology. Maryland high school construction-related programs allow students to advance their knowledge in design, construction management or construction trades professions.

CTE Program of Study	Required Courses	Minimum Number of Credits	Standards Used in Courses	Industry Certifications that Students May Earn	Postsecondary Credentials that Students May Earn Based on Statewide Articulation Agreements	Career and Technical Student Organization (CTSO) that Aligns to Program of Study
Construction Design and Management	• Introduction To Construction Design and Management • Principles of Construction Design • Advanced Design and 3D Modeling • Advanced Construction Management	4	Standards in Review by MSDE	• Autodesk AutoCAD Certified User • Autodesk Revit Certified User	• Morgan State University - 3 credits • University of Maryland Eastern Shore - 3 credits	SkillsUSA
Construction Trades Professions: Masonry	• Construction Core • Masonry Course 1 • Masonry Course 2 • Masonry Capstone	4	National Center for Construction Education and Research (NCCER)	• NCCER Construction Core • NCCER Masonry Level 1	N/A	SkillsUSA

CTE Program of Study	Required Courses	Minimum Number of Credits	Standards Used in Courses	Industry Certifications that Students May Earn	Postsecondary Credentials that Students May Earn Based on Statewide Articulation Agreements	Career and Technical Student Organization (CTSO) that Aligns to Program of Study
Construction Trades Professions: Carpentry	• Construction Core • Carpentry Course 1 • Carpentry Course 2 • Carpentry Capstone	4	National Center for Construction Education and Research (NCCER)	• NCCER Construction Core • NCCER Carpentry Level 1	N/A	SkillsUSA
Construction Trades Professions: Electrical	• Construction Core • Electrical Course 1 • Electrical Course 2 • Electrical Capstone	4	National Center for Construction Education and Research (NCCER)	• NCCER Construction Core • NCCER Electrical Level 1	N/A	SkillsUSA
Construction Trades Professions: Plumbing	• Construction Core • Plumbing Course 1 • Plumbing Course 2 • Plumbing Capstone	4	National Center for Construction Education and Research (NCCER)	• NCCER Construction Core • NCCER Plumbing Level 1	N/A	SkillsUSA
Construction Maintenance Professions: Industrial Maintenance	• Construction Core • Industrial Maintenance Course 1 • Industrial Maintenance Course 2	4	National Center for Construction Education and Research (NCCER)	• NCCER Construction Core • NCCER Industrial Maintenance Level 1	N/A	SkillsUSA

CTE Program of Study	Required Courses	Minimum Number of Credits	Standards Used in Courses	Industry Certifications that Students May Earn	Postsecondary Credentials that Students May Earn Based on Statewide Articulation Agreements	Career and Technical Student Organization (CTSO) that Aligns to Program of Study
Construction Maintenance Professions: Heating, Ventilation, and Air Conditioning (HVAC)	• Construction Core • HVAC Course 1 • HVAC Course 2 • HVAC Capstone	4	National Center for Construction Education and Research (NCCER)	• NCCER Construction Core • NCCER HVAC Level 1	N/A	SkillsUSA
Construction Maintenance Professions: Welding	• Construction Core • Welding Course 1 • Welding Course 2 • Welding Capstone	4	National Center for Construction Education and Research (NCCER)	• NCCER Construction Core • NCCER Welding Level 1	NA	SkillsUSA

Consumer Services, Hospitality, and Tourism

Programs in consumer services, hospitality and tourism prepare students for a variety of career options and further education. Each program includes options for students to earn industry certifications and/or college credit in a career field of interest. Students who pursue programs in culinary arts, restaurant management, lodging management or cosmetology engage in real-world experiences through internships and mentoring opportunities. These options allow students to apply their classroom instruction in meaningful ways and they give them (through licensure or certification) a jump start into the profession.

CTE Program of Study	Required Courses	Minimum Number of Credits	Standards Used in Courses	Industry Certifications that Students May Earn	Postsecondary Credentials that Students May Earn Based on Statewide Articulation Agreements	Career and Technical Student Organization (CTSO) that Aligns to Program of Study
Careers in Cosmetology	• Principles and Practice of Cosmetology • Advanced Cosmetology: Theory and Application • Mastery of Cosmetology	9	Code of Maryland Regulation 13A.04.19.02	• Cosmetology License • State Skill Certificate	N/A	SkillsUSA
Barbering	• Principles and Practice of Barbering • Advanced Barbering and Application • Mastery of Barbering	6	Code of Maryland Regulation 13a.04.20.02	• Barber License • State Skill Certificate	N/A	N/A

CTE Program of Study	Required Courses	Minimum Number of Credits	Standards Used in Courses	Industry Certifications that Students May Earn	Postsecondary Credentials that Students May Earn Based on Statewide Articulation Agreements	Career and Technical Student Organization (CTSO) that Aligns to Program of Study
Nail Specialist and Manicurist	• Principles and Practice of Nail Services • Advanced Nail Services and Applications • Mastery of Nail Services	6	Code of Maryland Regulation 13a.04.19.03	• Nail Technician Certification • State Skill Certificate	N/A	N/A
Culinary Arts (American Culinary Federation)	• Basic Cooking Principles • Introduction to Professional Cooking • Professional Cooking	4	American Culinary Federation	• Certified Fundamentals Cook (CFC)	N/A	SkillsUSA
Baking and Pastry Arts (American Culinary Federation)	• Basic Cooking Principles • Introduction to Professional Cooking • Professional Baking and Pastry	4	American Culinary Federation	• Certified Fundamentals Pastry Cook (CFPC)	N/A	SkillsUSA

CTE Program of Study	Required Courses	Minimum Number of Credits	Standards Used in Courses	Industry Certifications that Students May Earn	Postsecondary Credentials that Students May Earn Based on Statewide Articulation Agreements	Career and Technical Student Organization (CTSO) that Aligns to Program of Study
Food and Beverage Management (ProStart)	• Becoming a Food Service Professional (Level 1) • Becoming a Food Service Professional (Level 2) • Practical Experience as a Food Service Professional	4	ProStart National Restaurant Association Educational Foundation	• National ProStart Certificate of Achievement	N/A	• SkillsUSA • Future Business Leaders of America
Hospitality and Tourism Management	• Principles of Hospitality and Tourism • Hospitality and Tourism Management • Hospitality and Tourism Work-Based Learning Experience	3	American Hotel & Lodging Educational Institute	• Certified Hospitality Tourism Management Professional (CHTMP)	N/A	• SkillsUSA • Future Business Leaders of America

CTE Program of Study	Required Courses	Minimum Number of Credits	Standards Used in Courses	Industry Certifications that Students May Earn	Postsecondary Credentials that Students May Earn Based on Statewide Articulation Agreements	Career and Technical Student Organization (CTSO) that Aligns to Program of Study
Restaurant, Culinary, and Catering Management	• Introduction to food services • Introduction to Consumer Services, Hospitality and Tourism Management • Foundation topics in Restaurant, Culinary, and Catering Specialization • Advanced topics in Restaurant, Culinary, and Catering Specialization	4	ProStart National Restaurant Association Educational Foundation	• National ProStart Certificate of Achievement • State Skill Certificate	N/A	N/A

Environmental, Agricultural, and Natural Resources

The agricultural sector is a highly competitive industry creating new challenges in identifying global and domestic markets; improving business planning, financing, risk management, and productivity; and reducing costs. Advances in science and technology, in particular biotechnology, will continue to drive innovation and growth in this Career Cluster. Growing public concerns over natural resources, environmental quality and public health will continue to expand the role and scope of the natural resource management and environmental services sectors.

CTE Program of Study	Required Courses	Minimum Number of Credits	Standards Used in Courses	Industry Certifications that Students May Earn	Postsecondary Credentials that Students May Earn Based on Statewide Articulation Agreements	Career and Technical Student Organization (CTSO) that Aligns to Program of Study
Curriculum for Agricultural Sciences Education	1. Agriculture, Food, and Natural Resources 2. Principles Options: a. Principles of Agricultural Science - Animal Systems b. Principles of Agricultural Science - Plant Systems c. Principles of Agricultural Science - Natural Resources and Ecology d. Principles of Agricultural Science - Agricultural Power and Technology	4	National Quality Program Standards National AFNR Career Cluster Content Standards	State Skill Certification *Currently researching program-specific certifications such as iCEV, Nutrient Management & Fertilizer Application, Pesticide Application.*	Institute of Applied Agriculture at the University of Maryland - 3 credits *Currently working on additional agreements.*	FFA

CTE Program of Study	Required Courses	Minimum Number of Credits	Standards Used in Courses	Industry Certifications that Students May Earn	Postsecondary Credentials that Students May Earn Based on Statewide Articulation Agreements	Career and Technical Student Organization (CTSO) that Aligns to Program of Study
	3. Specializations Options (concentrator courses): a. Animal and Plant Biotechnology b. Food Science and Safety c. Environmental Science Issues d. Mechanical Systems in Agriculture 4. Agriculture, Research, and Development (Capstone)					
Horticultural Services	• Foundations of Horticulture • Plant Production • Landscape Design and Management • Horticultural Services Capstone Experience	4	Maryland Nursery Landscape Association (MNLA) Skill Standards	• Certified Professional Horticulturist (CPH) • State Skill Certification	*Currently working on statewide articulation agreements.*	FFA
Environmental Studies/ Natural Resources	• Human Ecology and Environmental Problem Solving	4	Next Generation Science Standards, Common Core	State Skill Certification	N/A	FFA

CTE Program of Study	Required Courses	Minimum Number of Credits	Standards Used in Courses	Industry Certifications that Students May Earn	Postsecondary Credentials that Students May Earn Based on Statewide Articulation Agreements	Career and Technical Student Organization (CTSO) that Aligns to Program of Study
	• Natural Resource Management • Environmental Technologies and Techniques • Environmental and Natural Resource Research and Ethics		Mathematics Standards, and the Maryland Environmental Literacy Standards			
Agricultural Sciences and Operations	• Introduction to agriculture • Foundation topics in agricultural services and operations specializations • Advanced topics in agricultural services and operations specializations	3	Standards in Review by MSDE	• Certified Professional Horticulturalist (CPH) certification • State Skill Certification • Geographic Information System (GIS) certification • ESRI ArcGIS Desktop certification	Varies by local school system	FFA

CTE Program of Study	Required Courses	Minimum Number of Credits	Standards Used in Courses	Industry Certifications that Students May Earn	Postsecondary Credentials that Students May Earn Based on Statewide Articulation Agreements	Career and Technical Student Organization (CTSO) that Aligns to Program of Study
Natural Resources and Conservation	• Introduction to Agriculture • Foundation Topics in Natural Resources and Conservation • Advanced Topics in Natural Resources and Conservation	3	Standards in Review by MSDE	State Skill Certification	Varies by local school system	FFA

Health and Biosciences

CTE programs in the Health and Biosciences Cluster focus on preparing dedicated professionals with the knowledge and skills necessary to pursue challenging and rewarding careers and further education. Health and bioscience careers are among the fastest growing and highest in demand in the country as the population ages and health care needs continue to increase. CTE programs in this career cluster prepare students for positions in direct patient care settings and research and laboratory facilities, as well as for opportunities in business and management related to health care.

CTE Program of Study	Required Courses	Minimum Number of Credits	Standards Used in Courses	Industry Certifications that Students May Earn	Postsecondary Credentials that Students May Earn Based on Statewide Articulation Agreements	Career and Technical Student Organization (CTSO) that Aligns to Program of Study
Academy of Health Professions - Certified Nursing Assistant (CNA)	• Foundations of Medicine and Health Science • Structure and Functions of the human body • Medical Specialty – Certified Nursing Assistant • Clinical Internship	4	Maryland Board of Nursing - CNA	Certified Nursing Assistant	Stevenson University – 4 credits	SkillsUSA

CTE Program of Study	Required Courses	Minimum Number of Credits	Standards Used in Courses	Industry Certifications that Students May Earn	Postsecondary Credentials that Students May Earn Based on Statewide Articulation Agreements	Career and Technical Student Organization (CTSO) that Aligns to Program of Study
Academy of Health Professions - Pharmacy Technician	• Foundations of Medicine and Heath • Structure and Functions of the human body • Medical Specialty – Pharmacy • Internship • College Course for Dual Enrollment	4	National Healthcareer Association	• Certified Pharmacy Technician (CPhT) • State Skill Certification	Stevenson University – 4 credits	SkillsUSA
Academy of Health Professions - Dental Assisting	• Foundations of Medicine and Heath • Structure and Functions of the human body • Medical Specialty – Dental • Internship • College Course for Dual Enrollment	4	Dental Assistant National Board	• Certified Dental Assistant (CDA) • State Skill Certification	N/A	SkillsUSA

CTE Program of Study	Required Courses	Minimum Number of Credits	Standards Used in Courses	Industry Certifications that Students May Earn	Postsecondary Credentials that Students May Earn Based on Statewide Articulation Agreements	Career and Technical Student Organization (CTSO) that Aligns to Program of Study
Academy of Health Professions - Clinical Medical Assistant	• Foundations of Medicine and Heath • Structure and Functions of the human body • Medical Specialty – Certified Clinical Medical Assistant • Internship • College Course for Dual Enrollment	4	National Healthcareer Association	• Certified Clinical Medical Assistant (CCMA) • State Skill Certification	Stevenson University – 4 credits	SkillsUSA
Academy of Health Professions - Physical Rehabilitation	• Foundations of Medicine and Heath • Structure and Functions of the human body • Medical Specialty – Physical Rehabilitation • Internship • College Course for Dual Enrollment	4	National Strength Professionals Association	• Personal Trainer Certification • Conditional Specialist Certification • State Skill Certification	Stevenson University – 4 credits	SkillsUSA

CTE Program of Study	Required Courses	Minimum Number of Credits	Standards Used in Courses	Industry Certifications that Students May Earn	Postsecondary Credentials that Students May Earn Based on Statewide Articulation Agreements	Career and Technical Student Organization (CTSO) that Aligns to Program of Study
Academy of Health Professions - Allied Health Other Specialty	• Foundations of Medicine and Heath • Structure and Functions of the human body • Medical Specialty – Other • Internship • College Course for Dual Enrollment	4	Standards in Review by MSDE	State Skill Certification	Stevenson University – 4 credits	SkillsUSA
Academy of Health Professions - Allied Health Intern	• Foundations of Medicine and Heath • Structure and Functions of the human body • Allied Health Internship	4	Standards in Review by MSDE	State Skill Certification	Stevenson University – 4 credits	SkillsUSA
Academy of Health Professions - Dual Enrollment	• Foundations of Medicine and Heath • Structure and Functions of the human body	4	Standards in Review by MSDE	N/A	Stevenson University – 4 credits	SkillsUSA

CTE Program of Study	Required Courses	Minimum Number of Credits	Standards Used in Courses	Industry Certifications that Students May Earn	Postsecondary Credentials that Students May Earn Based on Statewide Articulation Agreements	Career and Technical Student Organization (CTSO) that Aligns to Program of Study
	• Allied Health College Course for Dual Enrollment					
Biomedical Science (PLTW)	• PLTW Principles of Biomedical Science • PLTW Principles Human Body Systems • PLTW Medical Interventions • PLTW Biomedical Innovation	4	National Standards for Science, Mathematics, and English Language Arts, and the Accountability Criteria for National Health Care Cluster Foundation Standards	• Biotechnican Assistant • State Skill Certification	Stevenson University – Students scoring 7 or higher on each examination may earn transcripted credits	N/A
Health Professions/ Allied Health Professions and Related Sciences	• Introduction to Health • Foundation Topics in Health / Allied Health Specializations • Advanced Topics in Health / Allied Health Specializations	4	Standards in Review by MSDE	• Certified Pharmacy Technician (CPhT) • Certified Dental Assistant (CDA) • Certified Clinical Medical Assistant (CCMA) • State Skill Certification	N/A	N/A

CTE Program of Study	Required Courses	Minimum Number of Credits	Standards Used in Courses	Industry Certifications that Students May Earn	Postsecondary Credentials that Students May Earn Based on Statewide Articulation Agreements	Career and Technical Student Organization (CTSO) that Aligns to Program of Study
Biotechnology	• Molecular Biotechnology 1 • Molecular Biotechnology 2 • Special topics in Biotechnology	4	Standards in Review by MSDE	• Biotechnican Assistant • State Skill Certification	N/A	N/A

Human Resource Services

Advances in scientific knowledge and increased public awareness of social problems and issues are contributing to a demand for high-quality social services. Public concerns over crime and the increased demand for legal intervention in businesses and communities will continue to drive the growth of law enforcement, emergency services and legal services. The continuous need for professionals in education fields, especially in the critical shortage areas, offers creative ways to engage young people early on in the teaching profession

CTE Program of Study	Required Courses	Minimum Number of Credits	Standards Used in Courses	Industry Certifications that Students May Earn	Postsecondary Credentials that Students May Earn Based on Statewide Articulation Agreements	Career and Technical Student Organization (CTSO) that Aligns to Program of Study
Fire, and Emergency Medical Training/ High School Cadet (MFRI)	• Fire Emergency Training/High School Cadet Level I • Fire Emergency Training/High School Cadet Level II • Fire Emergency Training/High School Cadet Level III	4	Maryland Fire and Rescue Institute, National Fire Protection Association Professional Qualifications Standards and U.S. Department of Transportation	• Emergency Medical Technician (EMT-B) • Emergency Medical Responder Certification • Fire Fighter I Certification • Fire Fighter II Certification • Truck Company Fireground Operations Certification • Hazardous Materials Operations Certification	Anne Arundel Community College – Up to 10 articulated credits Cecil College – Up to 32 credits f College of Southern Maryland – Up to 20 credits Frederick Community College – Up to 15 credits Prince George's Community College – Up to 18 credits University of Maryland Global Campus – Varies dependent on major	Skills USA

CTE Program of Study	Required Courses	Minimum Number of Credits	Standards Used in Courses	Industry Certifications that Students May Earn	Postsecondary Credentials that Students May Earn Based on Statewide Articulation Agreements	Career and Technical Student Organization (CTSO) that Aligns to Program of Study
				• Rescue Technician, Site Operations Certification • Rescue Technician, Vehicle & Machine Extrication Certification		
Teacher Academy of Maryland	• Human Growth and Development through Adolescence • Teaching as a Profession • Foundations of Curriculum and Instruction • Education Academy Internship	4	Interstate Teacher Assessment and Support Consortium (InTASC) and the National Council for the Accreditation for Teacher Education (NCATE) standards.	• ParaPro • PraxisCORE	• Bowie State University – 3 credits • Coppin State University – 3 credits • Frostburg State University – 6 credits • Hood College – 3 • Morgan State University – 3 credits • Notre Dame of Maryland University – 9 credits • St. Mary's College of Maryland – 4 credits • Salisbury University – 3 credits	• SkillsUSA • Educators Rising

CTE Program of Study	Required Courses	Minimum Number of Credits	Standards Used in Courses	Industry Certifications that Students May Earn	Postsecondary Credentials that Students May Earn Based on Statewide Articulation Agreements	Career and Technical Student Organization (CTSO) that Aligns to Program of Study
					• Stevenson University – 6 credits • Towson University – 3 credits	
Homeland Security & Emergency Preparedness – Information/ Communications Technology	• Foundations of Homeland Security and Emergency Preparedness • Introduction to Geographic Information Systems and Remote Sensing • Advanced Geographic Information Systems and Remote Sensing • Internship, Capstone or Dual Enrollment	4	Standards in Review by MSDE	Geographic Information Systems (GIS) Certification	• University of Maryland Global Campus – 3 credits • Frederick Community College – 6 credits	N/A
Homeland Security & Emergency Preparedness - Homeland Security Sciences	• Foundations of Homeland Security and Emergency Preparedness • Homeland Security Science	4	Standards in Review by MSDE	N/A	• University of Maryland Global Campus– 3 credits • Frederick Community College – 6 credits	N/A

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	• Homeland Security Science Research Methods and Applications • Internship, Capstone or Dual Enrollment					
Homeland Security & Emergency Preparedness - Criminal Justice/Law Enforcement Pathway	• Foundations of Homeland Security and Emergency Preparedness • Administration of Justice I • Administration of Justice II • Internship, Capstone or Dual Enrollment	4	Standards in Review by MSDE	N/A	• Harford Community College – 3 credits • Frederick Community College – 3 credits	N/A

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Criminal Justice, Law and Society	• Introduction to Law OR Introduction to Criminal Justice • Advanced Topics in Law OR Advanced Topics in Criminal Justice • Contemporary Issues in Criminal Justice, Law and Society • Apprenticeship, Work-Based Learning, Capstone, Dual Enrolment OR Certification Exam Prep	4	Standards in Review by MSDE	NA	Varies based on school system	SkillsUSA
Early Childhood Education, Infants/Toddler Child Development Associate (CDA)	• Child Growth & Development (Birth – Adolescence) • Learning Environments for Infants & Toddlers • Establishing a Purposeful	4	• Child Development Associate (CDA) • Interstate Teacher Assessment and Support	Child Development Associate (CDA) Infant/Toddler	Anne Arundel Community College – 6 credits	SkillsUSA

CTE Program of Study	Required Courses	Minimum Number of Credits	Standards Used in Courses	Industry Certifications that Students May Earn	Postsecondary Credentials that Students May Earn Based on Statewide Articulation Agreements	Career and Technical Student Organization (CTSO) that Aligns to Program of Study
	Program for Infants and Toddlers • Child Development Associate Portfolio and Internship (Infants/Toddlers)		Consortium (InTASC) • Danielson Framework • AAS.EDU.ECD Early Childhood Development • Associate of Applied Science Degree • AAT.EDU.ECE Associate of Arts in Teaching • National Association for the Education of Young Children (NAEYC)			
Early Childhood Education, Preschool Child Development Associate (CDA)	• Child Growth and Development (Birth – Adolescence)	4	• Child Development Associate (CDA)	Child Development Associate (CDA) Preschool	Anne Arundel Community College – 6 credits	SkillsUSA

CTE Program of Study	Required Courses	Minimum Number of Credits	Standards Used in Courses	Industry Certifications that Students May Earn	Postsecondary Credentials that Students May Earn Based on Statewide Articulation Agreements	Career and Technical Student Organization (CTSO) that Aligns to Program of Study
	• Learning Environments for Preschoolers • Establishing a Purposeful Program for Preschoolers • Child Development Associate Portfolio and Internship (Preschoolers		• Interstate Teacher Assessment and Support Consortium (InTASC) • Danielson Framework • AAS.EDU.ECD Early Childhood Development Associate of Applied Science Degree • AAT.EDU.ECE Associate of Arts in Teaching • National Association for the Education of Young Children (NAEYC)			

CTE Program of Study	Required Courses	Minimum Number of Credits	Standards Used in Courses	Industry Certifications that Students May Earn	Postsecondary Credentials that Students May Earn Based on Statewide Articulation Agreements	Career and Technical Student Organization (CTSO) that Aligns to Program of Study
Early Childhood Education and Child Care	• Early Childhood Education, Child Care I OR Human Growth and Development through Adolescence • Early Childhood Education, Child Care II OR Curriculum Development for Young Children • Early Childhood Education, Child Care Internship Practicum • Capstone, Dual Enrollment or Exam Prep4	4	Standards in Review by MSDE	90-Hour Certificate	Varies with each school system and local community college	SkillsUSA
Junior Reserve Officers' Corps (JROTC) Navy	• Naval Science 1 • Naval Science 2 • Naval Science 3	3	JROTC curriculum is based on the principles of performance-based, learner-centered education, and is	N/A	In Progress- Local School Systems have various existing articulation agreements with local community colleges	SkillsUSA

CTE Program of Study	Required Courses	Minimum Number of Credits	Standards Used in Courses	Industry Certifications that Students May Earn	Postsecondary Credentials that Students May Earn Based on Statewide Articulation Agreements	Career and Technical Student Organization (CTSO) that Aligns to Program of Study
			linked to the McREL (instructional leadership resource) national standards.			
JROTC Army	• Leadership Education and Training 1 (LET1) • Leadership Education and Training 2 (LET2) • Leadership Education and Training 3 (LET3)	3	U.S. Army JROTC program has been accredited by the national accrediting agency, AdvancED	N/A	In Progress- Local School Systems have various existing articulation agreements with local community colleges	SkillsUSA
JROTC Marines	• Leadership Education 1 (LE-I) • Leadership Education 2 (LE-II) • Leadership Education 3 (LE-III)	3	Nationally accredited under CITA/SACS and is directly linked to National Standards		In Progress- Local School Systems have various existing articulation agreements with local community colleges	SkillsUSA
JROTC Air Force	• Aerospace Science and Leadership 100	3	Accredited by the national		In Progress- Local School Systems have various existing articulation	SkillsUSA

CTE Program of Study	Required Courses	Minimum Number of Credits	Standards Used in Courses	Industry Certifications that Students May Earn	Postsecondary Credentials that Students May Earn Based on Statewide Articulation Agreements	Career and Technical Student Organization (CTSO) that Aligns to Program of Study
	• Aerospace Science and Leadership 200 • Aerospace Science and Leadership 300		accrediting agency, AdvancED		agreements with local community colleges	

Information Technology

Information Technology (IT) professionals have the skills to determine customer and business needs and requirements, manage complex projects, and integrate software and hardware solutions. Maryland CTE programs include opportunities for students to focus on software development, programming, IT hardware and networking technologies. Cyber Security is an increasingly important part of IT programs and represents expanding opportunities for employment and advanced education and training in Maryland.

CTE Program of Study	Required Courses	Minimum Number of Credits	Standards Used in Courses	Industry Certifications that Students May Earn	Postsecondary Credentials that Students May Earn Based on Statewide Articulation Agreements	Career and Technical Student Organization (CTSO) that Aligns to Program of Study
Database Academy (Oracle) - Java Programming	• Java Fundamentals • Java Foundations • Java Programming	3	• Computer Science Teacher Association K-12 Computer Science Standards • International Society for Technology in Education (ISTE)	• Java SE 7 Fundamentals Certification Exam • Java SE 8 Programmer I 1Z0-803	N/A	SkillsUSA
Database Academy (Oracle) - Database Management	• Database Foundations • Database Design & Programming with SQL • Database Programming with PL/SQL	3	• CSTA K-12 Computer Science Standards • International Society for Technology in Education (ISTE)	• Oracle Database 11g: SQL Fundamentals I Certification Exam 1Z0-051 • Program With PL/SQL Certification Exam 1Z0-144	N/A	SkillsUSA

CTE Program of Study	Required Courses	Minimum Number of Credits	Standards Used in Courses	Industry Certifications that Students May Earn	Postsecondary Credentials that Students May Earn Based on Statewide Articulation Agreements	Career and Technical Student Organization (CTSO) that Aligns to Program of Study
Project Lead the Way (PLTW) Computer Science	• PLTW Computer Science Essentials • PLTW Computer Science Principles • PLTW Computer Science A (Java) • PLTW Cybersecurity	4	Computer Science Teachers Association (CSTA) Standards	N/A	Students can earn Advanced Placement (AP) credits through successful completion of the AP Computer Science Principles and/or AP Computer Science A examinations	Future Business Leaders of America
Apple Swift	• App Development with Swift, Level 1 • App Development with Swift, Level 2 • Entrepreneurship and Innovation	3	CSTA Standards	Apple App Development with Swift Coding 1	N/A	Future Business Leaders of America
IT Networking Academy CISCO - CCNA Routing and Switching	• Intro to Networks • Routing & Switching Essentials • Scaling Networks • Connecting Networks	4	National Institute for Standards and Technology	• Cisco Certified Technician, • or CompTIA Network+ • CCNA Routing & Switching	N/A	SkillsUSA
IT Networking Academy CISCO - CCNA Security	• Intro to Networks • Routing & Switching Essentials • Cybersecurity Essentials • CCNA Security	4	National Institute for Standards and Technology	• Cisco Certified Technician, • CompTIA Network+,	N/A	SkillsUSA

CTE Program of Study	Required Courses	Minimum Number of Credits	Standards Used in Courses	Industry Certifications that Students May Earn	Postsecondary Credentials that Students May Earn Based on Statewide Articulation Agreements	Career and Technical Student Organization (CTSO) that Aligns to Program of Study
				• CCNA Security or CompTIA Security+		
IT Networking Academy CISCO - CCNA Cyber Ops	• IT Essentials or Cybersecurity Essentials • Cybersecurity Essentials or NDG Linux Essentials • Network Essentials • Cyber Ops	4	National Institute for Standards and Technology	• IT Fundamentals, • CompTIA A+ • LPI Linux Essentials, • CCNA Cyber Ops, or • CompTIA PenTest+		SkillsUSA

Manufacturing, Engineering, and Technology

Programs in the Manufacturing, Engineering, and Technology Cluster prepare students for a variety of career areas, including opportunities to become engineers, engineering technologists or technicians. Students engage in real-world projects that strengthen their understanding of science, technology, engineering, and mathematics (STEM). By completing challenging projects related to design, manufacturing process applications and quality improvements, they are being educated for the high-performance workplace using advanced technologies. To remain internationally competitive, employers need employees who can develop and use new technologies that will continuously improve the quality of life for Marylanders.

CTE Program of Study	Required Courses	Minimum Number of Credits	Standards Used in Courses	Industry Certifications that Students May Earn	Postsecondary Credentials that Students May Earn Based on Statewide Articulation Agreements	Career and Technical Student Organization (CTSO) that Aligns to Program of Study
Project Lead the Way (PLTW) Pre- Engineering	• PLTW Introduction to Engineering Design • PLTW Principles of Engineering • PLTW Digital Electronics • PLTW Specialization Course (Aerospace Engineering; Civil Engineering and Architecture; Computer Integrated Manufacturing, Computer Science Principles; or Environmental Sustainability)	5	International Technology and Engineering Educators Association (ITEEA) Standards for Technological Literacy Computer Science Teachers Association (CSTA) Standards	Autodesk Certified User	University of Maryland Baltimore County (UMBC) – 3 credits Most articulation agreements reside at the district level	Skills USA

CTE Program of Study	Required Courses	Minimum Number of Credits	Standards Used in Courses	Industry Certifications that Students May Earn	Postsecondary Credentials that Students May Earn Based on Statewide Articulation Agreements	Career and Technical Student Organization (CTSO) that Aligns to Program of Study
	• PLTW Engineering Design and Development					
Manufacturing Engineering Technology (NIMS) - Machining Operations	• Measurement, Materials, and Safety; • Job Planning, Benchwork, and Layout; and **Two of the following:** • Manual Milling, • Turning Operations Between Centers, • Turning with Chucking, • Grinding, and • Drilling Operations	4	National Institute of Metalworking Skills (NIMS) Credentials	Machining Level I: • Measurement, Materials, and Safety; • Job Planning, Benchwork, and Layout; • Milling I; Turning I (Between Centers); Turning I (Chucking); Grinding I; and Drill Press I		SkillsUSA
Manufacturing Engineering Technology (NIMS) - CNC Programming and Operations	• Measurement, Materials, and Safety; • Job Planning, Benchwork, and Layout; and **Two of the following:**	4	National Institute of Metalworking Skills (NIMS) Credentials	Machining Level I: • Measurement, Materials, and Safety; • Job Planning, Benchwork, and Layout;		SkillsUSA

CTE Program of Study	Required Courses	Minimum Number of Credits	Standards Used in Courses	Industry Certifications that Students May Earn	Postsecondary Credentials that Students May Earn Based on Statewide Articulation Agreements	Career and Technical Student Organization (CTSO) that Aligns to Program of Study
	• CNC Lathe Operations • CNC Lathe Programming Set-up & Operations, • CNC Milling Operations, and • CNC Milling: Programming Set-up & Operations			• CNC Lathe Operations • CNC Lathe Programming Set-up & Operations, • CNC Milling Operations, and • CNC Milling: Programming Set-up & Operations		
Manufacturing Engineering Technology (NIMS) – Machining/CNC Programming and Operations	• Measurement, Materials, and Safety; • Job Planning, Benchwork, and Layout; and **One of the following:** • Manual Milling, • Turning Operations Between Centers, • Turning with Chucking, • Grinding, or	4	National Institute of Metalworking Skills (NIMS) Credentials	Machining Level I: • Measurement, Materials, and Safety; • Job Planning, Benchwork, and Layout; • Milling I; • Turning I (Between Centers); • Turning I (Chucking); • Grinding I; and • Drill Press I		SkillsUSA

CTE Program of Study	Required Courses	Minimum Number of Credits	Standards Used in Courses	Industry Certifications that Students May Earn	Postsecondary Credentials that Students May Earn Based on Statewide Articulation Agreements	Career and Technical Student Organization (CTSO) that Aligns to Program of Study
	• Drilling Operations and **One of the following:** • CNC Lathe Operations • CNC Lathe Programming Set-up & Operations, • CNC Milling Operations, and • CNC Milling: Programming Set-up & Operations			• CNC Lathe Operations • CNC Lathe Programming Set-up & Operations, • CNC Milling Operations, and • CNC Milling: Programming Set-up & Operations		

Transportation Technologies

Advances in science and engineering are producing major innovations in transportation technology, resulting in faster movement of people and goods at lower costs and with less environmental and safety risks. These innovations require additional skills to manage and maintain transportation equipment. CTE programs provide opportunities for students to prepare for careers in the automotive industry.

CTE Program of Study	Required Courses	Minimum Number of Credits	Standards Used in Courses	Industry Certifications that Students May Earn	Postsecondary Credentials that Students May Earn Based on Statewide Articulation Agreements	Career and Technical Student Organization (CTSO) that Aligns to Program of Study
Automotive Technology Maintenance and Light Repair- Plus (ASE)	• Electrical/Electronic Systems and HVAC • Suspension and Steering and Brakes • Maintenance Light Repair Powertrain and Engine Repair/ Performance	4	National Institute for Automotive Service Excellence (ASE)	Entry Level ASE -- Certification for: Maintenance Light Repair (MLR) Optional: Brakes, Electrical/ Electronic Systems, and/or Suspension & Steering	Community College of Baltimore County: Catonsville - 5 credits Pennsylvania College of Technology - up to 15 credits	SkillsUSA
Autobody/ Collision Repair Technician	• Non-Structural Analysis and Damage Repair • Principles of Painting and Refinishing • Advanced Painting and Refinishing	6	Standards from the National Institute for Automotive Service Excellence (ASE) Standard from the Inter-Industry Conference on	Entry Level ASE certification for: • Non-structural Analysis and Damage Repair • Painting and Refinishing	Pennsylvania College of Technology - 10 -16 Credits	SkillsUSA

CTE Program of Study	Required Courses	Minimum Number of Credits	Standards Used in Courses	Industry Certifications that Students May Earn	Postsecondary Credentials that Students May Earn Based on Statewide Articulation Agreements	Career and Technical Student Organization (CTSO) that Aligns to Program of Study
			Auto Collision Repair I-CAR	• Structural Analysis and Damage Repair I-CAR-Platinum ProLevel 1 Credentials for the • Refinish Technician and/or • Non-Structural Technician • Steel GMA Welding		
Medium/Heavy Truck Technician-Diesel (NATEF)	• Medium/Heavy Truck: Suspension, Steering and Brakes • Medium/Heavy Truck: Electrical/Electronic Systems • Medium/Heavy Truck: Diesel and	5	Standards from the National Institute for Automotive Service Excellence (ASE))	Entry Level ASE certification for: • Inspection Maintenance & Minor Repair and/or • Brakes • Electrical/Electronic Systems	Pennsylvania College of Technology - 4 credits	SkillsUSA

CTE Program of Study	Required Courses	Minimum Number of Credits	Standards Used in Courses	Industry Certifications that Students May Earn	Postsecondary Credentials that Students May Earn Based on Statewide Articulation Agreements	Career and Technical Student Organization (CTSO) that Aligns to Program of Study
	Preventative Maintenance			• Suspension & Steering		
Marine Maintenance and Repair Technologies	• Introduction to marine transportation technologies • Foundation topics in marine maintenance and repair • Advanced topics in marine maintenance and repair	4	The American Boat and Yacht Council (ABYC)	ABYC Certifications	N/A	SkillsUSA
Transportation Logistics and Management	• TLC Explorations • Intro Transportation & Logistics • Intro Air/Seaport Ops • Supply Chain Management	4	Association for Supply Chain Management	N/A	Dual Enrolled Credit with Anne Arundel Community College up to 18 credits, results in a Lower Division Certificate	Future Business Leaders of America
Automotive Maintenance and Repair Technologies	• Introduction to Automotive Transportation Technologies • Foundation Topics in Automotive	4	Standards from the National Institute for Automotive Service Excellence (ASE)	Entry Level ASE Certification for: Maintenance Light Repair Optional:	Varies from school system to school system. Each system has to enter into its own articulation agreements with colleges and trade schools.	SkillsUSA

CTE Program of Study	Required Courses	Minimum Number of Credits	Standards Used in Courses	Industry Certifications that Students May Earn	Postsecondary Credentials that Students May Earn Based on Statewide Articulation Agreements	Career and Technical Student Organization (CTSO) that Aligns to Program of Study
	Transportation Technologies • Advanced Topics in Automotive Transportation Technologies			Brakes, Electrical, and or Suspension & Steering.		

Work-based Learning

Supervised work-based learning allow high school students on-the-job experiences related to their career choice. Students may also elect to complete work-based learning through participation in a CTE program, Career Research and Development (CRD), or through the Apprenticeship Maryland (AMP) program. The programs are designed to link instruction with specific work experiences. These linked learning experiences are organized around a plan that is cooperatively developed by the student, a work-based learning coordinator, and employer to add value to and extend a student's career preparation. Students in CRD or AMP can be placed in positions related to any of Maryland's 10 Career Clusters.

CTE Program of Study	Required Courses	Minimum Number of Credits	Standards Used in Courses	Industry Certifications that Students May Earn	Postsecondary Credentials that Students May Earn Based on Statewide Articulation Agreements	Career and Technical Student Organization (CTSO) that Aligns to Program of Study
Career and Research Development	• Career Research and Development • Career Development, Preparation and Transition • Work-Based Learning Experience	3	National Career Development Guidelines, Maryland's Career Development Framework, and 21st Century Skills	N/A	N/A	• SkillsUSA • Future Business Leaders of America • FFA
Apprenticeship	• Apprenticeship Related Instruction • Apprenticeship Work-Based Learning Experience 1 • Apprenticeship Work-Based Learning Experience 2	4	Program designed by MSDE and Maryland Department of Labor. Apprenticeship Approved by Maryland Apprenticeship	Depends on the Apprenticeship experience. An industry-recognized credential if available and appropriate to the apprenticeship experience	Depends on the Apprenticeship experience. Some apprenticeships include opportunities to earn college credit	• SkillsUSA • Future Business Leaders of America • FFA

CTE Program of Study	Required Courses	Minimum Number of Credits	Standards Used in Courses	Industry Certifications that Students May Earn	Postsecondary Credentials that Students May Earn Based on Statewide Articulation Agreements	Career and Technical Student Organization (CTSO) that Aligns to Program of Study
	• Apprenticeship Work-Based Learning Experience 3		and Training Council			

Appendix A: Career Cluster Points of Contact

Each career cluster is led by staff in the Division of Career and College Readiness. Questions about programs of study within a career cluster may be directed to the appropriate cluster lead(s).

1. **Art, Media, and Communication**
    - Marquita Friday, Director of Career Programs
      Marquita.Friday@Maryland.gov
    - Jennifer Griffin, Career Programs and Apprenticeship Specialist
      Jennifer.Griffin@Maryland.gov

2. **Business Management and Finances**
    - Nicassia Belton, Ed.D., Director of Data and Accountability
      Nicassia.Belton@Maryland.gov
    - Kent Seuferer, Career Programs and Student Organization Specialist
      Kent.Seuferer@Maryland.gov

3. **Consumer Service, Hospitality, and Tourism**
    - Marquita Friday, Director of Career Programs
      Marquita.Friday@Maryland.gov
    - Nina Roa, Director of Finance and Legislation for Career Programs
      Nina.Roa@Maryland.gov

4. **Construction and Development**
    - Charles (Chuck) Wallace, Coordinator of Career Programs and Student Organizations
      Charles.Wallace@Maryland.gov

5. **Environmental, Agriculture, and Natural Resources**
    - Dean Kendall, Career Programs and Grants Specialist – Region I
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6. **Health and Bioscience**
    - Nina Roa, Director of Finance and Legislation for Career Programs
      Nina.Roa@Maryland.gov
    - Charles (Scott) Nichols
      Charles.Nichols@Maryland.gov

7. **Human Resource Services**
    - Traci Verzi, Acting Coordinator of Finance and Legislation for Career Programs
      Traci.Verzi@Maryland.gov

8. **Information Technology**
    - Marquita Friday, Director of Career Programs
      Marquita.Friday@Maryland.gov
    - Charles (Scott) Nichols, Acting Coordinator of Career Programs, STEM, and Computer Science
      Charles.Nichols@Maryland.gov

9. **Manufacturing, Engineering, and Technology**
    - Marquita Friday, Director of Career Programs
      Marquita.Friday@Maryland.gov
    - Charles (Scott) Nichols, Acting Coordinator of Career Programs, STEM, and Computer Science
      Charles.Nichols@Maryland.gov

10. **Transportation Technologies**
    - Nancy Hauswald
      Nancy.Hauswald@Maryland.gov

Work-based Learning

All CTE programs of study must provide the opportunity for students to engage in work-based learning experiences. The point of contact for work-based is:

Jennifer Griffin
Jennifer.Griffin@Maryland.gov

Appendix B: Division of Career and College Readiness Team

Tiara Booker-Dwyer, Assistant State Superintendent
Miranda Hill, Administrator to the Assistant State Superintendent

Nicassia Belton, Ed.D., Director of Data and Accountability for Career Programs and MOA Coordinator
Osh Oshitoye, Ph.D., Coordinator of Data and Accountability for Career Programs
China Wilson, Ph.D., Equity and Civil Rights Compliance Specialist

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Charles (Scott) Nichols, Acting Coordinator Career Programs, STEM, and Computer Science
Charles (Chuck) Wallace, Coordinator of Career Programs and Student Organizations
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Kent Seuferer, Career Programs and Student Organization Specialist

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Traci Verzi, Acting Coordinator of Finance and Legislation for Career Programs
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Nancy Hauswald, Career Programs and Grants Specialist, Region II

Ed Mitzel, Executive Director of Leadership Development and School Improvement
Laura Liccione, Coordinator of Academic Improvement
Morrall Thompson, Coordinator of Systematic Improvement
Lori Ellis, Ed.D, Coordinator of Leadership Development
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Tara Corona, Continuous Improvement Specialist
Katherine Key, Data Analyst
Felicia Lanham Tarason, Ed.D., School Leadership Support Specialist
Mary Minter, Ed.D., School Leadership Support Specialist

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