

# MARYLAND CAREER & TECHNICAL EDUCATION PROGRAMS OF STUDY





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# CAREER AND TECHNICAL EDUCATION (CTE):

## Vision for Career and Technical Education in Maryland

Each student has access and the opportunity to engage in career programs of study that:



align to high-skill, high-wage, or in-demand careers;



lead to earning industry-recognized and/or postsecondary credentials that will allow entrance 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.



Division of Career and College Readiness



## EDUCATING TOMORROW'S WORKFORCE TODAY

Career and Technical Education (CTE) provides secondary and postsecondary students an opportunity to pursue a sequential technical and academic program of study leading to advancement in a career field. Secondary CTE programs of study, which can start in 8th grade and culminate in high school, give students the opportunity to earn college credit and/or industry credentials in a career field of interest. The Maryland State Department of Education (MSDE) works closely with the Governor's Workforce Development Board to identify new programs in response to Maryland's workforce and economic development needs and to ensure all CTE programs keep pace with industry expectations to prepare students for both college and careers.

## MARYLAND SECONDARY CTE PROGRAMS OF STUDY

Maryland CTE programs of study are statewide programs designed to prepare students for the global economy and workforce needs. All CTE programs are aligned to nationally or state-recognized industry and academic standards.

CTE programs are organized by career clusters, which are groupings of occupations and industries based on shared features or "core functions." CTE programs are based on academic and technical skill standards to ensure student preparation for both college and careers. CTE programs include work-based learning opportunities (e.g., internships, apprenticeships, clinical experience or industry-mentored projects). Students also have the option to earn college credit and/or industry-recognized credentials such as certifications and licenses.

Maryland CTE programs of study are designed with state and national-level partners, are standardized across the state, and include opportunities for statewide professional learning for teachers. To keep programs current, MSDE in collaboration with business, higher education, and local school systems, provides guidance and support for the ongoing development of rigorous and relevant CTE programs of study that prepare students for both college and careers. The MSDE also collaborates with these partners as well as local school systems to develop and expand CTE programs in high-demand careers, such as those in the Science, Technology, Engineering, and Mathematics (STEM) disciplines.

## PREPARING STUDENTS FOR SUCCESS

CTE programs are designed to support students in making decisions about education and career options. Preparing for CTE begins in elementary school with career awareness learning experiences. In middle school, students participate in career exploration learning experiences such as workplace tours, job-shadows, and interest inventories. Students are required to develop an academic and career plan prior to entering high school. Plans must be updated annual. With over 60 CTE programs statewide, students can find the career pathway that will prepare them for future success.

# SAMPLE CTE PROGRAM OF STUDY

Students electing to complete a CTE Program are prepared for entry into college and a career pathway. Although the chart below shows a typical high school program of study that includes a CTE Program Sequence beginning in Grade 9, school systems may offer CTE programs as early as the 8th grade. As the chart also illustrates, CTE also leads to students earning industry recognized credentials or college credits.



HIGH SCHOOL PROGRAM					COLLEGE PROGRAM
REQUIREMENTS	GRADE 9	GRADE 10	GRADE 11	GRADE 12	
English - 4	English 9	English 10	English 11 AP Language	English 12 AP Literature	English/Language Arts Include AP Credit options
Social Studies - 3	US Government	World History AP European	US History AP US History	Government AP Govt.	Humanities/Social Sciences Include AP credit options
Mathematics - 4 Required each year	Algebra	Geometry	Algebra II	Trigonometry or Pre-Calculus or Calculus or AP Calculus	Mathematics Include AP credit options
Science - 3	Earth Science	Life Science	Phyiscial Science	AP Science Course	Science Include AP credit options
Physical Education - .5 Health Ed - 1	.5 PE	1 Health			
Fine Arts - 1	.5 Fine Arts	.5 Fine Arts			
Computer Science, Engineering, or Technology Education - 1	Foundations of Technology or Computer Science	<b>CTE PROGRAM SEQUENCE</b> Includes academic and technical content, work-based learning experiences, and industry certifications and credentials.			<b>CTE PROGRAM CONCENTRATION</b> Include articulation options
CTE Completer Program - 3 or more		<u>CTE Course (1)</u>	<u>CTE Course (2)</u>	<u>CTE Course (3)</u>	<ul style="list-style-type: none"> <li>• Dual Enrollment</li> <li>• Credit by Exam</li> <li>• Youth-Apprenticeship</li> </ul>
World Language - 2	World Language	World Language	World Language	World Language	

In Maryland, all secondary and postsecondary programs are offered in related programs of study to advance student preparation and success in a career. However, specific program offerings vary by location. Contact the local school system and/or community college who work together to identify areas of interest and program requirements.

In all CTE programs, the awarding of college credit and/or industry certification requires students to meet pre-determined standards and assessments as determined by the postsecondary institution and/or industry. A description of these requirements and opportunities for college credit and/or industry certification is included for each CTE program of study.

# ARTS, MEDIA & COMMUNICATION

Maryland offers great opportunities for career 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 Medical Production, Graphic Communications, Web Design, Interactive Media and Game Design. Maryland CTE programs include a focus on mass communication, graphic communication and multimedia production. Working with employers helps ensure that these programs keep pace with the industry certifications and college credit toward advanced study in their career field of interest.

HIGH SCHOOL CTE PROGRAM	DESCRIPTION	INDUSTRY CREDENTIAL
<p><b><u>Graphic Communications (Print[ED])</u></b>            For more information about the Graphic Arts Education and Research Foundation and the Print[ED] program standards, please go to: <a href="http://www.print-ed.org">www.print-ed.org</a></p>	<p>The Graphic Communications (Print[ED]) program is offered in partnership with the Printing and Graphics Association Mid Atlantic (PGAMA). This program of study is designed to give students an overall understanding of the industry and its major operations while teaching academic and technical skills required in the field. Students can gain industry certification through Print[ED] in several areas including: Digital File Preparation and Output, Digital Production Printing, Graphic Communications, Graphic Design, Offset Press Operations/Bindery and Finishing and Screen Printing. While gaining the technical skills they need to succeed in this career pathway, students can also earn college credits through articulation agreements.</p>	<p><u>Printing &amp; Graphic Association Mid Atlantic</u>            Introduction to Graphic Communications assessment plus Graphic Design assessment            Graphic Communication assessment plus Digital File Preparation/Digital File Output assessment            Graphic Communication assessment plus Offset Press assessment            Graphic Communication assessment plus Digital Production and Printing assessment            Graphic Communication assessment plus Screen Printing Technology assessment</p> <p>College Credit</p>



## PRINT ED

### PROGRAM HIGHLIGHT: GRAPHIC COMMUNICATIONS (PRINT[ED])

Twelve CTE Graphic Communications high school programs in Maryland are accredited by the Graphic Arts Education and Research Foundation's industry accreditation in Print[ED]. Students are eligible for college credit through statewide articulation agreements, and they can earn industry-recognized certifications in the following areas:

- Digital File Preparation and Output
- Digital Production Printing
- Graphic Design
- Introduction to Graphic Communications
- Offset Press Operations/Bindery & Finishing
- Screen Printing

# ARTS, MEDIA & COMMUNICATION CONTINUED

Maryland offers great opportunities for career 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 Medical Production, Graphic Communications, Web Design, Interactive Media and Game Design. Maryland CTE programs include a focus on mass communication, graphic communication and multimedia production. Working with employers helps ensure that these programs keep pace with the industry certifications and college credit toward advanced study in their career field of interest.

HIGH SCHOOL CTE PROGRAM	DESCRIPTION	INDUSTRY CREDENTIAL
<p><a href="#">Interactive Media Production</a></p> <p><b>Digital Media</b></p> <p><b>Graphic Design</b></p> <p><b>Interactive Media</b></p> <p>For more information about the related industry certification for Adobe Creative Suite, please go to: <a href="http://www.adobe.com">www.adobe.com</a></p>	<p>The Interactive Media Production (IMP) program includes a strong foundation in arts, technology and communication. The program starts with a foundation course in the Principles of Arts, Media and Communication. From there, students take two courses in Interactive Media Design that focus on digital media, interactive media and graphic design. The program concludes with a capstone course that emphasizes students' portfolio projects. Students gain experience in Internet technology and website development, computer graphics, electronic media and project management. Students have the opportunity to earn certification in Adobe Creative Suite or web design. Graduates may also earn college credit.</p>	<p><u>Adobe</u></p> <p>Animate Certification</p> <p>After Effects Certification</p> <p>Dreamweaver Certification</p> <p>Illustrator Certification</p> <p>InDesign Certification</p> <p>Photoshop Certification</p> <p>Premiere Pro Certification</p> <p>College Credit</p>



"Digital and creative skills are among the most in-demand capabilities in the country, and there is an industry ready and waiting to welcome young people into their workforces with open arms. The best part? You can develop these skills from anywhere, at any time, at any age. People will care about what you can do instead of how long you've been doing it. These CTE programs are an amazing opportunity to get a headstart on showing a future employer or client what you can do and begin building your career and earnings opportunities."

M. Timothy Bojanowski  
 President  
 Zest Social Media Solutions

# 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 Advance Placement (AP) Economics course is encouraged as a part of each program. Students may also participate in the Career and Technical Student Organization: Future Business Leaders of America (FBLA).



## PROGRAM HIGHLIGHT: BUSINESS MANAGEMENT AND FINANCE

The Maryland State Department of Education in partnership with the MBA Research and Curriculum Center has worked to align Business Management and Finance programs to the A\*S\*K (Assessment for Skills and Knowledge for business) assessment in finance, management, business and marketing. Additionally, participation in AP Microeconomics, AP Macroeconomics and the CLEP credit-by-examination program are encouraged as a part of each program. The CLEP credit-by-examination program and AP exam information can be found at [www.collegeboard.org](http://www.collegeboard.org).

HIGH SCHOOL CTE PROGRAM	DESCRIPTION	INDUSTRY CREDENTIAL
<p><b>Academy of Finance</b> For more information about the National Academy Foundation and the Academy of Finance, please go to: <a href="http://www.naf.org">www.naf.org</a></p>	<p>The National Academy Foundation (NAF) Finance Academy provides students with a board understanding of financial and economic concepts and provides internship opportunities. Students complete a series of courses including Principles of Finance, Accounting, Economics, Securities, Managerial Accounting, Financial Services, Ethics in Business and Applied Finance. Students may also complete a dual enrollment course or an internship to advance their understanding of careers in business and finance.</p>	<p><u>National Academy Foundation</u> NAF-Track Certification  College Credit</p>
<p><b>Accounting and Finance</b> For more information about the Principals of Accounting CLEP exam, go to: <a href="http://www.collegeboard.org/clep">www.collegeboard.org/clep</a>. For more information about the A*S*K certification for Finance, please go to: <a href="http://www.mbaresearch.org">www.mbaresearch.org</a></p>	<p>In the Accounting and Finance program, students learn decision making techniques, financial management, basic accounting principles, business communication skills, problem solving, teamwork and networking skills. There is also a focus on advanced accounting and finance knowledge to prepare students for college level courses and entry-level positions in the workforce. Students may also complete a capstone project, dual enrollment or internship in accounting and finance. Students have the opportunity to take the A*S*K Certification for Finance and Principles of Accounting CLEP exam.</p>	<p><u>MBA Research</u> Institute for the Assessment of the Skills and Knowledge of Business: Finance  CLEP Finance and Accounting Assessment  <u>College Board Exams</u> AP Microeconomics Exam AP Macroeconomics Exam  College Credit</p>
<p><b>Marketing</b> For more information about the Principles of Marketing CLEP exam, please go to: <a href="http://www.collegeboard.org/clep">www.collegeboard.org/clep</a>. For more information about the A*S*K certification for Finance, please go to: <a href="http://www.mbaresearch.org">www.mbaresearch.org</a></p>	<p>In the Marketing/program, students learn about the consumer's role, research in global marketing, developing a marketing plan and the importance of ethics and social responsibility. Internship and mentored projects are included in the program. Students may also complete a capstone project, dual enrollment or internship in Marketing. Students have to the opportunity to earn college credit, complete the A*S*K Certification for Marketing and/or take the Principles of Marketing CLEP exam.</p>	<p><u>MBA Research</u> Institute for the Assessment of the Skills and Knowledge of Business: Fundamental Marketing Concepts  CLEP Finance and Accounting Assessment  <u>College Board Exams</u> AP Microeconomics Exam AP Macroeconomics Exam  College Credit</p>

# BUSINESS MANAGEMENT AND FINANCE CONTINUED

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 Advance Placement (AP) Economics course is encouraged as a part of each program. Students may also participate in the Career and Technical Student Organization: FBLA.



HIGH SCHOOL CTE PROGRAM	DESCRIPTION	INDUSTRY CREDENTIAL
<p><b>Business Administrative Services</b> For information about the industry certification, please go to: <a href="http://www.microsoft.com/learning/mcp/officespecialist">www.microsoft.com/learning/mcp/officespecialist</a>.</p>	<p>The Business Administrative program provides students with knowledge of how effectively use technology in the analysis and communication of business principles. Students are required to complete Office Systems Management I and Office Systems Management II. The second course in the sequence includes coursework in Microsoft Office Applications preparing students for Microsoft Office Specialist (MOS) Certification for Microsoft Word and Excel.</p>	<p><u>MBA Research</u> Institute for the Assessment of the Skills and Knowledge of Business: Fundamental Business Concepts</p> <p><u>Microsoft Exam</u> Microsoft Office Specialist Certification</p> <p>College Credit</p>
<p><b>Business Management</b> For more information about the Principles of Management CLEP exam, please go to: <a href="http://www.collegeboard.org/clep">www.collegeboard.org/clep</a>. For more information about the A*S*K certification for Entrepreneurship/Management, please go to: <a href="http://www.mbaresearch.org">www.mbaresearch.org</a>.</p>	<p>The program begins with courses in Principles of Business, Management and Entrepreneurship and leads up to the Advanced Business Management course. This program prepares students for college-level programs in various areas of Business Management and the business world. Graduates may earn college credit through articulation agreements, dual enrollments, or by taking the Principles of Management CLEP exam. Students also have the opportunity to earn the A*S*K Certification for Entrepreneurship/Management.</p>	<p><u>Microsoft Exam</u> Microsoft Office Specialist Certification</p> <p><u>College Board Exam</u> CLEP Principles of Management Assessment</p> <p>College Credit</p>

“Students focusing on the finance, accounting, marketing, and management cluster will be able to lead in any type of industry. Whether they want to own their own business as an entrepreneur or be an accountant or management professional,” noted Christine Ross, President & CEO of the Maryland Chamber of Commerce, “each facet of the program is a critical business function and will support maximum flexibility for lucrative career opportunities.”

Christine Ross, CCE, MBA, MS  
President & CEO  
Maryland Chamber of Commerce

# CONSTRUCTION & 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.



## PROGRAM HIGHLIGHT: CONSTRUCTION PROFESSIONS AND MAINTENANCE

Construction-related programs across the state are using the National Center for Construction Education and Research (NCCER) curriculum, resources and assessments to ensure student preparation and advancement in a wide range of construction careers. Industry partnerships across the state support Maryland students as they advance their technical and business knowledge through work-based learning opportunities and in many cases, through summer employment. Several of Maryland's community colleges use the NCCER standards, allowing students to make easier transitions from high school to college programs and apprenticeships.

HIGH SCHOOL CTE PROGRAM	DESCRIPTION	INDUSTRY CREDENTIAL
<p><b><u>Construction Design and Management</u></b> For more information regarding industry certification, please go to: <a href="http://autodesk.com">autodesk.com</a>.</p>	<p>The Construction Design and Management (CDM) program is a four course project-based CTE Program of Study in which students develop an understanding of the built world through the design and construction process by completing and revising projects individually and in groups. All projects address increasingly complex questions, problems and challenges. Architectural drafting and design skills are developed through lab-based instruction using Autodesk software tools AutoCAD and Revit. Throughout the program, students develop a portfolio to demonstrate knowledge of each phase of the design and construction management process. The CDM program offers value-added opportunities such as AutoCAD certification, Revit certification and college credit through statewide articulation agreements with Morgan State University and the University of Maryland-Eastern Shore.</p>	<p><b><u>Autodesk</u></b> AutoCAD Certification Revit Certification</p> <p>College Credit</p>
<p><b><u>Construction Trades Professions</u></b></p> <ul style="list-style-type: none"> <li>• Carpentry</li> <li>• Electrical</li> <li>• Plumbing</li> <li>• Masonry</li> </ul> <p>For more information on program standards, certification and NCCER, please go to: <a href="http://nccer.org">nccer.org</a></p>	<p>The Construction Trades Professions program is a four course hands-on program based in the National Center for Construction Education and Research (NCCER) standards and prepares students for further education and careers in the construction industry. Program pathway options include Carpentry, Electrical, Plumbing and Masonry. Each pathway option starts with a core curriculum course and then progresses through NCCER Level I curriculum and culminates in a capstone project, dual enrollment, work-based learning or apprenticeship opportunity. Additional curriculum modules are offered as supplemental resources and can support articulation to postsecondary Construction Management programs. Schools offering a Construction Trades Professions program must complete the NCCER accreditation process that ensures students have access to certification through the NCCER National Registry, a national recognized industry certification platform which is updated as students progress through the program.</p>	<p><b><u>NCCER</u></b> Core plus Level 1 Carpentry assessment Core plus Level 1 Electrical assessment Core plus Level 1 Plumbing assessment Core plus Level 1 Masonry assessment</p> <p>College Credit</p>

# CONSTRUCTION & DEVELOPMENT CONTINUED



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.

## HIGH SCHOOL CTE PROGRAM

### Construction Maintenance Professions

- Heating, Ventilation, Air Conditioning (HVAC)
- Industrial Maintenance
- Welding

For more information on programs standards, certification and NCCER, please go to: [nccer.org](http://nccer.org)

## DESCRIPTION

The Construction Maintenance Professions program is a four course hands-on program based on the National Center for Construction Education and Research (NCCER) standards and prepares students for further education and careers in the construction industry. Program pathway options include Heating, Ventilation, and Air Conditioning (HVAC); Industrial Maintenance and Welding. Each pathway option starts with a core curriculum course and then progresses through NCCER Level I curriculum and culminates in a capstone project, dual enrollment, work-based learning or apprenticeship opportunity. Additional curriculum modules are offered as supplemental resources and can support articulation to postsecondary Construction Management programs. Schools offering a Construction Maintenance Professions program must complete the NCCER accreditation process that ensures students have access to certification through the NCCER National Registry —a national recognized industry certification platform which is updated as students progress through the program. Students who pursue welding may earn industry-recognized credentials issued by the American Welding Society (AWS), as students progress through the program. Welding meets AWS standards.

## INDUSTRY CREDENTIAL

### National Center for Construction Education and Research

- Core plus Level 1 HVAC assessment
- Core plus Level 1 Industrial Maintenance assessment
- Core plus Level 1 Welding assessment

College Credit

"Not many people realize how varied the careers and pathways are in the construction industry. You can immediately start working after graduation, while making a living wage and learning a skilled trade, or you can go on to higher education and study architecture, engineering or construction management," says Jennifer Sproul, LEED AP, President of the Maryland Center for Construction Education and Innovation. "Most importantly, those in the construction industry find pride in the lasting impact they make on society - environmentally, culturally, and humanitarially. Be a part of something bigger than yourself and choose a career in the built environment."

Jennifer Sproul , LEED AP  
President  
Maryland Center for Construction  
Education & Innovation (MCCEI)

# 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.



## PROGRAM HIGHLIGHT: CULINARY ARTS

The American Culinary Federation (ACF) program prepares students for careers and further education in professional cooking or baking. Nineteen Maryland high schools are accredited in culinary arts and/or professional baking—a one and a half year process that includes curriculum review, site visits, and assessments. The ACF programs at Easton High School in Talbot County and Worcester Technical High School in Worcester County have earned Exemplary Status by the American Culinary Federation Education Foundation.

HIGH SCHOOL CTE PROGRAM	DESCRIPTION	INDUSTRY CREDENTIAL
<p><b>Culinary Arts (ACF)</b></p> <ul style="list-style-type: none"> <li>Professional Cooking</li> <li>Professional Baking</li> </ul> <p>For more information about industry standards, certification and the ACF, please go to: <a href="http://www.acfchefs.org">www.acfchefs.org</a></p>	<p>The Culinary Arts partners with the American Culinary Federation (ACF) to prepare students for successful careers in the food and beverage industry with a focus on Professional Cooking or Professional Baking. The program includes education in food production, professional cooking, baking, cost control, nutrition, sanitation and food marketing. Students may earn ACF's Certified Junior Culinarian credential and may also earn articulated college credit at Stratford University through a statewide articulation agreement.</p>	<p><u>American Culinary Federation</u>                      Certified Fundamentals Cook (CFC) certification                      Certified Fundamentals Pastry Cook (CFPC) certification                      College Credit</p>
<p><b>Food and Beverage Management (ProStart)</b></p> <p>For more information about industry standards, certification and the professional organizations, please go to:</p> <ul style="list-style-type: none"> <li>RAMEF - <a href="http://www.ramef.org">www.ramef.org</a></li> <li>NRAEF - <a href="http://nraef.org/prostart">nraef.org/prostart</a></li> </ul>	<p>In partnership with the Restaurant Association of Maryland Education Foundation (RAMEF) and the National Restaurant Association Educational Foundation (NRAEF), the ProStart program introduces students to a wide variety of careers within the restaurant, food service and hospitality industry. Students study and practice professional food preparation, international cuisines, food safety and sanitation, customer service relations, accounting, cost control, marketing and lodging management. As part of the program, students complete an industry-mentored, work-based learning experience.</p>	<p><u>National Restaurant Association Education Federation</u>                      National ProStart Certificate of Achievement</p>

# CONSUMER SERVICES, HOSPITALITY AND TOURISM CONTINUED

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.



HIGH SCHOOL CTE PROGRAM	DESCRIPTION	INDUSTRY CREDENTIAL
<p><b>Hospitality and Tourism Management Program (HTMP)</b>                      For more information about industry standards and the industry certification CHTMP, please go to:  <a href="http://www.ahlei.org/Programs/High-School-Program-HTMP/">www.ahlei.org/Programs/High-School-Program-HTMP/</a>.</p>	<p>The Hospitality and Tourism Management Program (HTMP), is a nationally recognized program developed by industry experts and members of the American Hotel &amp; Lodging Association that offers the Certified Hospitality and Tourism Management Professional credential. Students enrolled in the program build business and management skills related to the lodging and tourism industry. The tourism industry offers significant job creation across all regions with tremendous success for long-term career pathways. Tourism is recognized as a major driver of economic growth and development in Maryland.</p>	<p><u>American Hotel &amp; Lodging Association Educational Institute</u>                      Certified Hospitality Tourism Management Professional (CHTMP) certification</p>
<p><b>Careers in Cosmetology</b>                      For more information about industry requirements and licensing in Maryland, please go to MD State Board of Cosmetology at  <a href="http://www.dllr.state.md.us">www.dllr.state.md.us</a>.</p>	<p>The Career in Cosmetology program prepares individuals to care for and beautify hair, skin and nails. Students are instructed in the art and science of cosmetology as well as all aspects of the industry. Emphasis is placed on hygiene, safety and sanitation as well as State Board of Cosmetologists' rules and regulations. Related areas of instruction include human anatomy and physiology, mathematics/measurement and chemistry. Salon management is an integral part of the classroom and clinical experience. The 1,500 hour program includes classroom instruction, clinical experience, related mentored work-based learning experiences and a senior capstone project. Upon successful completion of the program, the students are prepared to take Maryland State Board of Cosmetologists' Examination for licensure as a Cosmetologist.</p>	<p><u>Maryland Board of Cosmetologist</u>                      Cosmetology License                      Hairstylist License</p>

# ENVIRONMENTAL, AGRICULTURAL & 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 service sectors.



“CASE is the most powerful tool available for the advancement of agricultural education and enhancement of student learning of agricultural science subject matter.”

—National Association of Agricultural Educators



HIGH SCHOOL CTE PROGRAM	DESCRIPTION	INDUSTRY CREDENTIAL
<p><b><u>Curriculum for Agricultural Science Education (CASE)</u></b></p> <ul style="list-style-type: none"> <li>•Animal and Plant Biotechnology</li> <li>•Food Science and Safety</li> <li>•Environmental Science</li> <li>•Mechanical Systems in Agriculture</li> </ul> <p>For more information, please go to <a href="http://www.case4learning.org">www.case4learning.org</a></p>	<p>The Curriculum for Agricultural Science Education (CASE) is a national program of study that offers students a rigorous curriculum designed to challenge students to perform at high levels. Through the use of activities, projects and problem-solving, students explore agriculture subject matter while they learn necessary knowledge and skills. To establish these requirements, CASE incorporates the National Academic Standards and Agriculture Food and Natural Resources (AFNR) Content Standards. The program is a four-course sequence and offers students the opportunity to earn college credit through articulation agreements upon successful program completion. For more information about CASE, please see the program highlight at the bottom of this page.</p>	<p>College Credit</p>
<p><b><u>Horticultural Services: Certified Professional Horticulturist (CPH)</u></b></p> <p>For more information about industry requirements, please go to Maryland Nursery and Landscape Association: <a href="http://www.mnlg.org">www.mnlg.org</a>.</p>	<p>The Horticultural Services program of study is based on requirements for the Certified Professional Horticulturist (CPH), credentials recognized by the Maryland Nursery Landscape and Greenhouse Association. Students complete a sequence of courses which include: Introduction to Environmental/Plant/Animal Science, Foundations of Horticulture, Plant Production and Landscape Design and Management. Students have the opportunity to earn the student-level CPH certification by taking and passing the industry exam.</p>	<p>Certified Professional Horticulturist (CPH) certification</p>



## PROGRAM HIGHLIGHT: CURRICULUM FOR AGRICULTURAL SCIENCE EDUCATION (CASE)

In this program, students learn about all aspects of agricultural sciences and may take additional courses based on their area of interest. The following courses are offered as part of the program:

- Introduction to Agriculture, Food and Natural Resources
- Principles of Agricultural Science | Plant
- Principles of Agricultural Science | Animal
- Principles of Agricultural Science | Natural Resources and Ecology
- Principles of Agricultural Science | Agricultural Power and Technology
- Animal and Plant Biotechnology
- Food Science and Safety
- Environmental Science Issues
- Mechanical Systems in Agriculture
- Agricultural Business, Research and Development

# HEALTH & BIOSCIENCES

Career and Technical Education 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. These programs require students to apply knowledge learned in science and mathematics to professions in the Health and Biosciences field. These careers are among the fastest growing and highest in demand in the country as the population ages and health care needs continue to increase. These CTE programs 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. The Health and Biosciences Cluster also provides career development experiences for students who want to pursue careers in the medical professions including physicians, research scientists, nurses a wide more.

HIGH SCHOOL CTE PROGRAM	DESCRIPTION	INDUSTRY CREDENTIAL
<p><a href="#">Academy of Health Professions (AHP)</a>            Certified Nursing Assistant (CNA)            Pharmacy Technician            Dental Assistant            Certified Clinical Medical Assistant            Physical Rehabilitation</p>	<p>The Academy of Health Professions program uses project and problem-based learning and clinical experiences as well as classroom and lab instruction to teach students about the field of health care. Students progress through two foundation courses: Foundation of Medicine and Health Science and Structure and Functions of the Human Body. Opportunities for students to apply what they are learning to real-life health care situations are part of the specialized health care courses. Students also have the opportunity to earn state and/or nationally recognized industry certifications and/or college credit through articulation agreements with local colleges. Stevenson University provides on-going curriculum and professional development to AHP teachers and transcribed college credit to students who successfully complete the program.</p>	<p><a href="#">Maryland Board of Nursing</a>            Certified Nursing Assistant (CNA)            Geriatric Nursing Assistant (GNA)</p> <p><a href="#">Maryland State Board of Dental Examiners</a>            Dental Assisting certification</p> <p>Certified Clinical Medical Assistant (CCMA) certification</p> <p><a href="#">National Healthcareer Association</a>            Pharmacy Technician Certification - ExCPT exam</p> <p>College Credit</p>

“A profession in Health & Biosciences offers a rare and exceptional combination of a feeling of service and contribution, personal empowerment, and professional career and earning potential,” said Joseph DeMattos, President and CEO of the Health Facilities Association of Maryland. “We need and wecolme you to join us in providing quality care to Marylanders in need across a broad array of healthcare settings.”

Joseph DeMattos, Jr., MA (JHU)  
 President and CEO  
 Heath Facilities Association  
 of Maryland



# HEALTH & BIOSCIENCES CONTINUED

Career and Technical Education 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. These programs require students to apply knowledge learned in science and mathematics to professions in the Health and Biosciences field. These careers are among the fastest growing and highest in demand in the country as the population ages and health care needs continue to increase. These CTE programs 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. The Health and Biosciences Cluster also provides career development experiences for students who want to pursue careers in the medical professions including physicians, research scientists, nurses a wide more.

HIGH SCHOOL CTE PROGRAM	DESCRIPTION	INDUSTRY CREDENTIAL
<p><b>Biomedical Science: Project Lead The Way (PLTW)</b>            For more information about Project Lead The Way, please go to:  <a href="http://stevenson.edu/academics/schools/school-sciences/stem-initiatives/project-lead-the-way/index.html">stevenson.edu/academics/schools/school-sciences/stem-initiatives/project-lead-the-way/index.html</a>,  <a href="http://pltw.org">pltw.org</a> or <a href="http://biotility.research.ufl.edu">biotility.research.ufl.edu</a></p>	<p>PLTW Biomedical Science empowers students to build knowledge and skills in biomedical science, as well as in-demand, transportable skills like problem solving, critical and creative thinking, communication and collaboration. The program consists of a sequence of four courses: Principles of Biomedical Science, Human Body Systems, Medical Interventions, and Biomedical Innovation. Students who complete the program are prepared for employment and further education. Stevenson University, Maryland's PLTW Biomedical Sciences Affiliate University, offers transcribed college credit to students who successfully complete the program and meet specified requirements. Students who complete the Biomedical Science program may also take the Biotechnician Assistant Credentialing Exam (BACE)—an industry-recognized credential through which students demonstrate mastery of knowledge and skill sets valued by the bioscience industry when hiring for entry-level positions.</p>	<p><u><a href="#">Biotility Applied Biotech Training</a></u>            Biotechnician Assistant Credentialing Exam (BACE)             College Credit</p>



## PROGRAM HIGHLIGHT: BIOMEDICAL SCIENCE

The Project Lead The Way (PLTW) Biomedical Science program is one of Maryland's leading STEM focused Career and Technical Education program of study. The PLTW Biomedical Sciences (BMS) Program is a sequence of courses that are aligned with appropriate national learning standards, which follows a proven hands-on, real-world problem-solving approach to learning. Students explore the concepts of human medicine and are introduced to topics such as physiology, genetics, microbiology and public health. Through activities, like dissecting a heart, students examine the processes, structures and interactions of the human body—often playing the role of biomedical professionals. They also explore the prevention, diagnosis and treatment of disease while working in teams to investigate and design innovative solutions to the health challenges of the 21st century—such as fighting cancer with nanotechnology. The PLTW BMS program is preparing students for careers in this field by giving them the tools they need to compete and win in a rapidly changing 21st century economy.

# 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.



HIGH SCHOOL CTE PROGRAM	DESCRIPTION	INDUSTRY CREDENTIAL
<p><a href="#">Fire Emergency Medical Training/High School Cadet - Fire Science: Maryland Fire and Rescue Institute (MFRI)</a></p>	<p>The Fire Emergency Medical Training/High School Cadet program is offered in partnership with instructors from the Maryland Fire and Rescue Institute (MFRI) of the University of Maryland. Students progress through courses on fire prevention and control and emergency medical technology. The program includes classroom instruction and training at local fire companies. Students are required to complete work-based learning and take seven (7) certification exams.</p>	<p><a href="#">Maryland Fire &amp; Rescue Institute</a>                      Emergency Medical Technician (EMT) certification                      Emergency Medical Responder (EMT) certification                      Fire Fighter I certification                      Fire Fighter II certification                      Truck Company Fireground Operations certification                      Rescue Technician - Site Operations certification                      Rescue Technician - Vehicle and Machinery Extraction certification                      Hazardous Material Operations certification                      College Credit</p>
<p><a href="#">Homeland Security and Emergency Preparedness Programs:</a></p> <ul style="list-style-type: none"> <li>• Homeland Security Sciences</li> <li>• Criminal Justice and Law Enforcement</li> <li>• Information and Communications Technology</li> </ul>	<p>The Homeland Security and Emergency Preparedness (HSEP) programs prepare students for industry certification and college credit in one of three program options: Homeland Security Sciences, Criminal Justice and Law Enforcement or Information/Communications Technology. All Students complete a foundation level course with a focus on protecting against threats to public safety through effective communication, preparedness, detection, prevention, response and recovery. Students then go on to take courses related to their specific program.</p>	<p><a href="#">Esri</a>  <a href="#">Geographic Information System (GIS) certification</a>                      Esri ArcGIS Desktop certification                      College Credit</p>

## PROGRAM HIGHLIGHTS: TEACHER ACADEMY OF MARYLAND (TAM)

The Teacher Academy of Maryland (TAM) introduces students to the teaching profession and gives them a jump start on college coursework. TAM students can enroll directly in a four-year college with a teacher education program, netting credit for their high school program. They can also enroll in any of the 13 community colleges statewide that offer the articulated Associate of Arts in Teaching degree - a two-year degree with coursework that transfers to any in-state, four-year college (public or private) with a teacher-preparation program. Towson University, which graduates the largest number of teacher candidates in the state, is the program partner, offering transcribed credit and scholarship to TAM graduates as well as professional development to teachers.

For more information please go to:  
<http://www.towson.edu/coe/tam>.



# HUMAN RESOURCE SERVICES CONTINUED

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.



HIGH SCHOOL CTE PROGRAM	DESCRIPTION	INDUSTRY CREDENTIAL
<p><b>Early Childhood Education- Infants/Toddlers Child Development Associate (CDA)</b> Early Childhood Education Preschool Child Development Associate (CDA)</p>	<p>The Early Childhood Education - Infants/Toddlers and Preschool CDA follows the high school Child Development Associate (CDA) Program. Upon successful completion of the program, students are eligible for certification issued by The Council for Professional Recognition. The CDA is a nationally-transferable, most widely recognized, credible and valid credential in the Early Childhood Education field. Students may earn the CDA in center-based programs. Students complete 120 clock hours of child development content and 480 hours of experience working directly with children in licensed facilities. In addition to industry certification, students also have the opportunity to earn college credit.</p>	<p>Child Development Associate – Infant/ Toddler certification  Child Development Associate – Preschool certificate</p>
<p><b><u>Teacher Academy of Maryland (TAM)</u></b> For more information about teaching requirements go to: <a href="http://www.towson.edu/coe">http://www.towson.edu/coe</a> For more information about the ParaPro certification, please visit: <a href="http://www.ets.org">www.ets.org</a>.</p>	<p>The Teacher Academy of Maryland program prepares students for further education and careers in the education profession. The program focuses on human growth and development through adolescence, teaching as a profession, curriculum and instruction, and an education academy internship. Upon completion of the program and passing the ParaPro assessment, high school graduates are ready for employment in the teaching profession. This program is based on the outcomes of the Maryland Associate of Arts in Teaching (A.A.T.) degree. Students can receive college credit and scholarship to several Maryland baccalaureate teacher education programs.</p>	<p><u>Educational Testing Services</u> PraxisCORE ParaPro  College Credit</p>
<p><b>Junior Reserve Officers' Training Corps (JROTC)</b> Army Junior Reserve Officers' Training Corps (AJROTC) Navy Junior Reserve Officers' Training Corps (NJROTC) Air Force Junior Reserve Officers' Training Corps (AFJROTC) Marine Corps Junior Reserve Officers' Training Corp (MCJROTC)</p>	<p>JROTC programs prepare students for a variety of occupations and leadership JROTC programs provide a platform for students to conduct interest inventories and career exploration activities that highlight the educational and experiential requirements required for a broad spectrum of career fields. JROTC programs are designed to teach high school students the value of citizenship, leadership, service to the community, personal responsibility, and provide a sense of accomplishment, while instilling in them self-esteem, teamwork, and self-discipline. JROTC helps students build a strong knowledge base of self-discovery and leadership skills applicable to many leadership and managerial situations in both the military and civilian sectors.</p>	<p>Armed Services Vocational Aptitude Battery (ASVAB)  College Credit</p>

# INFORMATION TECHNOLOGY

Information Technology (IT) professionals will face increasing pressure to design, develop, implement, and support more complex and reliable IT solutions that will meet the needs of external and internal customers. This will require that 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.



HIGH SCHOOL CTE PROGRAM	DESCRIPTION	INDUSTRY CREDENTIAL
<p><b>Java Database Academy (Oracle)</b> For more information about industry standards, certification and the ACF, please go to: <a href="http://www.academy.oracle.org">www.academy.oracle.org</a>.</p>	<p>The Java Database Academy leverages Oracle's global technology leadership to offer a complete portfolio of computer science education resources to secondary schools with the goal of helping students become college and career ready. Students develop IT and business skills using production software that is common in hundreds of industries—and educators keep pace with current technology through ongoing professional development. The program is comprised of two pathways that lead to Oracle Associate Junior Certifications.</p> <p>Oracle Pathways: Java Programming and Database Programming</p>	<p><u>Oracle</u> Java Foundations Certified Junior Associate certification</p>
<p><b>IT Networking Academy (CISCO)</b> For more information about the Cisco Academy and Cisco certifications, please go to: <a href="http://www.netacad.com">www.netacad.com</a>.</p>	<p>The IT Networking Academy (Cisco) introduces students to both the physical and logical sides of networking. The program focuses on troubleshooting common networking issues with a strong emphasis on the security and documentation of network topology. Four pathway options prepare students to be career ready in the IT industry or continue their preparation at a postsecondary IT program. Students learn content that can lead to a range of industry certifications.</p> <p>Cisco Pathways: Certified Entry Network Technician, Certified Network Associate, Cybersecurity and Cyber Security Operations.</p>	<p><u>CompTIA</u> CompTIA ITF CompTIA A+, Network+, Security+, PenTest+, and Linux+ LPI Linux Essentials Cisco CCT Cisco CCNA RS Cisco CCNA Security Cisco CCNA Cyber Ops</p> <p>College Credit</p>



## PROGRAM HIGHLIGHT: IT NETWORKING ACADEMY (CISCO)

The IT Networking Academy (Cisco) prepares students for advanced study in a wide range of IT careers, including networking, cabling and wireless technologies. Approximately 2,500 students are enrolled in Cisco Academies across Maryland at the high school and college level. Cybersecurity is an increasingly important part of Information Technology (IT) programs and represents expanding opportunities for employment and advanced education in Maryland, which is home to: More than 12,000 IT and cybersecurity companies, 60+ government agencies tasked with protecting our nation from cyber-crime, including the National Security Agency, The National Cybersecurity Center for Excellence, The U.S. Cyber Command and 17 higher education institutions that have been designated National Academic Centers of Excellence in Cyber Defense.

# INFORMATION TECHNOLOGY CONTINUED

Information Technology (IT) professionals will face increasing pressure to design, develop, implement, and support more complex and reliable IT solutions that will meet the needs of external and internal customers. This will require that 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.



HIGH SCHOOL CTE PROGRAM	DESCRIPTION	INDUSTRY CREDENTIAL
<p><b>PLTW Computer Science</b> For more information about the Computer Science program, go to: <a href="http://www.pltw.org">www.pltw.org</a></p>	<p>The Project Lead The Way (PLTW) Computer Science program engages high school students in real-world activities like using automation to process and analyze DNA-sequence data. The PLTW projects and problems cultivate students' computational thinking, challenge them to think big, and help illustrate how intricately computer science is woven into our society. The College Board recognizes PLTW as an endorsed provider of curriculum and professional development for Advanced Placement (AP) Computer Science Principles (AP CSP). The program culminates in a cybersecurity course that includes a virtual cyber range where students learn to detect IT system vulnerabilities.</p>	<p><u>College Board Exam</u> AP Computer Science Principles AP Computer Science A  College Credit</p>
<p><b>Mobile Apps and Software Development (Apple)</b> For more information about the Mobile Apps and Software Development program, go to: <a href="https://www.apple.com/education/k12/">https://www.apple.com/education/k12/</a></p>	<p>The Develop in Swift curriculum is intended for high school and higher education students to explore designing and building a fully functioning app of their own. As they develop new skills, students will master key coding concepts and can even earn AP<sup>®</sup> credit or an industry-recognized certification for their knowledge of Swift and Xcode. And students who earn certification can share a digital badge with their professional networks to convey their preparedness for industry. Supporting teacher guides provide educators with tools to deepen engagement with aspiring app developers, regardless of experience teaching Swift or other programming languages. For after-school or summer learning programs, there are complimentary Swift Coding Club materials. And app showcases give aspiring coders a chance to celebrate their ingenuity with the community, whether they are learning in or out of the classroom.</p>	<p><u>College Board Exam</u> AP Computer Science Principles  <u>Apple</u> APP Develop with Swift: Level 1</p>

# MANUFACTURING, ENGINEERING, AND TECHNOLOGY

Programs in the Manufacturing, Engineering, and Technology Cluster prepares 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.



HIGH SCHOOL CTE PROGRAM	DESCRIPTION	INDUSTRY CREDENTIAL
<p><b><u>Project Lead The Way Engineering</u></b></p> <p>Aerospace Engineering                      Civil Engineering and Architecture                      Computer Integrated Manufacturing                      Computer Science Principles                      Environmental Sustainability</p> <p>For general information about PLTW please go to:  <a href="http://www.pltw.org">www.pltw.org</a></p>	<p>The Project Lead The Way (PLTW) Engineering: program prepares students for further education and careers in engineering and engineering technology. Students complete foundation-level courses in Engineering, including Introduction to Engineering Design, Principles of Engineering and Aerospace Engineering, Civil Engineering and Architecture, Computer Integrated Manufacturing, Computer Science Principles, or Environmental Sustainability. In the final course, students complete an industry-mentored capstone project in Engineering Design and Development. Students who qualify can earn transcribed credit at PLTW—affiliated colleges and universities nationwide, including the University of Maryland Baltimore County.</p>	<p><u>Autodesk</u>                      AutoCAD Certification                      Revit Certification</p> <p><u>College Board Exam</u>                      AP Computer Science Principles</p> <p>College Credit</p>



PLTW contributes to a strong, positive impact on mathematics and science achievement and offers a pathway to prepare and motivate students to enter careers in engineering and science. Maryland's PLTW Engineering program is focused on increasing the number of students prepared for college and STEM-related careers—specifically women and minorities who are underrepresented in the field. Below are some Maryland manufacturing facts from the U.S. Bureau of Economic Analysis and the U.S. Census Bureau:

- Manufacturers in Maryland account for 5.89 percent of the total output in the state, employing 3.92 percent of the workforce.
- Total output from manufacturing was \$24.32 billion in 2018.
- In addition, there were 108,000 manufacturing employees in Maryland in 2019, with an average annual compensation of \$90,661.01 in 2018.

“A solid foundation in math and science broadens the higher education and career opportunities available to students. Students who participate in Maryland's PLTW Engineering Program arrive at our campus well-prepared to complete a degree in engineering or another STEM-related field.”

- Freeman Hrabowski, President  
 UMBC - PLTW Affiliate University

# MANUFACTURING, ENGINEERING, AND TECHNOLOGY CONTINUED



Programs in the Manufacturing, Engineering, and Technology Cluster prepares 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.

HIGH SCHOOL CTE PROGRAM	DESCRIPTION	INDUSTRY CREDENTIAL
<p><b><u>Manufacturing Engineering Technologies</u></b>                      Manual Milling                      Turning Operations Between Centers                      Turning with Chucking                      Grinding                      Drilling Operations                      CNC Turning Operations                      CNC Turning: Programming Set-up &amp; Operations                      CNC Milling Operations                      CNC Milling: Programming Set-up &amp; Operations</p> <p>For general information about NIMS credentials, please go to: <a href="http://www.nims.org">www.nims.org</a>.</p>	<p>This program prepares students for a beginning career in manufacturing and machine technologies and aligns to the National Institute of Metalworking Skills (NIMS) Machining Level I Credentials. Students participate in hands-on education in precision machining while developing competency in process control, manual operations, process adjustment, and part inspection. They must also demonstrate machine safety. Students enrolled in the MET-NIMS CTE program of study must complete the NIMS accreditation process. The program includes for credentialing areas—two required by NIMS and two selected by the school system. Students must complete at least one credentialing area.</p>	<p><u>National Institute of Metalworking Skills</u>                      Job Planning, Benchwork &amp; Layout                      Measurement, Materials &amp; Safety                      Manual Milling Skills I certification                      Turning Operations: Turning Between Centers                      NIMS Turning Operations: Turning Chucking                      NIMS Grinding Skills I                      NIMS Drill Press Skills I                      NIMS CNC Turning: Programming Setup &amp; Operations                      NIMS CNC Milling: Pgm Setup &amp; Operations                      NIMS CNC Turning: Operations                      NIMS CNC Milling: Operations</p> <p>College Credit</p>



**National Institute for Metalworking Skills®**

NIMS credentials are earned by students, trainees, apprentices, employees, and military personnel nationwide and around the world. By earning NIMS credentials, these individuals secure a competitive edge when applying for jobs because they have demonstrated that their skills meet the industry established standards. And NIMS credentials never expire.

# 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 higher level skills to manage and maintain transportation equipment. High school programs provide opportunities for students to prepare for careers in the automotive industry.



HIGH SCHOOL CTE PROGRAM	DESCRIPTION	INDUSTRY CREDENTIAL
<p><b><u>Automotive Technician (ASE)</u></b>                      For more information about Automotive Service Excellence (ASE) Education Foundation standards and industry certification, please go to:  <a href="http://www.aseeducation.org">www.aseeducation.org</a></p>	<p>The Automotive Technology program incorporates the Automotive Service Excellence (ASE) program certification standards. The ASE accreditation model has been updated and broadened to include all eight certification areas: Suspension and Steering, Brakes, Electrical/Electronic Systems, Engine Performance, Engine Repair, Heating and Air Conditioning, Automatic Transmission and Transaxle, and Manual Drive Train. Each course is aligned to industry requirements for certification and success in the field. The end-of-course assessment provide students the opportunity to earn up to four ASE student certifications as well as college credit.</p>	<p><u>Automotive Service Excellence Education Foundation</u>                      Suspension and Steering student certification                      Brakes student certification                      Electrical/ Electronic Systems student certification                      Engine Performance student certification                      Engine Repair student certification                      Automatic Transmission/Transaxle student certification                      Manual Drive Train and Axles student certification                      Heating and Air Conditioning student certification                      Maintenance and Light Repair student certification</p> <p>College Credit</p>



**Education Foundation**

## PROGRAM HIGHLIGHT: AUTOMOTIVE TECHNICIAN

The ASE Education Foundation was founded to develop, encourage, and improve automotive technician education. ASE examines the structure and resources of training programs and evaluate them against nationally accepted standards of quality. ASE's precise national standards reflect the skills that students must master. The ASE evaluation process ensures that ac credited training programs meet or exceed industry-recognized uniform standards of excellence.

# TRANSPORTATION TECHNOLOGIES CONTINUED

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 higher level skills to manage and maintain transportation equipment. High school programs provide opportunities for students to prepare for careers in the automotive industry.

HIGH SCHOOL CTE PROGRAM	DESCRIPTION	INDUSTRY CREDENTIAL
<p><b><u>Autobody/Collision Repair Technician (ASE)</u></b>            For more information on Autobody/Collision Repair Technician (ASE), please go to ASE at <a href="http://www.aseeducation.org">www.aseeducation.org</a> or to the Inter-Industry Conference on Auto Collision Repair, (I-CAR) at <a href="http://www.i-car.com">www.i-car.com</a>.</p>	<p>The Autobody/Collision Repair Technician program combines technical, academic, and workplace skills in an integrated curriculum in accordance with the Automotive Service Excellence's (ASE) guidance and directives and from the Inter-Industry Conference on Auto Collision repair (I-CAR). The program consists of the following courses: Non-Structural Analysis &amp; Damage Repair, Paint and Refinishing, and Structural Analysis and Damage Repair. Each course has an ASE end-of-course assessment providing students the opportunity to earn ASE students achievement certificates and college credit.</p>	<p><u>Automotive Service Excellence Education Foundation</u>            Painting and Refinishing student certification            Structural Analysis and Damage Repair student certification            I-CAR Platinum Certificate            College Credit</p>
<p><b>Medium-Heavy Truck (ASE)</b>            For more information about the ASE standards and industry certification, please go to: <a href="http://www.aseeducation.org">www.aseeducation.org</a></p>	<p>The Medium/Heavy Truck Technician program combines technical, academic and workplace skills in an integrated curriculum in accordance with all ASE guidance and directives. The program consists of the following courses: Diesel Engineering, Suspension and Steering, Brakes, Electrical/Electronic Systems, and Preventive Maintenance. Each course has an ASE end-of-course assessment providing students the opportunity to earn ASE student achievement certificates and college credit.</p>	<p>Diesel Engines student certification            Electrical/Electronic Systems student certification            Brakes student certification            Suspension and Steering student certification            College Credit</p>



Education Foundation

# WORK-BASED LEARNING

Supervised work-based learning allows 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.



HIGH SCHOOL CTE PROGRAM	DESCRIPTION	INDUSTRY CREDENTIAL
<p><b>Career Research and Development (CRD)</b> Stevenson University is the affiliate partner for CRD. For more information about the CRD curriculum, please go to: <a href="http://www.crd-msde.org">www.crd-msde.org</a>.</p>	<p>The Career Research and Development (CRD) is a CTE program that prepares students with the academic, technical and workplace skills necessary to seek further education and employment in a career field of their interest upon graduating high school. Students learn how to effectively plan for their future by defining their employment, education and goals; building financial literacy skills; and integrating the Maryland's Skills for Success as they begin to manage their career and educational choices. The program consists of two in-school courses and a work-based learning component. The work-based learning (WBL) experience takes place at the worksite, includes a minimum of 135 hours, and may be paid or unpaid. This experience is directed by an agreement that is developed by the student, WBL coordinator, and employer. The WBL plan identifies the appropriate academic, technical, and workplace readiness competencies that apply directly to students' goals for a specific work-related placement.</p>	<p><u>Armed Services Vocational Aptitude Battery</u> Career Research and Development students may take the Armed Services Vocational Aptitude Battery (ASVAB) <a href="https://www.asvabprogram.com">https://www.asvabprogram.com</a>.</p> <p>A score of 31 is determined to meet the Technical Skill Assessment (TSA) requirement for the purposes of Maryland CTE program of study accountability measures.</p>
<p><b>Apprenticeship Maryland (AMP)</b> For more information about the AMP program, please go to: <a href="http://www.marylandpublicschools.org">www.marylandpublicschools.org</a> or <a href="http://www.dllr.state.md.us">www.dllr.state.md.us</a>.</p>	<p>The Apprenticeship Maryland (AMP) program is the result of a partnership between the Maryland State Department of Education and the Department of Labor, Licensing and Regulation. The program provides high school students with all aspects of an apprenticeship experience including work-based learning, related classroom instruction, and one-on-one mentoring from an industry professional. In addition to the traditional pathways, students are encouraged to participate in youth apprenticeships leading to sustainable employment and further education in manufacturing and Science, Technology, Engineering, and Mathematics (STEM) occupations. Participating students start the program in their junior or senior year and complete at least one year related classroom instruction and a minimum of 450 hours of work-based training under the supervision of an eligible employer. The workplace component is a paid (at least minimum wage) mentored, on-the-job work experience with a written learning plan and a formal agreement among the students, school and employer.</p>	<p>Students will receive a State Skill Certification through the Department of Labor.</p>

## PROGRAM HIGHLIGHT: APPRENTICESHIP MARYLAND (AMP)

Current Youth Apprenticeship Program Overview as of March 25, 2021



- Number of Total Youth Apprentices 2020-2021 School Year: 57
- Number of Participating Businesses 2020-2021 School Year: 177 unduplicated employers
- Number of Participating School Systems 2020-2021 School Year: 16
- Current Average Hourly Wage: \$12.62 (ranges from \$11.00 to \$15.00)
- Number and Percentage of AMP Students Also With Status as Registered Apprentices: 23 (40.3%)

# CAREER AND TECHNICAL STUDENT ORGANIZATION (CTSO)



CTSOs are co-curricular learning experiences that allow students to build on CTE instructional and technical content learned during the school day. Students expand their career awareness and development through participation and leadership in a CTSO. Future Business Leaders of America-Phi Beta Lambda inspires and prepares students to become community-minded business leaders in a global society through relevant career preparation and leadership experiences.

Future Business Leaders of America-Phi Beta Lambda, Inc. (FBLA-PBL) is the largest career student business organization in the world. Each year, FBLA-PBL helps over 230,000 members prepare for careers in business. FBLA-PBL's programs focus on: Leadership Development, Academic Competitions, Educational Programs, Membership Benefits, Community Service, and Awards & Recognition.

FBLA-PBL classroom activities include business education, marketing, finance, and management experience through work-and project-based learning. Members explore career fields and job industries through academic competitions, educational programs, and classroom activities.

Currently, there are over 230,000 FBLA members in middle school (FBLA-Middle Level), high school (FBLA), and college (PBL) in all 50 states, U.S. territories, and international chapters. In Maryland, there are 116 local chapters and over 3,600 student members.

Students enhance their leadership skills, expand their business knowledge, contribute to their local communities, and earn recognition by immersing themselves in the National Awards Program. The National Awards Program focuses on academic competitions in ten of the 16 national career clusters through 143 different competitive events with real-life, hands-on experiences for student members.

For more information about the FBLA program, please go to: [www.marylandpublicschools.org](http://www.marylandpublicschools.org).



## CAREER AND TECHNICAL EDUCATION PROGRAMS OF STUDY

Academy of Finance (NAF)	Java Database Academy (Oracle)
Accounting & Finance	Hospitality & Tourism Management Program
Business Administrative Services	Interactive Media Production
Marketing	IT Networking Academy (CISCO)
Food & Beverage Management (ProStart)	Mobile Application & Software Development (Apple)
Graphic Communication	PLTW Computer Science

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CTSOs are co-curricular learning experiences that allow students to build on CTE instructional and technical content learned during the school day. Students expand their career awareness and development through participation and leadership in a CTSO. FFA makes a positive difference in the lives of students by developing their potential for premier leadership, personal growth and career success through agricultural education.

The FFA is an intracurricular student leadership organization for students enrolled in agriculture education. It is one of three components of a total agricultural education program along with classroom instruction and career preparation/work-based learning.

FFA classroom activities include math and science as well as hands-on work experience and the development of life skills, helping members discover their career path and realize success. FFA members are future chemists, veterinarians, government officials, entrepreneurs, bankers, international business leaders, teachers and premier professionals in many career fields.

Currently, there are 760,113 FFA members in grades seven through 12 and college, ages 12-21, in 8,739 chapters in all 50 states, Puerto Rico and the U.S. Virgin Islands. In Maryland, there are 54 local chapters and over 2,500 student members.

Collectively, FFA members earn more than \$4 billion annually through their hands-on work experience.

Members participate and learn advanced career skills in 47 national proficiency areas based on their hands-on work experiences ranging from agricultural communications and food science and technology to turf grass management and wildlife production and management.

Through 24 national career development events, FFA members are challenged to real-life, hands-on test of skills used to prepare them for over 300 unique careers in agriculture.



## CAREER AND TECHNICAL EDUCATION PROGRAMS OF STUDY

CASE - Agricultural Engineering

CASE - Animal Science

CASE - Natural Resources

CASE - Plant Sciences

Horticultural Service: Certified Professional Horticulturist (CPH)



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CTSOs are co-curricular learning experiences that allow students to build on CTE instructional and technical content learned during the school day. Students expand their career awareness and development through participation and leadership in a CTSO. SkillsUSA is a partnership of students, teachers and industry working together to ensure America has a skilled workforce.

SkillsUSA's mission is to empower its members to become world-class workers, leaders and responsible citizens. The mission is accomplished through the development of the SkillsUSA Framework, a blueprint for career readiness that incorporates personal, workplace and technical skills grounded in academics. The organization's vision is to produce the most highly skilled workforce in the world, providing every member the opportunity for career success.

SkillsUSA the nation's most diverse Career and Technical Student Organization (CTSO) recognized by the U.S. Department of Education and Labor as a successful model of employer-driven workforce development. Active in 53 states and U.S. territories, SkillsUSA serves more than 370,000 students and instructors annually.

Each year, SkillsUSA Maryland chapters across the state serve over 4,000 middle-school, high-school and college/postsecondary students as they prepare for careers in trade, technical and skilled services, including health occupations. Chapter members participate in a wide variety of activities and professional development opportunities including state and national conferences and program-aligned competitive events.



## CAREER AND TECHNICAL EDUCATION PROGRAMS OF STUDY

Academy of IT	HVAC	Electrical	Legal Support Services
Autobody/Collision Repair	Construction Maintenance	Engineering	Manufacturing Engineering
Automotive Service Technology	Welding	Fire Science	Masonry
Biomedical Science	Cosmetology	Food & Beverage Management (ProStart)	Medium-Heavy Truck Technology
Media Broadcasting	Criminal Justice	Graphic Communication (Print[ED])	Pharmacy Tech
Cisco Academy	Culinary Arts	Health Professions	Plumbing
Communications Technology	Database Academy	Homeland Security	Teacher Academy
Construction Design	Dental Assisting	Interactive Media Production	Carpentry

# CAREER & TECHNICAL EDUCATION

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