This document was developed using funds authorized under the Carl D. Perkins Career and Technical Education Improvement Act of 2006, as amended by Public Law 109-270.

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Career and Technology Education (CTE) provides high school and community college students an opportunity to pursue a sequential technical and academic program of study leading to advancement in a career field. High school CTE programs of study give students the opportunity to transition smoothly into further education or postsecondary education and to earn college credit and/or industry credentials in a career field of interest.

Maryland leads the nation in the redesign of CTE programs as called for in the federal Carl D. Perkins Career and Technical Education Improvement Act of 2006. The Maryland State Department of Education (MSDE) works closely with the Governors Workforce Investment Board (GWIB) to identify new programs in response to Maryland's workforce development needs and to ensure all CTE programs of study keep pace with industry expectations and prepare students for their next steps toward college and careers.

Career Clusters: The New Career Technology Education (CTE)

MSDE in partnership with statewide industry advisory groups, identified ten (10) Career Clusters that represent core business functions across broad industry areas in Maryland. Business partners further identified career pathways based on the end-to-end business processes within career clusters. This representation of industry clusters and career pathways is provided in the MSDE publication Maryland Career Clusters: Restructuring Learning for Student Achievement in a Technologically Advanced, Global Society and serves as a starting point for the identification of Maryland CTE programs of study.

Career Clusters allow students to explore a wide range of career options and to apply academic and technical skills in a career area. Career Pathways are like road maps of learning that help students plan for and pursue further education and careers.

Using the Career Clusters Framework to develop new CTE programs at the high school helps students gain a better understanding of the world of work and what is required to prepare for a career. Each Career Cluster includes at least two CTE program options for students to gain more advanced understanding and preparation for a career field. For example, the chart below depicts the wide range of career fields in the Arts, Media, and Communication industry in Maryland. Students may choose from three CTE programs or arts-based programs to further explore these careers.

Maryland’s CTE Career Clusters

- Arts, Media, and Communication
- Business Management and Finance
- Construction and Development
- Consumer Services, Hospitality, and Tourism
- Environmental, Agricultural, and Natural Resources Systems
- Health and Biosciences
- Human Resource Services
- Information Technology
- Manufacturing, Engineering, and Technology
- Transportation Technologies

## Industry Career Pathways

<table>
<thead>
<tr>
<th>Multimedia Production</th>
<th>Interactive Media Production</th>
</tr>
</thead>
<tbody>
<tr>
<td>Graphic Design/Printing</td>
<td>Graphics and Printing Communication Technology</td>
</tr>
<tr>
<td>Film and Radio</td>
<td>Communication and Broadcast Technology</td>
</tr>
<tr>
<td>Broadcast Journalism</td>
<td></td>
</tr>
<tr>
<td>Visual Arts</td>
<td></td>
</tr>
<tr>
<td>Performing Arts</td>
<td>Art, Music and Drama courses and programs are offered through the high school art department. These are not CTE programs of study.</td>
</tr>
<tr>
<td>Public Relations</td>
<td></td>
</tr>
</tbody>
</table>

For more information about Maryland’s Career and Technology Education programs, go to www.MarylandPublicSchools.org. Click first on Divisions and then on Career and College Readiness.
Maryland CTE Programs of Study

Maryland CTE programs of study are statewide model programs designed to prepare high school students for the 21st Century's global economy and its rapidly changing workforce needs. All CTE programs are aligned to established academic and technical skill standards to ensure student preparation for college and careers. These programs also include work-based learning opportunities (e.g., internships, clinical experiences, or industry-mentored projects) tied to the student's area of interest. Upon completion of a Maryland CTE program of study, students also have the option to earn college credits and/or industry-recognized credentials such as certifications and licenses.

The Maryland CTE programs of study outlined in this document serve as a resource for local school systems and their community college partners. The programs included in this document are MSDE-developed programs designed with state and national-level partners, are standardized across the state and include opportunities for state-wide professional development for teachers. For each Career Cluster, MSDE has identified several new Maryland CTE programs of study for development. Most of the programs listed have been completed and are offered throughout Maryland. However, several programs are currently under development. Please review the program descriptions for specific information regarding each Maryland CTE program of study.

The Maryland State Department of Education, 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. Local school systems are encouraged to adopt the Maryland CTE programs of study outlined in this publication and to partner with higher education in supporting student transition to postsecondary education and careers. The MSDE is also collaborating with school systems, business and higher education to develop and expand CTE programs in high-demand careers, such as those in the Science, Technology, Engineering and Mathematics (STEM) disciplines.

Given that CTE programs are closely aligned with regional economic and work-force development priorities, not all high schools have programs in all career clusters. Based on local needs and opportunities, each school system decides which clusters and corresponding CTE programs to offer. For more information about local CTE programs of study, please contact the local school system or go to www.MarylandPublicSchools.org for a link to the school district's web site.

Preparing Today for the Jobs of Tomorrow

CTE programs are designed to support students in making decisions about education and career options. While students generally enroll in a CTE program in 10th or 11th grade, career exploration begins far earlier. In middle school, students participate in career-awareness activities—for example, field trips, job-shadowing, interest inventories—and develop high school plans, mapping out academic coursework and career options.

Today, high school students face many options for academic growth and career exploration. Making informed choices about their high school program of study will prepare them for success in further education and lead to a rewarding career. Students may learn more about career opportunities for Maryland graduates at www.BeWhatIWanttoBe.com.

Program Highlight: Career Research and Development (CRD)

To support students in learning about careers, work-based learning opportunities are made available to all CTE students. Supervised work-based learning experiences allow high school students on-the-job training related to their career choice. Students may also elect to complete the work-based learning CTE program, Career Research and Development (CRD). The program is designed to link the classroom with specific work experiences and includes two school-based courses followed by at least two work-based learning credits (generally in the last year of high school). These experiences are organized around a work plan that is cooperatively developed by the school coordinator and employer to add value to and extend a student's career preparation. Students in CRD can be placed in positions related to any of Maryland's 10 career clusters.
Sample High School Program of Study

Students electing to complete a CTE Program as part of the high school program are prepared for entry into college and a career pathway. The chart below shows a typical high school program of study that includes a CTE Program Sequence beginning in Grade 10. It also depicts how students can earn industry certification and/or college credit while in high school.

<table>
<thead>
<tr>
<th>High School Program</th>
<th>College Program</th>
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</thead>
<tbody>
<tr>
<td><strong>Requirements</strong></td>
<td><strong>Grade 9</strong></td>
</tr>
<tr>
<td>English - 4</td>
<td>English 9</td>
</tr>
<tr>
<td></td>
<td>AP Language</td>
</tr>
<tr>
<td>Social Studies - 3</td>
<td>US Government</td>
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<tr>
<td></td>
<td>AP European</td>
</tr>
<tr>
<td>Mathematics - 3</td>
<td>Algebra I</td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Science - 3</td>
<td>Earth or AP</td>
</tr>
<tr>
<td></td>
<td>Physical Science</td>
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<td></td>
<td></td>
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<tr>
<td>Physical Education</td>
<td>.5 PE</td>
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<tr>
<td>- .5</td>
<td></td>
</tr>
<tr>
<td>Fine Arts - 1</td>
<td>.5 Fine Arts</td>
</tr>
<tr>
<td>Technology</td>
<td>.5 Fine Arts</td>
</tr>
<tr>
<td>Education - 1</td>
<td>Foundations</td>
</tr>
<tr>
<td></td>
<td>of Technology</td>
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<tr>
<td>CTE Completer</td>
<td>CTE Course (1)</td>
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<tr>
<td>Program - 4</td>
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<tr>
<td>CTE Program</td>
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<tr>
<td>Sequence</td>
<td></td>
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<tr>
<td>CTE Program</td>
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<tr>
<td>Concentration</td>
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<tr>
<td>Foreign Language</td>
<td>Foreign Language</td>
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<tr>
<td>Language - 2</td>
<td></td>
</tr>
<tr>
<td>and/or Advanced</td>
<td></td>
</tr>
<tr>
<td>Tech Ed - 2</td>
<td></td>
</tr>
</tbody>
</table>

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 systems and/or community colleges who work together to identify areas of interest and program requirements.

In most 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.
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 Broadcast Production, Graphic Communications, Web Design, Interactive Media and Game Design. Maryland CTE programs include a focus on mass communication and broadcast journalism, graphic communication, and multimedia production. Working with people from the industry helps ensure that our programs keep pace with the industry. These programs include options for students to earn industry certifications and college credit toward advanced study in the career field.

<table>
<thead>
<tr>
<th>High School CTE Program</th>
<th>CTE Program Description:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication and Broadcast Technology</td>
<td>The Communication and Broadcast Technology program is currently under development. This program builds on current CTE programs and will provide students the opportunity to apply technical knowledge and skills to the production of television and other media programs. Students will learn about media production and related operations including sound, video, film and digital media transmission. As part of the program, students may participate in an internship or mentored project related to the field of communication. Support for the development of this program is provided by Maryland Public TV, industry partners, and Maryland colleges and universities.</td>
</tr>
</tbody>
</table>

**Program Highlight: Graphic Communications (PrintED)**

Twenty out of 21 CTE Graphic Communications programs in Maryland have earned the Graphic Arts Education and Research Foundation's industry certifications in PrintED. Students earning certification are eligible for college credit through statewide articulation agreements.

<table>
<thead>
<tr>
<th>Graphic Communications (PrintED)</th>
<th>For more information about the Graphic Arts Education and Research Foundation and the PrintED program standards, please go to: <a href="http://www.gaerf.org/printed">www.gaerf.org/printed</a></th>
</tr>
</thead>
</table>

**Interactive Media Production**

- Advanced Interactive Media
- Simulation and Gaming

For more information about the related industry certifications for Adobe Creative Suite, please go to: [www.adobe.com](http://www.adobe.com)

For more information about industry certification for web design and the World Organization of Webmasters, please go to: [www.joinwow.org](http://www.joinwow.org)

Interactive Media Production students gain experience in Internet technology and website development, computer graphics, digital media production and project management. Simulation and Gaming students advance their understanding and skill level in computer game design and interactive programming. All students develop a portfolio of their work and may earn certification in Adobe Creative Suite or web design. Graduates may also earn articulated college credit.
High School CTE Program

Academy of Finance (NAF)
For more information about the National Academy Foundation and the Academy of Finance, please go to: www.naf.org

Accounting and Finance
For more information about the Financial Accounting CLEP exam, please go to: www.collegeboard.com
Also visit: www.businesseducationmsde.com

Marketing
For more information about the Principles of Marketing CLEP exam, please go to: www.collegeboard.com

Business Administrative Services
For information about the industry certification, please visit: www.microsoft.com/learning/mcp/officeprofessional/officeprofessional.mspx

Business Management
For more information about the Principles of Management CLEP test, please go to: www.collegeboard.com

CTE Program Description:

Academy of Finance (NAF)
The National Academy Foundation (NAF) Finance Academy provides students with a broad 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 an internship to advance their understanding of careers in business and finance.

Accounting and Finance
In the Accounting and Finance program students learn decision making techniques, financial management, basic accounting principles, business communication skills, problem solving, and teamwork and networking skills. The final two courses in the program focus on advanced accounting and finance knowledge to prepare them for college level courses and entry-level positions in the work force and a capstone course project. Students may also complete a capstone project and/or dual enrollment in college accounting and finance.

Marketing
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. Internships and mentored projects are highly recommended. Graduates may earn college credit through articulation agreements, dual enrollment, or by taking the Principles of Marketing CLEP exam.

Business Administrative Services
The Business Administrative Services program provides students with knowledge of how to effectively utilize 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.

Business Management
The program begins with courses in Principles of Business, Administration, and Management and Financial Management. The final two courses in the program focus on Management, including Advance Business Management and Capstone course. This program prepares students for college-level programs in various areas of Business Administration. Graduates may earn college credit through articulation agreements, dual enrollment, or by taking the Principles of Management CLEP exam.
Program Highlight: Construction Trades 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 easier transition from high school to college programs and apprenticeship.

High School CTE Program

<table>
<thead>
<tr>
<th>Construction Design and Management</th>
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</thead>
<tbody>
<tr>
<td>For more information regarding industry certification, please go to: <a href="http://www.autodesk.com">www.autodesk.com</a></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Construction Trades Professions</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Carpentry</td>
</tr>
<tr>
<td>• Electrical</td>
</tr>
<tr>
<td>• Plumbing</td>
</tr>
<tr>
<td>• Masonry</td>
</tr>
<tr>
<td>For more information on program standards, certification and NCCER, please go to: nccer.org</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Construction Maintenance</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Heating, Ventilating, Air Conditioning (HVAC)</td>
</tr>
<tr>
<td>• Industrial Maintenance</td>
</tr>
<tr>
<td>• Welding</td>
</tr>
<tr>
<td>For more information on program standards, certification and NCCER, please go to: nccer.org</td>
</tr>
</tbody>
</table>

CTE Program Description:

The Construction Design and Management program is currently under development. Students will be engaged in each phase of the design and construction process as they progress through the program. The first two courses require students to use design software to complete several projects and plans, including the use of 3-D modeling tools. In the advanced courses, students work in teams to complete a development project, with emphasis on construction standards; coordination of the construction process; estimating, planning and scheduling; and site management. Students may earn industry certification through Autodesk and/or college credit through articulation agreements with Construction Management programs.

The Construction Trades Programs are based on the National Center for Construction Education and Research (NCCER) standards and prepare students for further education and careers in the construction industry, with a focus on Carpentry, Electrical, Plumbing, or Masonry. Additional curriculum modules covering project management and project supervision as it relates to all areas of construction are offered as resources and support articulation to postsecondary Construction Management programs. Graduates meet Apprenticeship Training requirements and may earn industry certification and college credit through articulation agreements with community colleges.

The Construction Maintenance programs are based on the National Center for Construction Education and Research (NCCER) standards and prepare students for further education and careers in the construction industry, with a focus on Heating, Ventilating, Air Conditioning (HVAC); Industrial Maintenance; or Welding. Additional curriculum modules covering project management and project supervision as it relates to all areas of construction are offered as supplemental resources and support articulation to postsecondary Construction Management programs. Graduates meet Maryland Apprenticeship Training requirements and may earn industry certification and college credit through articulation agreements with community colleges.

Construction and Development

Advances in science and technology will continue to drive innovation in the design, construction, and maintenance of buildings and infrastructure, 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 specific construction trades, design or construction management.
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 the career field. Students who are interested in culinary arts, restaurant management, lodging management, or cosmetology, engage in real-world experiences through internships and mentoring opportunities. These allow students to apply their classroom instruction in meaningful ways, and they give them (through licensure or certification) a head start into the profession.

High School CTE Program

**CTE Program Description:**

**Culinary Arts (ACF)**

- Culinary Arts Program
- Baking / Pastry Program

The Culinary Arts program partners with the American Culinary Federation (ACF) to prepare students for successful careers in the food and beverage industry, with a focus on Culinary Arts 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 with Stratford.

**Food and Beverage Management (ProStart)**

For more information about the ProStart program, please go to: nraf.org/prostart

Food and Beverage Management (ProStart) is in partnership with 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. Students can also earn articulated credit at Stratford University through a statewide articulation agreement with Stratford.

**Lodging Management Program (LMp)**

For more information about CRDS, go to: www.lodgingmanagement.org

The Lodging Management Program introduces students to careers within the lodging industry. Students study and experience multiple aspects of the lodging industry including the rooms division, general department and facilities management, marketing and sales, and food and beverage services. The American Hotel and Lodging Educational Institute (AHLEI) designed the program’s curriculum and the Certified Rooms Division Specialist (CRDS) credential.

**Academy of Hospitality and Tourism (nAF)**

For more information about NAF, please go to: www.naf.org

In partnership with the National Academy of Foundation (NAF), the Academy of Hospitality and Tourism prepares students for postsecondary education and careers in one of the world’s largest service industries, hospitality and tourism. All AOHT students first take Principles of Hospitality & Tourism for a broad introduction to the core concepts at the heart of the hospitality industry. Students then take courses in customer service, geography, hospitality marketing, sports, entertainment and event planning, and sustainable tourism as well as complete an internship. In addition to the internship, students may also complete a college-level course during the senior year of high school.

**Careers in Cosmetology**

For more information about industry requirements and licensing in Maryland, please go to: MD State Board of Cosmetology at www.dllr.state.md.us

The Careers 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 and 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 experience and a senior capstone project. Upon successful completion of the program, the student are required to take the Maryland State Board of Cosmetologists’ Examination.

Program Highlight: Culinary Arts

The American Culinary Federation (ACF) program prepares students for careers and further education in professional cooking or baking. Thirteen 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. Students completing the program earn ACF’s Certified Junior Culinarian credential.
Program Highlight: Curriculum for Agriculture 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 will be offered as part of the program:

- Introduction to Agriculture, Food and Natural Resources
- Principles of Agricultural Sciences - Plant
- Principles of Agricultural Sciences - Animal
- Animal and Plant Biotechnology
- Food Science and Safety
- Agricultural Business, Research and Development

The Curriculum for Agriculture 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 will offer students the opportunity to earn college credit upon successful program completion. For more information about CASE, please see the program highlight at the bottom of this page.

High School CTE Program

Curriculum for Agriculture Science Education (CASE)

For more information, please go to www.case4learning.org

CTE Program Description:

The Curriculum for Agriculture 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 will offer students the opportunity to earn college credit upon successful program completion. For more information about CASE, please see the program highlight at the bottom of this page.

Horticultural Services: Certified Professional Horticulturist (CPH)

For more information about industry requirements, please go to Maryland Nursery and Landscape Association: www.mnlaonline.org

The Horticultural Services program of study is based on requirements for the Certified Professional Horticulturist (CPH) certification used by the Maryland “green industry.” Students complete a sequence of courses which include including: 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.

Environmental Studies/Natural Resources

The Environmental Studies/Natural Resources program of study is composed of a four-course sequence that covers both environmental and natural resource management technologies and current issues related to these fields of study. This program incorporates green technologies and the impact of today's environment on our natural resources. The program includes an emphasis on research and the ethics involved in making decisions that impact our ecosystem. Students will engage in technical research and writing as it relates to real-world problem solving. Students will also have the opportunity to earn college credit through articulation agreements with Maryland colleges (currently under development).

Program Highlight: Curriculum for Agriculture Science Education (CASE):

"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
Health and Biosciences

Career and Technology 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, 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, and a wide variety of exciting careers.

High School CTE Program

**Academy of Health Professions (AHP)**
- CNA / GNA
- Pharmacy Tech
- Dental Assistant

For more information about Board of AHP program visit: [MarylandAHP.org](http://www.MarylandAHP.org)

**Biomedical sciences: Project Lead The Way (PLTW)**

For more information about Project Lead The Way, please go to: [Stevenson.edu/pltw/](http://www.Stevenson.edu/pltw/)

CTE Program Description:

The Academy of Health Professions program uses project and problem-based learning, clinical experiences, as well as classroom and lab instruction to teach students about the field of health care. Students progress through two foundation courses: Foundations 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 a specialized health care course. Students will also have the opportunity to earn state and/or nationally recognized certifications, and/or college credit through articulation agreements with local colleges. Stevenson University provides on-going curriculum and professional development to AHP teachers.

The Biomedical Sciences program is based on the national content standards for Science, Mathematics, and English Language Arts and the Accountability Criteria for the national Health Care Cluster Foundation Standards. The program consists of a sequence of four courses: Principles of the Biomedical Sciences, Human Body Systems, Medical Interventions, and Biomedical Innovations. Students who complete the program are prepared for employment and further education. Stevenson University, Maryland’s PLTW Biomedical Sciences Affiliate University, offers transcripted credit to students who successfully complete the program.

Program Highlight: Biomedical Sciences

Maryland is one of the first states in the country to implement the Biomedical Sciences program developed by Project Lead the Way (PLTW). Instructors in the program report that their students are very engaged in and highly motivated by the structure and content of the program. The PLTW Biomedical Sciences program is a problem and project-based curriculum where students work to solve real-world problems using scientific methods and research techniques. The science content of the first course is well aligned to Maryland’s Biology HSA and reinforces what students are learning in their science courses. The goal of the PLTW program is to produce an increasing and more diverse group of students to be successful in science, engineering and biotechnology programs at the four and two-year college level. Students enrolled in the program take the following sequence of courses: Principles of the Biomedical Sciences, Human Body Systems, Medical Interventions, and Biomedical Innovations. Stevenson University provides professional development to the PLTW Biomedical Sciences instructors.

“Biomedical Sciences careers are among the fastest growing in Maryland, and that’s why, together, we’re preparing our students by giving them the tools they need to compete and win in a rapidly changing 21st century economy.”

- Governor Martin O’Malley
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, security, and emergency response and the increased demand for legal intervention in business and communities will continue to drive the growth of law enforcement, emergency and legal services. The continuous need for education professionals, especially in the critical shortage areas, offers creative ways to engage young people early on in the teaching profession.

**Program Highlight: Teacher Academy of Maryland (TAM)**

The Teacher Academy of Maryland (TAM) introduces students to the teaching profession and gives them a jump 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. Or they can enroll in any of the 13 community colleges statewide that offer the articulated Associate of Arts in Teaching degree—a two-year degree whose coursework transfers to any in-state 4-year college (public or private) with a teacher-preparation program. Towson University, which graduates about one in every four teacher candidates—far more than any other college in Maryland—is the state’s program partner, offering both transcripted credit and scholarships to TAM graduates.

<table>
<thead>
<tr>
<th>High School CTE Program</th>
<th>CTE Program Description:</th>
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<tbody>
<tr>
<td><strong>Fire Science: Maryland Fire and Rescue Institute (MFRI)</strong></td>
<td>The Fire Science 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 as well as formal training at local fire companies. Students are required to complete work-based learning and take the seven certification exams.</td>
</tr>
<tr>
<td>For more information about the Maryland Fire and Rescue Institute, go to: <a href="http://www.mfri.org">www.mfri.org</a></td>
<td><strong>Homeland Security and Emergency Preparedness:</strong></td>
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<td>- Homeland Security Sciences</td>
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<td></td>
<td>- Criminal Justice and Law Enforcement</td>
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<td>- Information and Communications Technology</td>
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<td>For more information about the STARS GIS Technician Certification, please go to: <a href="http://www.mfri.org/stars_certify.php">www.mfri.org/stars_certify.php</a></td>
<td>The Homeland Security and Emergency Preparedness (HS/EP) program prepares students for industry certification and college credit in one of three areas: 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 completing the Homeland Security Sciences program complete additional courses in Homeland Security Science Research Methods and Applications. Students completing Criminal Justice and Law Enforcement complete an additional course in Administration of Justice and participate in an internship as part of the program. Students in the Information/Communications Technologies courses focus on Geographic Information Systems (GIS) and Remote Sensing (RS) technology leading to the STARS Entry-Level GIS Technician Certification.</td>
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<td><strong>Legal Support Services</strong></td>
<td>The Legal Support Services program is currently under development. This program will provide an overview of law, legal terminology and documentation, research, court related services and professional standards and ethics. This program will prepare students for legal services and for college law-related programs.</td>
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<td><strong>Childcare and Early Childhood Education</strong></td>
<td>The Childcare and Early Childhood Education program will be developed to provide an overview of learning theory and practice with an emphasis on early childhood. This program will prepare graduates to teach students ranging in age from infancy through eight years. Students will also have the opportunity to earn industry certification and college credit.</td>
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<td><strong>Teacher Academy of Maryland (TAM)</strong></td>
<td>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 test or PRAXIS I, 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, which aligns with the National Council for the Accreditation for Teacher Education standards.</td>
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<td>For more information about teaching requirements go to: <a href="http://www.marylandpublicschools.org">www.marylandpublicschools.org</a></td>
<td>For more information about the Parapro certification, please visit: <a href="http://www.ets.org">www.ets.org</a></td>
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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

Academy of Information Technology (NAF)

- IT Programming
- IT Networking
- Web Design

For more information about NAF, please go to: www.naf.org

Database Academy (Oracle)

The Database Academy (Oracle) program prepares students for successful careers in database administration, database programming, IT consulting, IT project management, and computer engineering. The Oracle Academy is a two-year program that includes database programming and programming for web-based applications. Each course of the Oracle Academy prepares students for the Oracle Certified Associate (OCA) certification.

For more information about Oracle, please go to: www.academy.oracle.com

IT Networking Academy (Cisco)

The IT Networking Academy (Cisco) prepares students for advanced study in IT and for industry certification, the first step in IT career path. Students learn how to install and configure switches and routers in multiprotocol networks using local- and wide-area networks; provide troubleshooting service; and improve network performance and security. The high school program for the IT Networking Academy starts with a foundation in computer hardware and software basics. Students advance their understanding of IT and may earn a range of industry certifications, such as CompTIA (A+, Net+) and Cisco CCENT.

For more information about Cisco Academy and Cisco certifications, please go to: www.cisco.com

IT Computer Science and Cyber Security

The Computer Science and Cyber Security program includes a sequence of four courses, starting with an overview of the Computing and Information Technology field and progressing through a more in-depth study of computer science. Students will learn all aspects of Computer Science. Students will learn all aspects of Computer Science, including programming, networks, graphics, databases, cyber security, artificial intelligence, and other applications in IT. Students may earn college credit for introductory level computer science and cyber security courses. Certification options are also available, including the Microsoft Technology Associate (MTA).

For more information about the Cisco Networking Academy, please go to: www.cisco.com

CTE Program Description:

In partnership with the National Academy Foundation (NAF), the Academy of Information Technology prepares students for post-secondary education and careers in a wide range of Information Technology (IT) careers. All students complete foundation-level courses in computer science and then choose an area of specialization. Students may focus on programming, networking, or web design options. Industry certification is available through Microsoft, CompTia, Cisco, Oracle and WOW based on the program option selected.

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. More than 3,000 students are enrolled in Cisco Academies across Maryland at the high school and college level. Cyber Security is an increasingly important part of Information Technology (IT) programs and represents expanding opportunities for employment and advanced education and training in Maryland. As students progress through these IT programs, additional options for Cyber Security and Information Assurance is provided.
Program Highlight: Project Lead The Way Pre-Engineering
Maryland's Project Lead The Way (PLTW) Pre-Engineering program is the fastest growing CTE program in the state. Currently, 21 school systems offer the program which 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. Nationally, the benefits of the program are:

- PLTW alumni are 5-10 times more likely to be studying engineering and technology.
- PLTW students have a higher retention rate in college engineering and science programs
- 97% of PLTW seniors intend to pursue a four-year degree or higher; whereas the national average is 67%.

“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
Program Highlight: Automotive Technician

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

Learn more about Achieving NATEF Accreditation for all three Automotive Training Programs at: http://natef.org/documents.html