NICE Webinar Series

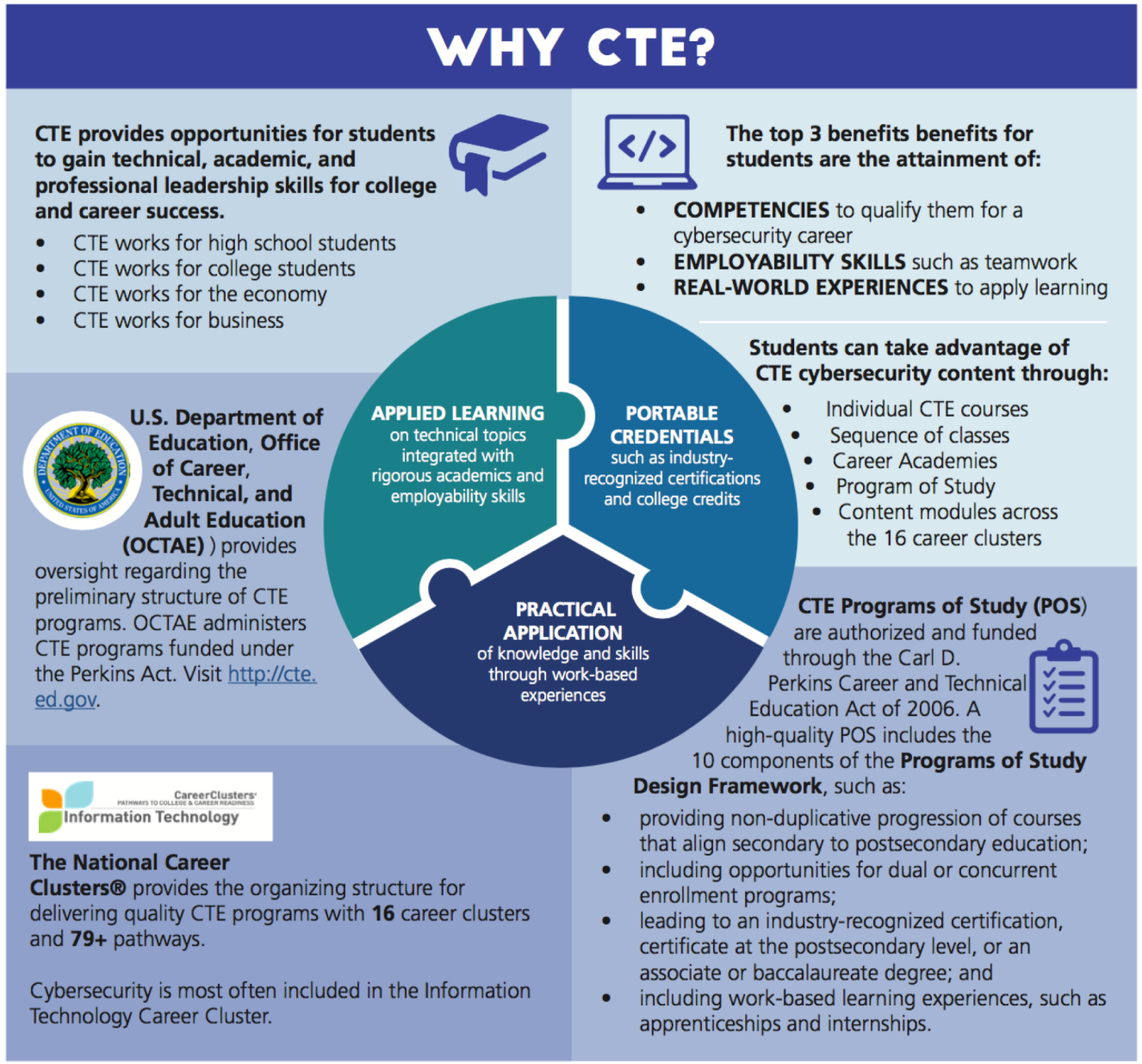
NATIONAL INITIATIVE FOR CYBERSECURITY EDUCATION

Preparing Students through Career and Technical Education and Cybersecurity Programs of Study

May 16, 2018

Career and Technical Education (CTE) programs have proven to be an effective approach to prepare secondary and postsecondary students to succeed in cybersecurity careers.

CTE provides students with the academic, technical, and employability skills through rigorous and applied coursework, work-based learning experiences, dual or concurrent enrollment, and industry-recognized certifications.



View the CTE One Pager at:

https://www.nist.gov/file/451611

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Overview of Career Technical Education and Programs of Study

Albert Palacios
Education Program Specialist
Division of Academic and Technical Education
Office of Career, Technical, and Adult Education
U.S. Department of Education

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Career and Technical Education

- Funded through the Carl D. Perkins Career and Technical Education Act of 2006 (Perkins IV)
- $1.1 Billion per year in Formula Grants
- States administer funding
- $7.4 Million in National Activities

CTE Programs of Study

- Incorporate and align secondary and postsecondary education
- Integrate academic, technical, and employability skills
- Include a coordinated sequence of courses
- Lead to industry-valued degrees and credentials

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For More Information

Perkins Collaborative Resource Network

http://cte.ed.gov

cte@ed.gov

Contact:

Albert Palacios

Albert.Palacios@ed.gov

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Q & A

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Cybersecurity Across CTE Pathways

Stephanie Holt

Fairfax County Public Schools

NEW High School Courses!

CYBERSECURITY

Career Pathway Courses Offered

Beginning Fall 2017

Learning that works for Virginia CTE™

16 CAREER CLUSTERS

Agriculture, Food & Natural Resources
Architecture & Construction
Arts, Audio/Visual Technology & Communications
Business Management & Administration
Education & Training
Finance
Government & Public Administration
Health & Medical Sciences
Hospitality & Tourism
Human Services
Information Technology
Law, Public Safety, Corrections & Security
Manufacturing
Marketing
Science, Technology, Engineering & Mathematics (STEM)
Transportation, Distribution & Logoistics

VIRGINIA DEPARTMENT OF EDUCATION

Career and Technical Education (CTE) actively partners with business and industry and Virginia educators to design and implement high quality, dynamic programs that meet current and projected workforce needs. Relevant work-based learning opportunities are critical for helping students connect learning to successful transition from high school to further education and careers.

A ***"CTE completer"*** is a student who has met the requirements for a "concentration" of courses and all requirements for high school graduation or an approved alternative education program.

A ***"concentration"*** is a coherent sequence of state-approved courses in which the student earns the equivalent of two 36-week courses and related stackable industry-recognized credentials.

Students in Cybersecurity courses will…

- Perform threat analysis strategies
- Simulate risk management protocols while working in problem solving teams
- Model communication practices and troubleshooting techniques
- Investigate networking concepts
- Explore the importance of safeguarding electronic information
- Examine cyber threats and protective measures
- Research cyber opportunities, responsibilities, and ethical and legal constraints

Cybersecurity affects ALL occupations! Pathway courses will be customized for each of the 16 Career Clusters.

See descriptions of NEW CYBERSECURITY COURSES on reverse.

June 2017

New Cybersecurity Pathways

Learning that works for Virginia CTE™

Cybersecurity…

- *Cybersecurity Fundamentals (6302)*
  - *Selected CTE endorsed teachers in each program area are eligible to teach this course*
- *Cybersecurity* affects ALL occupations
- *Cybersecurity* has applications in all CTE clusters
- *Cybersecurity* pathway courses will be customized for each of the 16 career clusters

Cybersecurity Career Pathways Concentration Implementation Model

Learning that works for Virginia CTE™

8 NEW Cybersecurity Courses	Teacher Endorsement Code
1) Cybersecurity Fundamentals	2004 – Computer Science 3010 – Computer Science Specialist 6900 – Business & Information Technology 7200 – Technology Education 8000 – Agricultural Education 8100 – Marketing Education 8200 – Family & Consumer Sciences 8425 – Electronics Technology 8490 – Computer Systems Technology 8620 – Health & Medical Sciences 9010 – Computer Technology
2) Cybersecurity Software Operations 3) Cybersecurity Software Operations, Advanced	6900 – Business & Information Technology 6630 – Networking 2004 – Computer Science 3010 – Computer Science Specialist
4) Cybersecurity Systems Technology 5) Cybersecurity Systems Technology, Advanced 6) Cybersecurity Network Systems	2004 – Computer Science 3010 – Computer Science Specialist 8425 – Electronics Technology 8485 – Computer Repair Technology 8490 – Computer Systems Technology 9010 – Computer Technology 6900 – Business & Information Technology 6630 – Networking
7) Cybersecurity in Manufacturing	7200 – Technology Education
8) Health Informatics	8620 – Health & Medical Sciences 6900 – Business & Information Technology
*Cybersecurity in the Food & Agriculture Industry	8000 – Agricultural Education
*Cybersecurity in Family & Work Life	8200 – Family & Consumer Sciences
*Cybersecurity in Digital Marketing	8100 – Marketing Education

*New courses available fall 2018

Cybersecurity Career Pathways Concentration Implementation Model

Learning that works for Virginia CTE™

August 2017

There are eight new high school cybersecurity courses available, beginning fall 2017. During high school, a student who has an interest in cybersecurity will have the flexibility to take two or more pathway courses in a concentration.

The chart illustrates 4 cybersecurity career pathways. ***Students must take at least two or more pathway courses in a concentration sequence*** along with the appropriate academic courses to meet graduation requirements and to become a CTE program completer[3]. Beginning in 2013-2014, first time ninth grade students (graduating class of 2017) are required to earn a Board-approved industry credential to graduate with a Standard Diploma.

Career Pathways[1]

Coherent Sequence (Concentration[2]) of State-Approved Courses

Year 1 Course* (Grade 9, 10, or 11)	Year 2 Course (Grade 10, 11, or 12)	Year 3 Course (Grade 10, 11, or 12)	Year 4 Course (Grade 12)
Programming & Software Development Pathway[1] **Cybersecurity Fundamentals** (Course Code 6302)	**Cybersecurity Software Operations** (Couse Code 6304)	**Cybersecurity Software Operations, Advanced** (Course Code 6306)	*To be developed*
Health & Medical Sciences Pathway[1] **Cybersecurity Fundamentals** (Course Code 6302)	**Health Informatics** (Course Code 8338)	*To be developed*	*To be developed*
STEM/Pre-Engineering Technology Pathway[1] **Cybersecurity Fundamentals** (Course Code 6302)	**Cybersecurity in Manufacturing** (Course Code 8499)	*To be developed*	*To be developed*
Network Systems Pathway[1] **Cybersecurity Fundamentals** (Course Code 6302)	**Cybersecurity Systems Technology** (Course Code 8628)	**Cybersecurity Systems Technology, Advanced** (Course Code 8629)	**Cybersecurity Network Systems** (Course Code 8630)

**The Cybersecurity Fundamentals course (Year 1) serves as the "core" for all Year 2 courses in the coherent sequence.*

[1] ***Career Pathway*** — *A career pathway represents a common set of skills and knowledge, both academic and technical, necessary to pursue a full range of career opportunities ranging from entry level to management, including technical and professional careers.*

[2] ***Concentration*** — *A "concentration" is a coherent sequence of state-approved courses in which the student earns the equivalent of two 36-week courses and related stackable industry-recognized credentials.*

[3] ***CTE completer*** — *A "CTE completer" is a student who has met the requirements for a "concentration" of courses and all requirements for high school graduation or an approved alternative education program.*

Virginia Department of Education

YEAR 1* - COMING Fall 2017

Cybersecurity Fundamentals
(Code/SCED/36 weeks)
Suggested Grade Level: 9, 10 or 11
Teacher Endorsement: Computer Science Specialist, all CTE Program Areas

This course focuses on the evolving and pervasive technological environment with an emphasis on securing personal, organizational, and national information. Students will investigate the high-skills, high-wage, and in-demand career opportunities in the vast field of cybersecurity. Learn the principles, explore emerging technologies, and examine threats and protective measures.

Career and Technical Education *(CTE) actively partners with business and industry and Virginia educators to design and implement high quality, dynamic programs that meet current and projected workforce needs. Relevant work-based learning opportunities are critical for helping students connect learning to successful transition from high school to further education and careers.*

A ***"CTE completer"*** *is a student who has met the requirements for a "concentration" of courses and all requirements for high school graduation or an approved alternative education program.*

A ***"concentration"*** *is a coherent sequence of state-approved courses in which the student earns the equivalent of two 36-week courses and related stackable industry-recognized credentials.*

YEAR 2*- COMING Fall 2017

Cybersecurity Software Operations
(Code/SCED/36 weeks)
Suggested Grade Level: 10, 11, or 12
Teacher Endorsement: Business & Information Technology

The Cybersecurity Software Operations course focuses on aspects of computer support and network administration with an emphasis on project-driven learning and cybersecurity. Students learn networking concepts, create peer-to-peer network systems and client server networks, install and configure network cards and operating systems, and create and implement security plans.

Health Informatics
(Code/SCED/36 weeks)
Suggested Grade Level: 10, 11, or 12
Teacher Endorsement: Business & information Technology, Health & Medical Sciences

Students explore the importance of safeguarding electronic healthcare information by using various technologies and trends that affect the healthcare industry. In simulated problem-driven lab experiences, students will apply knowledge and skills related to: safeguarding the Electronic Health Record (EHR) and the Electronic Medical Record (EMR), ethical and privacy issues, and cybersecurity and data breaches.

Cybersecurity Systems Technology
(Code/SCED/36 weeks)
Suggested Grade Level: 10, 11, or 12
Teacher Endorsement: Trade & Industrial Education

Students will troubleshoot, install, configure, and secure various operating systems, computers, and peripherals. They will develop skills in computer networking and resource sharing to explore the relationships between internal and external computer components.

Cybersecurity in Manufacturing
(Code/SCED/36 weeks)
Suggested Grade Level: 10, 11, or 12
Teacher Endorsement: Technology Education

While connected technology drives innovation in the manufacturing sector, it also creates challenges in cybersecurity. Students will learn about manufacturing processes and the connections among manufacturing machines and computers for automation. Virtual labs will allow experiences with sophisticated security issues as teams design systems with risk management in mind.

YEAR 3*- COMING Fall 2017

Cybersecurity Software Operations, Advanced
(Code/SCED/36 weeks)
Suggested Grade Level: 11 or 12
Teacher Endorsement: Business & Information Technology

This course focuses on cybersecurity and the management and support of network users and systems. Students engage in experiences to apply their understanding in website management; training end users; evaluating new technology; developing system policies; troubleshooting workstations, systems and client-server networks; managing network services and protocols; implementing security plans; and effectively using electronic communications.

Cybersecurity Systems Technology, Advanced
(Code/SCED/36 weeks)
Suggested Grade Level: 11 or 12
Teacher Endorsement: Trade & Industrial Education

This advanced course provides training for optimizing and troubleshooting concepts for computer systems, subsystems, and networks. Students will gain an understanding of emerging technologies including unified communications, mobile, cloud and virtualization technologies.

YEAR 4*- COMING Fall 2017

Cybersecurity Network Systems
(Code/SCED/36 weeks)
Suggested Grade Level: 12
Teacher Endorsement: Trade & Industrial Education

Students gain competitive skills required to administer, analyze, and secure applications, networks, and devices. Students will understand concepts that include threats, attacks, and vulnerabilities; exploring technology and tools; examining architecture and design; analyzing identity and access management; demonstrating risk management; and examining cryptography and public key management.

YEAR 2* - COMING Fall 2018

Cybersecurity in the Food and Agriculture Industry
(Code/SCED/36 weeks)
Suggested Grade Level: 10, 11, or 12
Teacher Endorsement: Agricultural Education

The cybersecurity course in agriculture will explore the safeguards and challenges related to keeping the U.S. agriculture industries safe. This course will also examine the areas of information assurance, cybercrime investigation, digital forensics, and cyber operations relate to the production, processing, marketing, and distribution sectors of the agricultural, food, and natural resources industries.

Cybersecurity in Family and Work Life
(Code/SCED/36 weeks)
Suggested Grade Level: 10, 11, or 12
Teacher Endorsement: Family and Consumer Sciences

Students will examine how cybersecurity impacts work and family life. This course focuses on identifying emerging technologies in the home and work environments, examining threats and protective measures, and investigating cybersecurity in family and consumer sciences careers.

Cybersecurity in Digital Marketing
(Code/SCED/36 weeks)
Suggested Grade Level: 10, 11, or 12
Teacher Endorsement: Marketing

Students will gain knowledge of the tools and techniques used in Internet marketing and experience how to design a secure website. They will explore opportunities, threats, responsibilities, and ethical and legal constraints associated with operating in cyberspace.

For more information go to:
http://www.doe.virginia.gov/instruction/career_technical/cybersecurity/index.shtml

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CTE™

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CTE CYBERSECURITY PROGRAM

(IT PATHWAY - CIP 11.1003 COMPUTER AND INFORMATION SYSTEMS SECURITY/INFORMATION ASSURANCE)

BAY-ARENAC ISD, BAY CITY, MI
PATRICK SCHULTZ – TECHNOLOGY INTEGRATION SPECIALIST
MICHAEL RICARD – PROGRAM INSTRUCTOR

CYBERSECURITY PROGRAM OVERVIEW

- Demographics
- Pilot Michigan State Program
- Curriculum Aligned to Industry Certifications
- Articulation Credits to Multiple Post-Secondary Institutions
- CTSO / Competition Involvement

- Computer Hardware / Troubleshooting
- Computer Networking
- Network Security
- Digital Forensics
- Disaster Recovery
- Virtualization
- Linux Operating System
- Ethical Hacking
- Vulnerability Testing
- Python Programming

CYBERSECURITY (CERTIFICATIONS OFFERED)

Microsoft Technology Associate
- Security Fundamentals
- Network Fundamentals

CompTIA
- A+
- Network+
- Security+
- Linux+

TestOut
- PC Pro
- Security Pro
- Network Pro
- Server 2016 Pro
- Linux Pro

EC-Council
- Certified Ethical Hacker (CEH)

HIGH SCHOOL CREDIT/ARTICULATION AGREEMENTS

High School Credit
- Math
- ELA

Post-Secondary Articulation
- Average Credits: 18
- Certification Aligned

CYBERSECURITY (WORK EXPERIENCES)

Risk Assessment (Non-Profits)
Vulnerability Testing
Windows Server (Data and Active Directory)
Physical Security/Surveillance
Networking (Routers/Switches)
Network Security

'Our first student for the Cybersecurity Program has been placed at Nexteer Automotive working on programming and security of automated vehicles'

'Our program is currently working with placement of students within the Security Operations Center (SOC) Team at Dow Chemical.'

CONTACT

Patrick Schultz – schultzp@baisd.net

Michael Ricard – ricardm@baisd.net

Q & A

Early College Program, Cybersecurity

LaRee Siddiqui, MSW

Overview

Early College Program in Cybersecurity – HCPSS Class of 2019 and Beyond

Five Year Program

	9th grade	10th grade	11th Fall	11th Spring	12th Fall	12th Spring	13th Fall	13th Spring
English	English 9	English 10	English 11	English 11	English 121	Humanities Core	Literature Core	Humanities Core
Math	Algebra I	Geometry	Algebra II	Algebra II	Math 138 or 143*	Math 141	Social and Behavioral Sciences Core	Social and Behavioral Sciences Core
Social Studies	US History	American Gov't	Mod World History		CSCO 292 Routing and Switching Essentials	CMSY 255 Introduction to Unix and Linux	Science Core	Science Core
Science	Earth Science	Biology	Chemistry		CMSY 163 Intro to Firewalls and Network Security Systems	CMSY 164 Intro To Intrusion Detection and Prevention Systems	CMSY 263 Ethical Hacking and Cyber Defense	CMSY 262 Encryption and Secure Comm.
	Fine Art	Elective	Elective		Site Based Work Experience at ARL	Site Based Work Experience at ARL	Coop 201 Cooperative Education Work Experience I	SPCH 105 Fundamentals of Public Speaking
	Tech Ed	CRD I at ARL/FYEX	CMSY 162 Intro To Network Security Systems	CMSY 172 Intro to Programming with JavaScript				
	PE/Health	CRD II at ARL/FYEX	CMSY 158 Fundamentals and Practice for Network+ Certification	CSCO 291 Intro to Networks				

- High School courses
- HCC courses taken at ARL
- Dual credit courses (HCPSS and HCC) taken at HCC
- HCC courses taken at HCC

Elements of Success

- Soft Skills Instruction
  - Career Research and Development
- Technical Skills Instruction and Scaffolding
  - Individualized academic advising that puts the soft skills to work
  - Empower students to own their academic success
  - HCC and HCPSS collaborate regularly to deliver quality supports
- Community Partnerships
  - Advisory Board
  - EnRich Minds
- Effective balance between high school and college life
  - Sports, CTSO's and other extracurriculars are accessible
  - Engagement with "home high school"

100%

Of students graduating from the first cohort of the Early College Program are continuing to HCC to complete their AA Degree

“The great aim of education is not knowledge, but action”

-Herbert Spencer

Thank You!

Contact:

LaRee Siddiqui, MSW

laree_siddiqui@hcpss.org

(410) 313-6998

Q & A

Thank You for Joining Us!

Upcoming Webinar:
Cybersecurity Education and Training for the Operational Technology Workforce

When:
Wednesday, June 20, 2018 at 2:00pm – 3:00pm ET

Register:
https://nist-nice.adobeconnect.com/webinar-jun2018/event/registration.html

nist.gov/nice/webinars

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