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Bridging the Skills Gap: (Re)training Workers into Cybersecurity Careers

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Anne Arundel Community College · College of Lake County · Clover Park Technical College · Cuyahoga Community College · Florida State College at Jacksonville · Ivy Tech Community College · Macomb Community College · Northwest Arkansas Community College · Roane State Community College · South Seattle Community College

What is the NSC?

- Anne Arundel Community College in Maryland
- College of Lake County in Illinois
- Clover Park Technical College in Washington State
- Cuyahoga Community College in Ohio
- Florida State College at Jacksonville
- Ivy Tech Community College in Indiana
- Macomb Community College in Michigan
- Northwest Arkansas Community College
- Roane State Community College in Tennessee
- South Seattle Community College in Washington State

The TAACCCT Grant Program

- U.S. Department of Labor
- U.S. Department of Education
  - Trade Adjustment Assistance Community College and Career Training (TAACCCT) Grant Program
- NSC awarded $19.7 Million on October 1, 2011

What is the Role of the NSC?

Design and deliver Science, Technology, Engineering, and Mathematics (STEM) programs that are:

- Nationally portable
- High-quality certificate-level
- Responsive to labor market needs
- Build a national model for multi-college cooperation

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NSC Industries

- Composite Materials
- Cyber Technology
- Electric Vehicle Development and Repair
- Environmental Technology
- Mechatronics

Two Key Deliverables

Five one-year STEM credit certificates with complete curriculum:

-Syllabi, lesson plans, presentations available in an open educational resource.

-Two key "sticking points" for each course fully developed and available online in Platform+

STEM Bridge:

-STEM Readiness Course available in Platform +

-Course materials and lesson plans for FAST TRACKS program targeted to lower level learners.

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What makes NSC Unique?

- Compressed
- Built-for-completion
- One-year certificate programs
- Embedded, contextualized remediation – “STEM Bridge”

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Who are the Participants?

Other workers in need of updated skills:

- Workers Eligible for Trade Adjustment Assistance (TAA)
- Dislocated workers
- Other unemployed workers
- Under-employed workers

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NSC Partners

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Role of Industry

- Identify industry needs
- Provide input on curriculum
- Assist in development of

  STEM Bridge
- Hire our completers!

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Industry-Recognized Credentials

- Composites: considering
  - Certified Production Technician (Manufacturing Skills Standards Council)
  - Certified Composites Technician (American Composites Manufacturers Assn.)
- Cyber: A+, Network+, and Security+ from CompTIA and CCNA from Cisco
- Electric Vehicle: SAE International's Vehicle Electrification Fundamentals and Safety Certificate of Competency
- Environmental: OSHA – including HAZWOPER
- Mechatronics: SIEMENS Certification

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What is the STEM Bridge?

- Grant deliverable
- Programmatically consistent across all pathways
- Integration of basic, workforce, computer skills and job readiness training
- Contextualized within the five pathways
- Delivered along with technical curriculum

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STEM Readiness Course

- Designed to quickly refresh “rusty” skills
- Taken in conjunction with technical curriculum
- Learning outcomes developed based on key skills common to the pathways (15 hours each):
  - Math
  - Critical Thinking and Workplace Communication
  - Professional Skills
- Workplace-contextualized scenarios built with industry partners
- Available in Platform+

Co-Development Partners

- National STEM Consortium – STEM Bridge Team
- Carnegie Mellon's Open Learning Initiative (OLI)
- CAST – ensures accessibility for learners
- Industry partners
  - Offered assistance in developing realistic scenarios and provided company name and images – ARINC
  - Industry experts offered experience in developing realistic scenarios but company names are fictitious.

STEM Bridge Strategy

- STEM Readiness Course is flexible:
  - Hybrid format with face to face instruction
  - Online only
  - Delivered up front in first term or spread across multiple terms
  - Credit or non-credit courses, labs or modules

OLI Platform+ System

Platform + system offers variety of ways to engage the learner:

- Learning outcomes based instruction
- “Learn by Doing” and “Did I Get This?” activities
- Embedded videos, audios, photos and walk-throughs (animated power point presentations)
- Writing labs
- Quiz questions
- Instructor dashboard allows instructor to see how well a student is doing on a particular activity or how well class is doing

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STEM Bridge: FAST TRACKS

Support for lower level learners:

- An intensive program designed to ready students for a NSC – STEM certification program in the areas of math, English and life skills. These are referred to as key skills.
- The curricula developed are envisioned as a resource that may be used in whole or in part to provide resources at lesson, bundle or program level.
- All curriculum material will be available to all colleges to fit into their local educational systems

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Technical Curriculum

- The five technical certificate programs will also put selected portions of their curriculum into Platform+
- Two learning points in each of the technical courses in each certificate program will be developed for delivery in Platform+
- The learning points will be concepts that many students have difficulty grasping in each particular class (“sticking points”).

Technical Curriculum

- Platform + will allow the integration of videos, audios, Learn by Doing activities and other tools to help students grasp these concepts.

- Syllabi, lesson plans, power points and other instructional aides will be available in zip files

Cyber Technology Curriculum

- Core Skills for STEM
- A+ Hardware & Software (A+)
- Networking Essentials (Net+)
- Security Fundamentals (Sec+)
- Cisco 1-4 (CCNA)
- Skills-based Capstone

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THE NATIONAL CYBERSECURITY WORKFORCE FRAMEWORK

INTRODUCTION

The ability of academia and public and private employers to prepare, educate, recruit, train, develop, and retain a highly-qualified cybersecurity workforce is vital to our nation's security and prosperity.
[full text version]

DEFINING CYBERSECURITY

Defining the cybersecurity population using common, standardized labels and definitions is an essential step in ensuring that our country is able to educate, recruit, train, develop, and retain a highly-qualified workforce. The National Initiative for Cybersecurity Education (NICE), in collaboration with federal government agencies, public and private experts and organizations, and industry partners, has published version 1.0 of the *National Cybersecurity Workforce Framework* ("the Framework") to provide a common understanding of and lexicon for cybersecurity work.
[full text version]

THE CALL TO ACTION

Only in the universal adoption of the *National Cybersecurity Workforce Framework* can we ensure our nation's

OPERATE AND MAINTAIN — CUSTOMER SERVICE AND TECHNICAL SUPPORT

Addresses problems and installs, configures, troubleshoots, and provides maintenance and training in response to customer requirements or inquiries (e.g., tiered-level customer support).

TASK | KSA

ID	Statement	Competency
7	Knowledge of "knowledge base" capabilities for identifying the solutions to less common and more complex system problems	Knowledge Management
33	Knowledge of database procedures used for documenting and querying reported incidents	Incident Management
37	Knowledge of disaster recovery and continuity of operations plans	Incident Management
76	Knowledge of measures or indicators of system performance and availability	Information Technology Performance Assessment
127	Knowledge of systems administration concepts	Operating Systems
142	Knowledge of the operations and processes for diagnosing common or recurring system problems	Systems Life Cycle
145	Knowledge of the type and frequency of routine maintenance needed to keep equipment functioning properly	Systems Life Cycle
165	Skill in conducting open source research for troubleshooting novel client-level problems	Knowledge Management
204	Skill in identifying possible causes of degradation of system performance or availability and initiating actions needed to mitigate this degradation	Systems Life Cycle
221	Skill in testing and configuring network workstations and peripherals	Network Management
222	Skill in the basic operation of computers	Computer Skills
235	Skill in using the appropriate tools for repairing software, hardware, and peripheral equipment of a system	Computers and Electronics
264	Knowledge of basic physical computer components and architectures, including the functions of various components and peripherals (e.g., central processing units [CPUs], network interface cards [NICs], data storage)	Computers and Electronics

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Data Administration | Knowledge Management | Customer Service and Technical Support | Network Services | System Administration | System Security Analysis

Home | Using This Document | Sample Job Title | Securely Provision | Operate and Maintain | Protect and Defend | Investigate | Collect and Operate | Analyze | Oversight and Development

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Struggles

- Recruitment
- Right “fit” grant student
- Exam changes (CCNA)
- Regional challenges
  - Academic Requirements
  - Employment markets
- Shiny, new product
- Cyber curriculum itself – not CEH, CISSP

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Sustainability – Beyond the Grant

- Create a national repository of materials available at no cost to all community colleges.
- Creative Commons Attribution License.
- Open Learning Initiative.
- Center for Applied Special Technology.

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Impact

- Higher education
  - New nationally-portable programs.
  - Contextualized remediation.
  - Open education resources.
  - Changing the culture of higher education.

Access STEM Bridge Course

- www.oli.cmu.edu
- Click “Sign Up” to register for an instant student account
- Log in to OLI and enter Course Key: **NSC-STEM**, click “Go”
- The STEM Readiness course will display, click “Register”
- Click “Enter Course”

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Disclaimer

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