



# CAE-C AI-Cybersecurity Workforce Development Pilot Program (CWCT)

Consortium for IA-cybersecurity Workforce Certification Based Training Program (CWCT)

NCAE-C-003-2020

## Project Overview

- The Consortium Partners
  - Purdue University Northwest (Coalition/Consortium Leader)
  - Ivy Tech Community College of Indiana (multiple campuses)
  - University of North Carolina at Charlotte
  - University of Tennessee at Chattanooga

• Goal

- Develop three (3) online training tracks with new advanced courses in Digital Forensics, Cloud Infrastructure, IoT and AI
- Al and Cybersecurity Workforce
- Major Objective-Train 425 participants from
  - 75% (expected)
    - Law enforcement
    - Military veterans/transitioning
    - Other front-line responders
  - 25% Underrepresented minority groups







### Presentation Road Map

- CWCT Course Curriculum
- CWCT Course Development
- Course Delivery (Sessions and Online Delivery)
- Pathways
- Recruitment and Enrollment
- Instructor Training
- Building Towards Apprenticeship

### The Training Program Pathways

The 3 Tracks Digital Forensics Cybersecurity Administration Artificial Intelligence-IoT Cybersecurity

> For Each Track 3 Common Core Courses 3 Track specific Courses Prepare for 3+ certifications

> > **For Each Course**

40 instructional hours in 8 weeks Certification preparation for 2 weeks Pre and post assessment

### The Training Program Curricula

Tracks	3 Required Common Core Courses	The 3 Elective Courses that are required for the Track
CS_SA	1. CompTIA A+ 2. CISCO Cyber Ops 3. Security+	4. RedHat System Admin/Linux+, 5. Cloud System Administration, 6. CEH (Certified Ethical Hacker)
CS_DF		4. Computer Forensics-ACE, 5. Mobile Forensics, 6. CHFI
CS_AI		<ol> <li>Python Essentials, 5. IoT and CyberSecurity,</li> <li>AI &amp; Machine Learning for Cybersecurity</li> </ol>

### The Training Program Courses

A total of 12 courses CWCT100 – CompTIA A+ CWCT105 – CompTIA Security+ CWCT115 – Cisco CyberOps CWCT116 – Red Hat Sys Admin (CompTIA Linux+) CWCT140 – Python Essentials CWCT225 – Ethical Hacking CWCT230 – Cloud System Admin CWCT235 – Computer Forensics CWCT240 – Mobile Forensics CWCT245 – AI/ML in Cybersecurity CWCT250 – IoT Cybersecurity



### Certifications & Two Week Certification Prep

- Certification Preparation
  - Ucertify
  - Practical exams developed by CWCT
    - E.g., ACE (Computer Forensics)
  - Certification Vendor practices (EC Council, CompTIA, AccessData)
- Many options (support up to 3 certification vouchers)
  - CompTIA A+ (Industry Support), Linux+, Security+
  - Cisco CyberOps Associate (Industry Support)
  - RedHat System Administrator (Industry Support)
  - EC Council CEH/CHFI (Industry Support)
  - AccessData Certified Examiner (AccessData)
  - Certified Python Associate Programmer
  - Certified AI Practitioner
  - AWS Machine Learning Badge (Industry Support)
  - SimbaChain (Blockchain) (Industry Support)
  - Possibly others by June



### Pre-Requisites Relationships

Phase I	Phase II	Phase III	
	Cisco Cyber Ops (required)	Certified Ethical Hacker (CEH), EC-Council	
Complia A+ Course (required)	Security+ (required)		
<ol> <li>Computer Forensics Fundamentals for ACE Certification</li> <li>Mobile Forensic</li> </ol>		Certified Hacking Forensic Investigator (CHFI)	
Python Essentials Course for PCAP	Machine Learning for Cybersecurity, for CAIP/AWS ML, and SimbaCha (Blockchain) Certifications		
	Internet of Things & Hardware Security		
RedHat/Linux+ Course	Cloud System Administration		



### Course Session Availability

- 1. Courses will be offered in multiple 8-week sessions
- 2. The course at the same phase will all be offered in the same 8-week session
  - 1. The **1**<sup>st</sup> session will offer only phase I courses for the Cohort 1 learners
  - 2. Phase I and phase II courses can be offered at the same 8-week session for different cohorts
  - 3. Learners could be cross-cohorts due their own schedule



### Tracks By Participating Institution (2<sup>nd</sup> year)

Participating Institution	Training Track Offering	Number
Purdue University Northwest	Digital Forensics, AI, Security Administration	150
Ivy Tech Community College (Lake County and Valparaiso)	Digital Forensics, AI, Security Administration	150
University of Tennessee Chattanooga	Cloud SA	75
University of North Carolina Charlotte	AI and IoT	50



### Course Curriculum Development

Partner Institution	Courses with Curriculum Development at Year 1		
Purdue Northwest	Computer Forensics with ACE, Mobile Forensics		
lvy Tech CC	Machine Learning for Cybersecurity, Cisco Cyber Ops (partial), CHFI (partial)		
UT Chattanooga	Cloud System Administration (with a light Windows Server Administration) RedHat Openstack Administration – RedHat Academy		
UNC Charlotte	Internet of Things and Hardware Security (in Python with hardware Security), Cisco Academy		
The Consortium	Courses with module customization only (Linux+, A+, CEH, Security+, Python)		
Purdue Northwest	ADA compliant for all curriculum modules		
Purdue Northwest	Clark site submission of the newly developed course modules from the 7 courses (Year 2)		



### Learning Outcome Evaluation

- Individual
  - Pre/Post exams
    - Knowledge Objectives?
    - Pretest A+, CyberOps and Security+ (other courses?)
    - PostTest is Final grade
    - Ucertify (A+, Linux+, Security+, Python) Cisco has CyberOps PreTest
    - Pretests to be completed one week prior to class.
  - A+/CyberOps/Security+
    - **75%** have passed at 70% or higher
    - Taken and passed at least one certification exam from this group
  - Taken and passed at least two certifications overall.
- 240 complete a track
- 700 certifications earned



### Course Sample-CWCT235 Computer Forensics

Week	Topics	Labs, Quiz
Week 1	Forensics investigation procedures, Law/regulations, FTK Tool Suites Basics	Lab 1, Quiz 1
Week 2	File System Analysis, FAT, NTFS, GPT, FTK, FTK Imager, Steganography Tools	Lab 2, quiz 2
Week 3	Windows Registry Forensics Analysis and Registry Viewer, Regedit, etc.	Lab 3, Quiz 3
Week 4	Applied Decryption Technologies (login passwords, EFS, dictionary attack), PRTK	Lab 4, Quiz 4
Week 5	Windows 10 OS Forensics, FTK	Lab 5, Quiz 5
Week 6	Network Forensics with Wireshark and system log analysis, Wireshark, etc.	Lab 6
Week 7	Internet Application Analysis (IE, Firefox, Google Chrome, Edge, cloud client)	Lab 7
Week 8	FTK Advanced Analysis and ACE	Lab 8, Quiz 6
Week 9-10	ACE Practice Quizzes (2 extra sets of practical quizzes)	Final Practical Exam

**CWCT** course curriculum is hands-on oriented

## **Course Offering Schedule**



- Session Schedules
  - Pilot Course offering June 7 Aug 15, 2020
    - A+, Linux, computer Forensics, Python
  - Session 1: Aug 16 Oct 24, 2021
  - Session 2: Oct 25 Dec 19 + Jan 3-14, 2022
  - Session 3: Jan 18 Mar 27, 2022
  - Session 4: Mar 28 Jun 5, 2022
  - Session 5: Jun 6 Aug 14, 2022
- Sessions
  - 6 sessions in total
  - 60 weeks in total or 6 terms
  - 5 hours per week per course
  - 25 students in pilot session for 4 courses at Phase I
  - 80 students per session on average
  - 3 cohorts split into Mornings, Evenings, and Saturdays

### **Online Learning System**







### A sample course at Ivy Tech IvyLearn Canvas

Modules Assignme Quizzes

Grades

People

Search LinkedIn Pages Files Outcome Rubrics

Conferen

Collabora

Settings

Discussio Zoom Cengage Dashboa

	$\stackrel{\scriptstyle\scriptstyle{\scriptstyle{\scriptstyle{\scriptstyle{\scriptstyle{\scriptstyle{\scriptstyle{\scriptstyle{\scriptstyle{\scriptstyle{\scriptstyle{\scriptstyle{\scriptstyle{\scriptstyle{\scriptstyle}}}}}}}}$		
ents	Module 1 Lect_Digital Forensics Law and Regulations.pptx		
	# Ø Module 2 Lect_Forensics Tools.pptx		
ons	Hab 1FTK Tool Basics Jun 13, 2021   0 pts		
Unlimited	Image: Symplectic symple		
rd	Image: Second system       Quiz 2-FTK Tool Basics         Jun 16, 2021   50 pts		
Learning Ø	🗄 🔗 FTK Imager Video from AccessData		
ø	🗄 🔗 FTK Tool Video from AccessData		
rs Ø Ø			
ces Ø	⋮ ▼ Lecture 2-FAT, NTFS, GPT File System Forensics and FTK Imager		
itions Ø	I Module 3 Lect_File System_FAT.pptx		
	Module 4 Lect_NTFS_GPT.pptx		
	Image: System Labs         Jun 20, 2021   0 pts		
	Quiz 3-File System Forensics         Jun 20, 2021   31 pts		

### Articulation



- All training participants will be enrolled as Ivy Tech non-credit students
  - Receive the Ivy Tech transcripts marked with V (vocational)
    - Can be transferred to degree programs at Ivy Tech and other Institutions
  - Industry Certificates of Completion (Cisco CyberOPs, etc.)
  - Industry Certifications if passing the certification exams (A+, Linux+, Security+, CEH, etc.)
  - CWCT Certificate of Completion
- Articulation Agreements
  - CWCT Tracks Ivy Tech AAS/Certificates (next slides)
  - PNW- Ivy Tech as a template
  - Course Mapping—shown in next slides
- Trainee transfer between tracks?
  - As xx institution trainee originally applied
  - Can take courses from other tracks

### **Articulation Certificates**



Certificate Programs at Ivy Tech

Cybersecurity Offense (CEH, CyberOps) – SOC Specialist CT Cybersecurity Defense (CHFI) – Cybersecurity Incident Analyst CT Secure Software Engineering (AI/ML, IoT, cloud) - Software Development CT CyberCrime (LEO focused) – CyberCrime CT

Statewide

### CWCT & IT Degree Program Course Mapping

CS_DF Tracks Course	Ivy Tech AAS Degree Program	<b>B.S CIT &amp; Cybersecurity Concentration</b>
CompTIA A+	ITSP135: Hardware/Software Support	ITS135: Operating Systems Technologies
Python Essential	SDEV140: Intro to Soft. Dev.	ITS140: Computer Logics with Python
Cisco Cyber Ops	NETI105: Network Fundamentals	ITS170: Networking Technologies
Security+	CSIA105: Intro. to Cyber Security/IA	ITS250: Fund. of Information Assurance (IA)
AI for Cybersecurity	SDEV264: Crypto and Secure Coding	ITS265: introduction to AI
Linux+	SVAD116/117: Linux	ITS372: System Administration
<b>Computer Forensics/ACE</b>	CSIA235: Digital Forensics	ITS452: Computer Forensics
Mobile Forensics	CSIA281: Special Topics	ITS458: Adv. Topics in Cyber Forensics
CEH	CSIA225: Ethical Hacking	ITS478: Adv. Topics in Cyber Forensics
Cloud System Admin	SDEV230: Cloud Hybrid Systems	ITSXXX: CIT Elective
IoT and Hardware Security	ITSP281: Special Topics	ITSXXX: CIT Elective
CHFI Preparation	CSIA281: Special Topics	ITSXXX: CIT Elective



## Common Ground across Colleges

- Knowledge Assessment (Pre/Post, Certification)
- Competency Matching
- Certification Crosswalks (Ladder and Lattice)
- Transfer and Reverse Transfer for Certificates, AAS, AS and BS degrees

## Recruitment & Enrollment

### Recruitment



- Recruitment strategy setup
  - Hiring dedicated person (@PNW, Ivy Tech, UNCC, and UTC)
  - Strategic Outreach
    - NIISSA.org NW Indiana LEO's
    - Muncie, IN PD and Fort Worth/Arlington, TX PD
    - Chicago PD
    - State of Indiana Veteran's Affairs
    - Dept. of Workforce Development (NextLevelJobs)
    - WorkOne
    - Senior Military Colleges
    - Police Academies
    - Criminal Justice Programs (PNW, Ivy Tech, etc)
    - Governor's office
    - US and State Senators and Congress offices

### Recruitment Plan



## Application

- Application link: <u>https://link.ivytech.edu/cwct</u>
- Apply to Partnership Site (Managed by Recruiters)
  - Select Tracks
  - Need individual college applications
  - US Citizens or Permanent Resident
  - Admission requirements (PNW)
    - GPA 2.5, 21 points of SAT Math, transfer students: GPA 2.0
  - Resume/CV
  - 75% Required goal = 319 participants)
    - Military Active/Veterans (DH?)
    - First responders
      - LEO
      - EMT
      - Fire
      - Nurse/Other
    - 25% (minor goal) (107 participants)
      - Underrepresented groups
        - Ethnic
        - Diverse Abilities
        - Female
        - Financial Adversity

### Cybersecurity Workforce Certification Training

**PURDUE UNIVERSITY NORTHWEST** 

Introducing Highly Qualified Professionals into the Cybersecurity Workforce.

This program will offer Artificial Intelligence (AI)-Cybersecurity training with online delivery to transitioning military, first responders, and other adult trainees free of charge. Successful completion of the program will offer participants the opportunity to earn three Industry and Government recognized certifications through examination as well as gain pathways to pursue degree programs at participating institutions.

There are 3 training tracks offered through the program:

- Cybersecurity-System Administration (CS\_SA)
- Cybersecurity-Artificial Intelligence (CS\_AI)
- Cybersecurity-Digital Forensics (CS\_DF)

UNC CHARLOTTE

Topics include Windows and Linux computer technologies, cloud technology, network, python programming, cybersecurity fundamentals, ethical hacking, hardware security, computer and mobile forensics, artificial intelligence and machine learning.

The program consists of 8 weeks learning with 5 instructional hours per week and 2 weeks for certification preparation and examination.

#### Registration

The program is open to all adult learners interested in AI-cybersecurity job transitioning and upskilling with priority given to transitioning military and first responders.

Registration requires:

- Proof of citizenship or permanent resident status
- Education records (high school diploma or higher)
- Military Service/First Responder service history (to receive priority registration)

TO REGISTER

#### About/Contact Information:

https://www.pnw.edu/cybersecurity/cybersecurity-workforce-certification-training/







### Instructor Hiring



#### • Required Credentials

- US citizen/Permanent Resident
- BS. Degree (in field) + certification + other (research publication or 2 years industry experience, or teaching award)
- M.S degree or higher preferred

#### • Process

- Instructor hired as temporary employee (adjunct) by home institution
  - Multiple institutions (Ivy Tech, and other institution)
    - Needs to access Ivy Tech Canvas, lab and license different institution
  - Policy legal side, accountability setup, loading
  - Non-Ivy Tech Employees setup the same as dual credit instructors for course access
- Sample contract? Ivy Tech and PNW (in discussion)

### • Common equipment and resources for instructors

- Laptop loan if necessary
- Access to online Ivy Tech Canvas, Cisco Academy, Netlab cyber range, and virtual class rooms
- Access to license (FTK at PNW)
- Access to other IT resources
  - UTC Openstack, Redhat, Cisco Academy
  - UNCC Cisco Academy, Red Hat Academy and Virtual IoT Lab
  - Amazon Web Services and Oracle Academy



### Participant Support

- Mentors
- Tutors
- Technical support
- Virtual machines development/maintenance
- Books
- Laptop

### Instructor Training



### • Trainer Criteria

- Academic background: Industry Specific credentials for course or academy (Cisco, RedHat, and AWS)
- Certification required for AccessData, EC-Council, AWS and Cisco

### Instructor training Process Setup

- Instructor Cohorts
- Stipend for instructors for successful completion
- Live, Virtual and Recorded

### Instructor training Schedule

- Session 1: March May, 2021 (and Early Course Beta Test)
- Session 2: June-Aug, 2021 (and Later Course Beta Test)



## Data Sharing Policy and Mechanisms

- Policy document and user agreements in November/December
  - Shared google drive -- documents
    - Deb
  - Sharing policy FERPA and PII
    - Ivy Tech FileDrop -- sharing
      - Internal system, login as VPN, file transfer
      - Temporary Storage: one year
    - Archive Storage disk encrypted, internal to PNW, dedicated machine:
      - Transcripts will be kept at Ivy Tech
      - A copy will be kept at PNW 5-10
      - Progress records (certifications)- at PNW
      - Certification of completion kept at PNW
      - A comprehensive report
    - User obligations downloaded, accessed, make sure to clean if no longer used or maintain surely if keep locally
      - User agreements --- Matthew has a template to share based on DOL and NSF grants



## Participant Records

- Who will maintain?
  - Ivy Tech
    - Ivy Tech maintain the central application Site/Link
      - Application data
      - Pre-assessment data
      - Learning platform access to enroll
      - Transfer records for Non-credit
  - PNW
    - Application Approval
    - Progress tracking
      - Course completion (from Ivy Tech)
      - Track completion
      - Certification completion
    - Program Completion Certification
    - Post-assessment
    - Record Maintenance for future transfer
      - 10 years at least
      - Keep at both Ivy Tech and PNW
  - UTC/UNCC
    - Recruitment, completion and placement of trainees

## Towards apprenticeship



- LEA's
- District Attorneys
- Army Reserve/National Guard Recruiters
- Cisco Talent Bridge Engine
- Salesforce Pathfinder Internship Program
- IndianaIntern.net recovers 50% of internship for employers in Indiana
- RedHat
- AWS
- US Chamber of Commerce (and local)
- Governor's Office
- <u>https://www.intelligencecareers.gov/</u>
- Manufacturing and related DOL grants
  - Focused on Apprenticeship bringing in IT/IoT CyberSecurity
  - DOL new application on CyberCrime, Security+, CyberOps, AI/ML and Swift
- California IT Apprenticeship Model

### Industry Partnership Development





### Implementation

- Year 1
  - Curriculum development
  - Participant recruitment
  - Instructor hiring and training
  - Participant enrollment
  - Laptop delivery
  - Pilot course offering for only 4 sections
- Year 2
  - Course offering 5 sessions, each 10 weeks
    - 8 weeks of instruction, 2 weeks of certification preparation





Time Frame	Project Deliverables
Winter 2020	Staffing Consortium (Secretary, 4 recruiters, academic advisor, 1 lab manager, 10 Technicians/Tutors) Marketing and Applications Start
Starting January 2021-June 2022	425 trainee recruited by the recruitment team from participating institutions
March-August 2021	Instructor Training and course testing including ADA
June 2021	Instructions Starts with Session 1
By August 2022	Instructions Completed with Session 6 <b>240</b> Participants completed Curriculum is accessible to Clark site
Optional 3 <sup>rd</sup> Year	Placement services Expansion to other States

### Formative Assessment Metrics-Implementation

Description of Objectives	Year 1	Year 2	Year 3
Goal 1-Activity: Staffing the recruitment industry relation	by month 3	continue with	Continue with
Goal 1-Activity: Staffing the virtual lab platform admin team	by month 6	the full staff	the full staff
Goal 1-Activity: Staffing the academic advising team	by month 9	from year 1	from year 2
Goal 1a: Total unique participants/trainee recruited for first two	300	125 +300 (this	125
years and the optional year 3.		is for year 3)	
Goal 1b: Minimal number of transitioning military/first	225	95 +225 (this	95
responders recruited for first two years and the optional year 3.		is for year 3)	
Goal 2a: Number of courses developed with full set curriculum,	5, 2, 5	0	0
partial set curriculum, and content customization only.			
Goal 2b: Number of courses curriculum (full or partial) ADA	0	8	0
compliant and Clark Site submission for public access.			
Goal 3-Activity: courses ready online	by month 10	continue	continue
Goal 3-Activity: online instructor hired and trained	by month 12	continue	continue
Goal 3: Number of participants received training.	0	425	425

### Summative Evaluation--Learning

Description of Project Goal 3 and Learning Outcomes	Year 2	Year 3
Total unique participants participated in training program	425	425
The average percentage of trainees that received 70% or higher of the overall final	75%	75%
grade for the 3 core courses (A+, Security+, Cisco CyberOPs).		
The average percentage of trainees that received 70% or higher of the overall final	75%	75%
grade for the elective courses.		
Total number of participants complete one of the training track (6 courses)	240	240
Total number of certifications received by trainees	700	700



### Thank you!

• Questions?