Best Practices in Cybersecurity Pathway Education; A 3-Year NSF-ATE Project Cypress College

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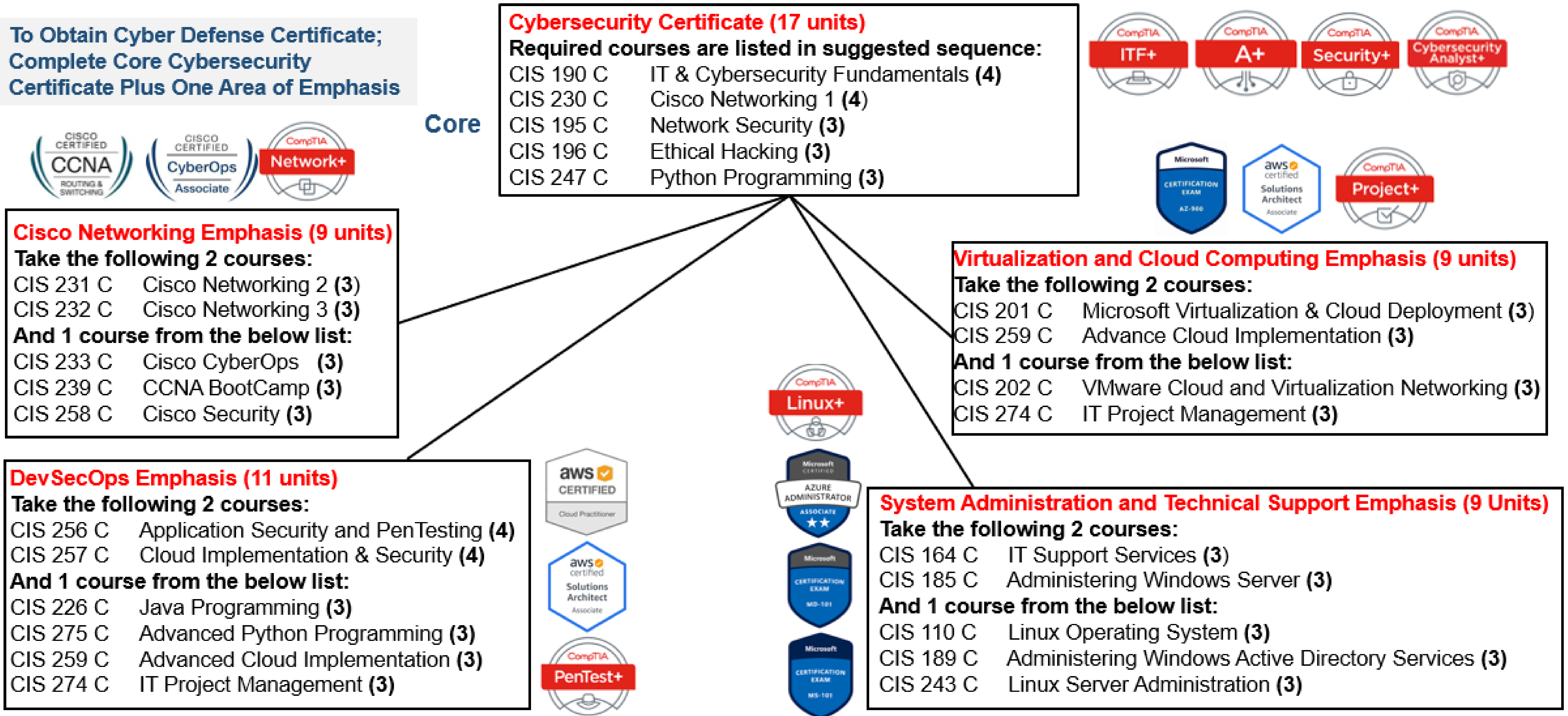
Pathway to Advancement in Cybersecurity Education - PACE

- Cybersecurity pathway that introduces dual enrollment College courses as early as 9th grade
- Funded for the last three years by a grant from the NSF-ATE.

- GOAL1: Establish a comprehensive Cybersecurity Pathway from at least middle school to 4-year institutions with a number of exit points.
- GOAL2: Encourage visible, fun and popular activities designed to improve student matriculation, persistence, and graduation
- GOAL3: Improve the number and quality of applicants for high paying Cybersecurity careers.

Cyber Defense & CIS Stackable Certificates

The Cyber Defense certificate provides concepts and hands-on skills to identify Cybersecurity threats and implement procedures to protect Cyber assets. It will also enhance students' chances to pursue a professional career in Cybersecurity by giving them various options to prepare for industry-recognized certificates such as ITF+, A+, Network+, Security+, CySA+, CyberOps, CCNA, AWS CCP and SAA, To earn a certificate, complete the required courses as listed with a minimum grade of "C". At least 50% of all course work must be completed at Cypress College.



To Obtain Cyber Defense Certificate; Complete Core Cybersecurity Certificate Plus One Area of Emphasis

Core

Cybersecurity Certificate (17 units)

Required courses are listed in suggested sequence:

CIS 190 C	IT & Cybersecurity Fundamentals **(4)**
CIS 230 C	Cisco Networking 1 **(4)**
CIS 195 C	Network Security **(3)**
CIS 196 C	Ethical Hacking **(3)**
CIS 247 C	Python Programming **(3)**

Cisco Networking Emphasis (9 units)

Take the following 2 courses:

CIS 231 C	Cisco Networking 2 **(3)**
CIS 232 C	Cisco Networking 3 **(3)**

And 1 course from the below list:

CIS 233 C	Cisco CyberOps **(3)**
CIS 239 C	CCNA BootCamp **(3)**
CIS 258 C	Cisco Security **(3)**

Virtualization and Cloud Computing Emphasis (9 units)

Take the following 2 courses:

CIS 201 C	Microsoft Virtualization & Cloud Deployment **(3)**
CIS 259 C	Advance Cloud Implementation **(3)**

And 1 course from the below list:

CIS 202 C	VMware Cloud and Virtualization Networking **(3)**
CIS 274 C	IT Project Management **(3)**

DevSecOps Emphasis (11 units)

Take the following 2 courses:

CIS 256 C	Application Security and PenTesting **(4)**
CIS 257 C	Cloud Implementation & Security **(4)**

And 1 course from the below list:

CIS 226 C	Java Programming **(3)**
CIS 275 C	Advanced Python Programming **(3)**
CIS 259 C	Advanced Cloud Implementation **(3)**
CIS 274 C	IT Project Management **(3)**

System Administration and Technical Support Emphasis (9 Units)

Take the following 2 courses:

CIS 164 C	IT Support Services **(3)**
CIS 185 C	Administering Windows Server **(3)**

And 1 course from the below list:

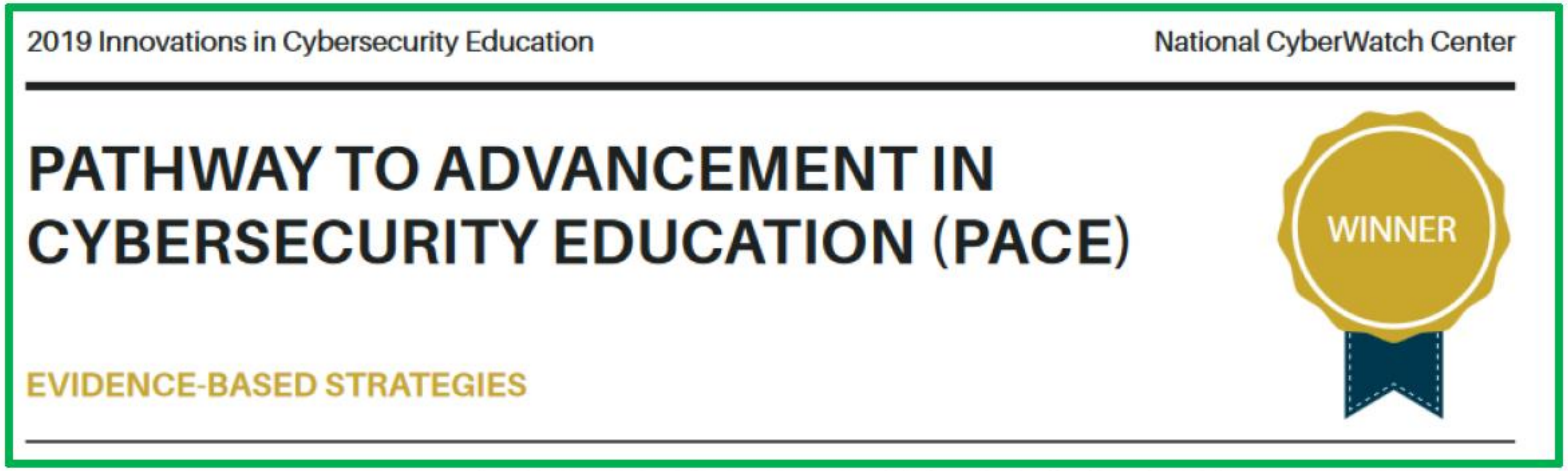
CIS 110 C	Linux Operating System **(3)**
CIS 189 C	Administering Windows Active Directory Services **(3)**
CIS 243 C	Linux Server Administration **(3)**

PACE Awards

INNOVATIONS IN CYBERSECURITY EDUCATION

NATIONAL CYBERWATCH CENTER

2019



2019 Innovations in Cybersecurity Education

National CyberWatch Center

PATHWAY TO ADVANCEMENT IN CYBERSECURITY EDUCATION (PACE)

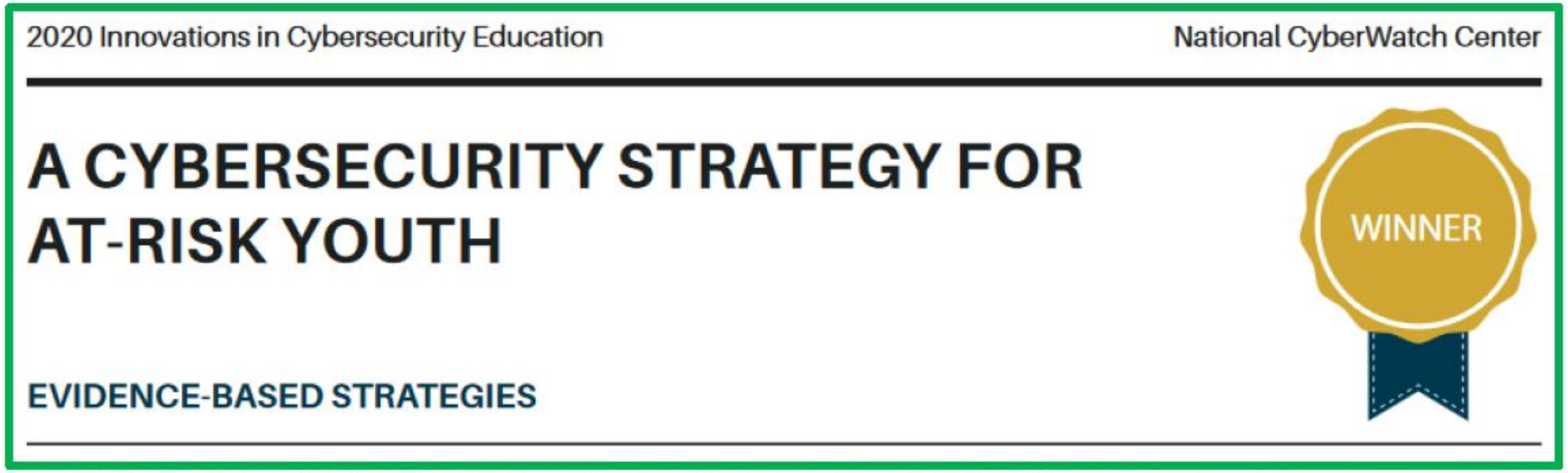
WINNER

EVIDENCE-BASED STRATEGIES

- 127 high school students passed industry certification exams
- 37 HS students completed College certificates
- 1,170 elementary/middle school/high school students participated in Cybersecurity training & competition events

PACE Awards

2020
INNOVATIONS IN CYBERSECURITY EDUCATION
NATIONAL CYBERWATCH CENTER



2020 Innovations in Cybersecurity Education

National CyberWatch Center

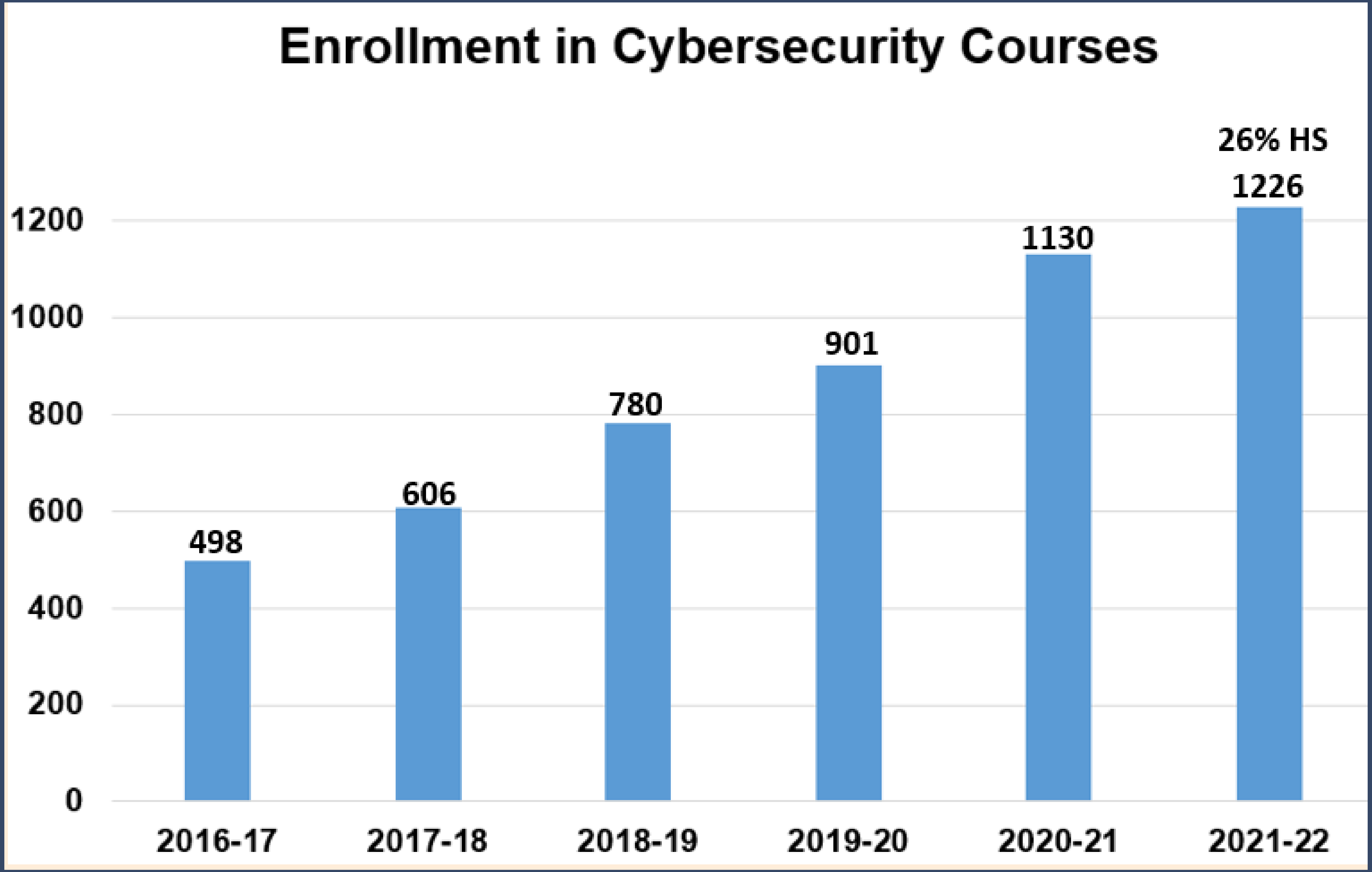
A CYBERSECURITY STRATEGY FOR AT-RISK YOUTH

WINNER

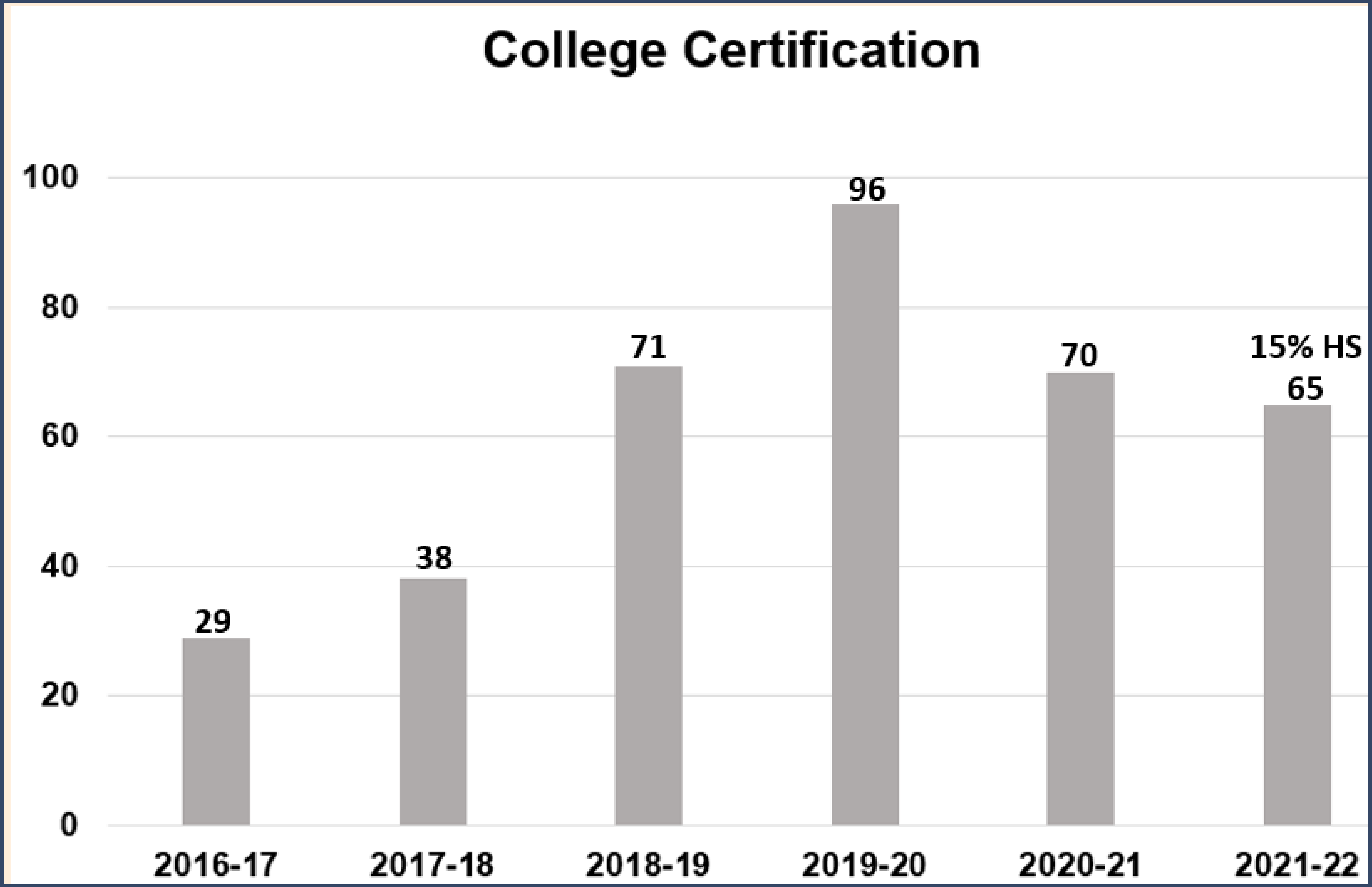
EVIDENCE-BASED STRATEGIES

A compressed Cybersecurity education program designed for at-risk youth that follows our CAE-CD program of study

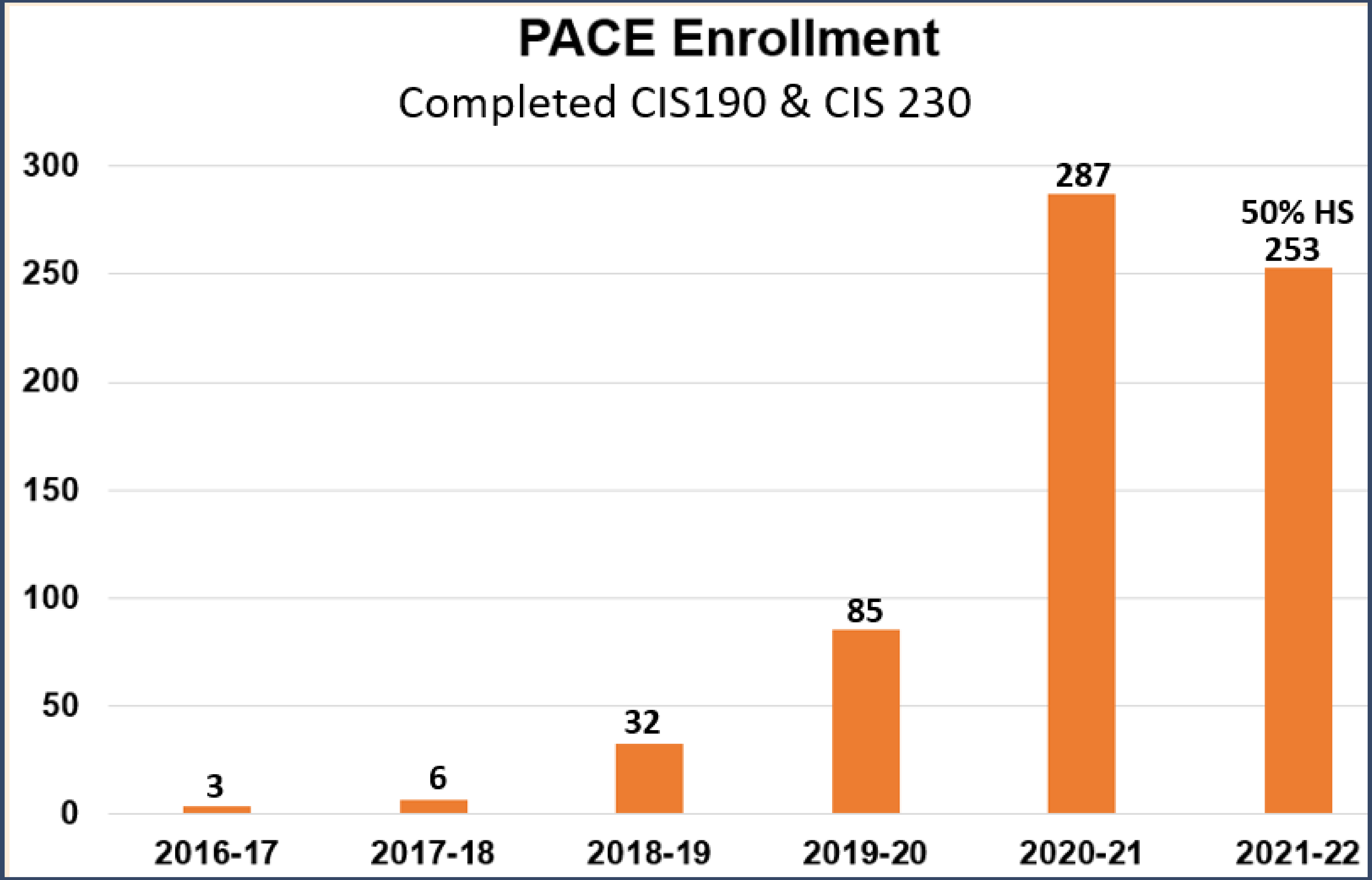
PACE Results: Course Enrollment

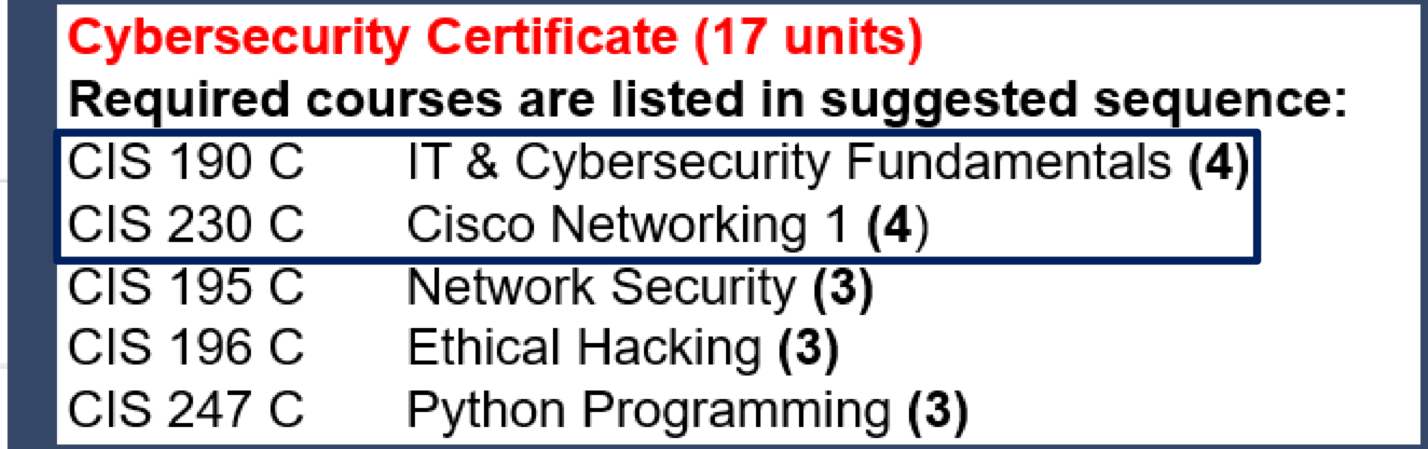


PACE Results: College Certification



PACE Results: PACE Enrollment





Cybersecurity Certificate (17 units)

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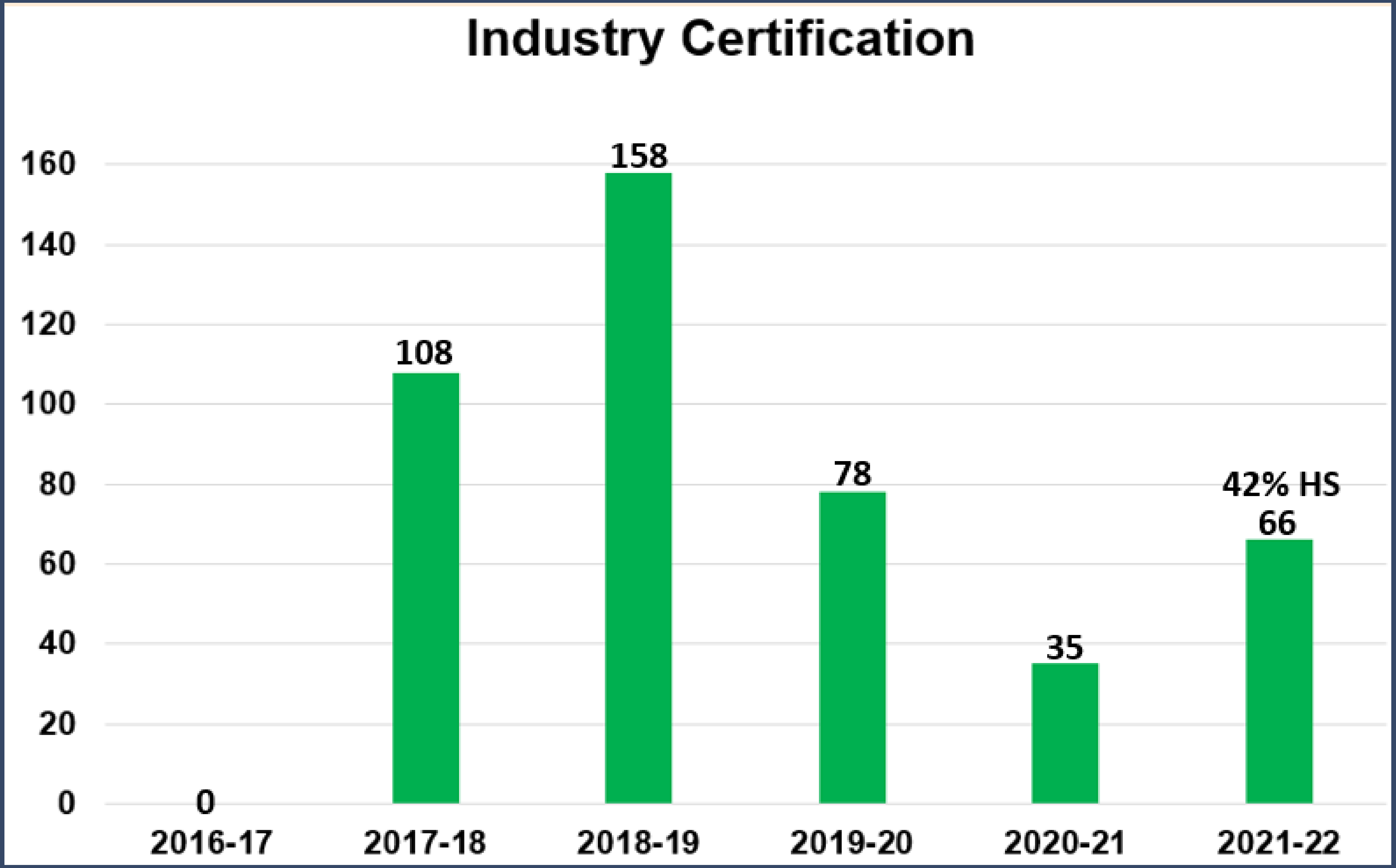
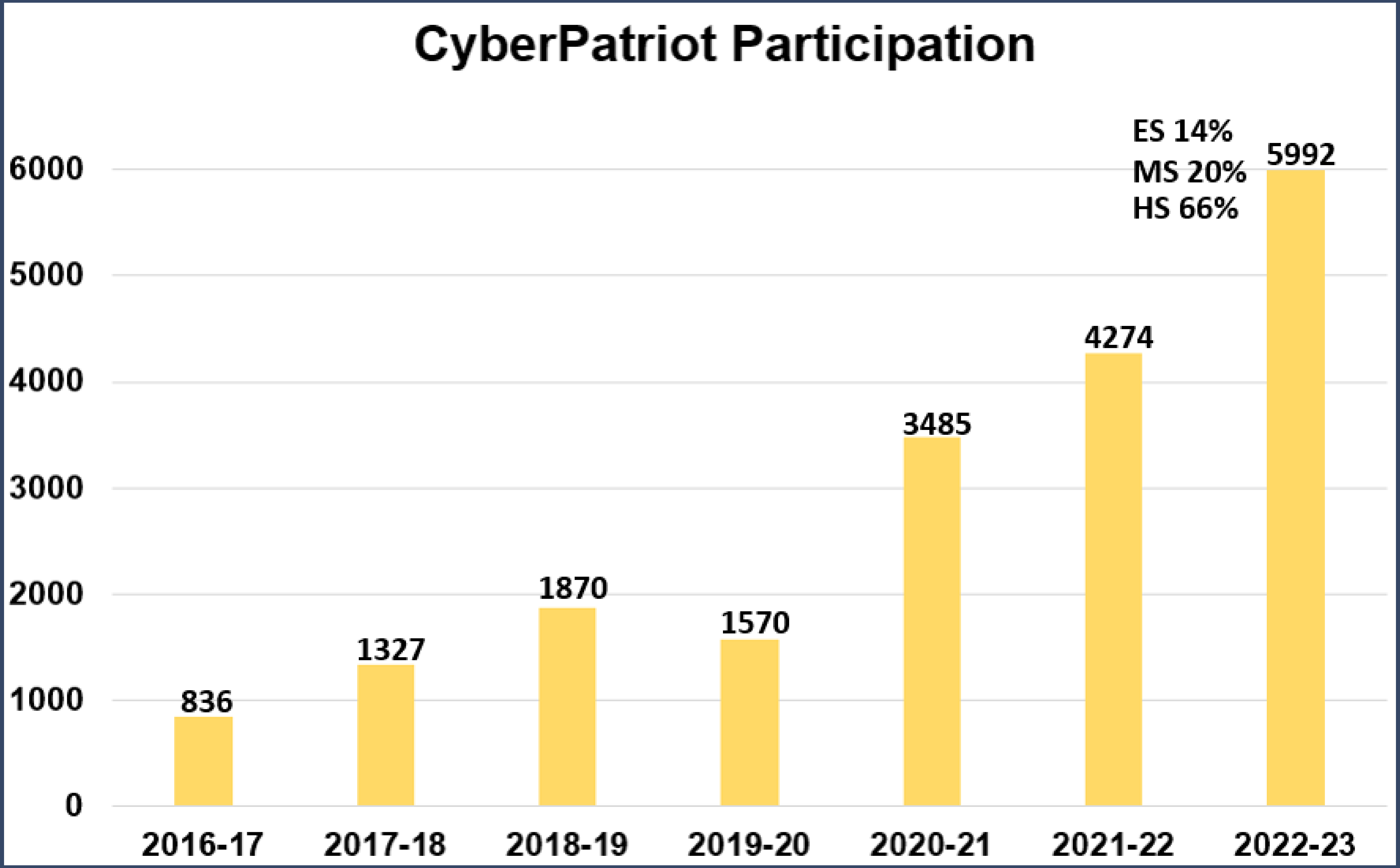
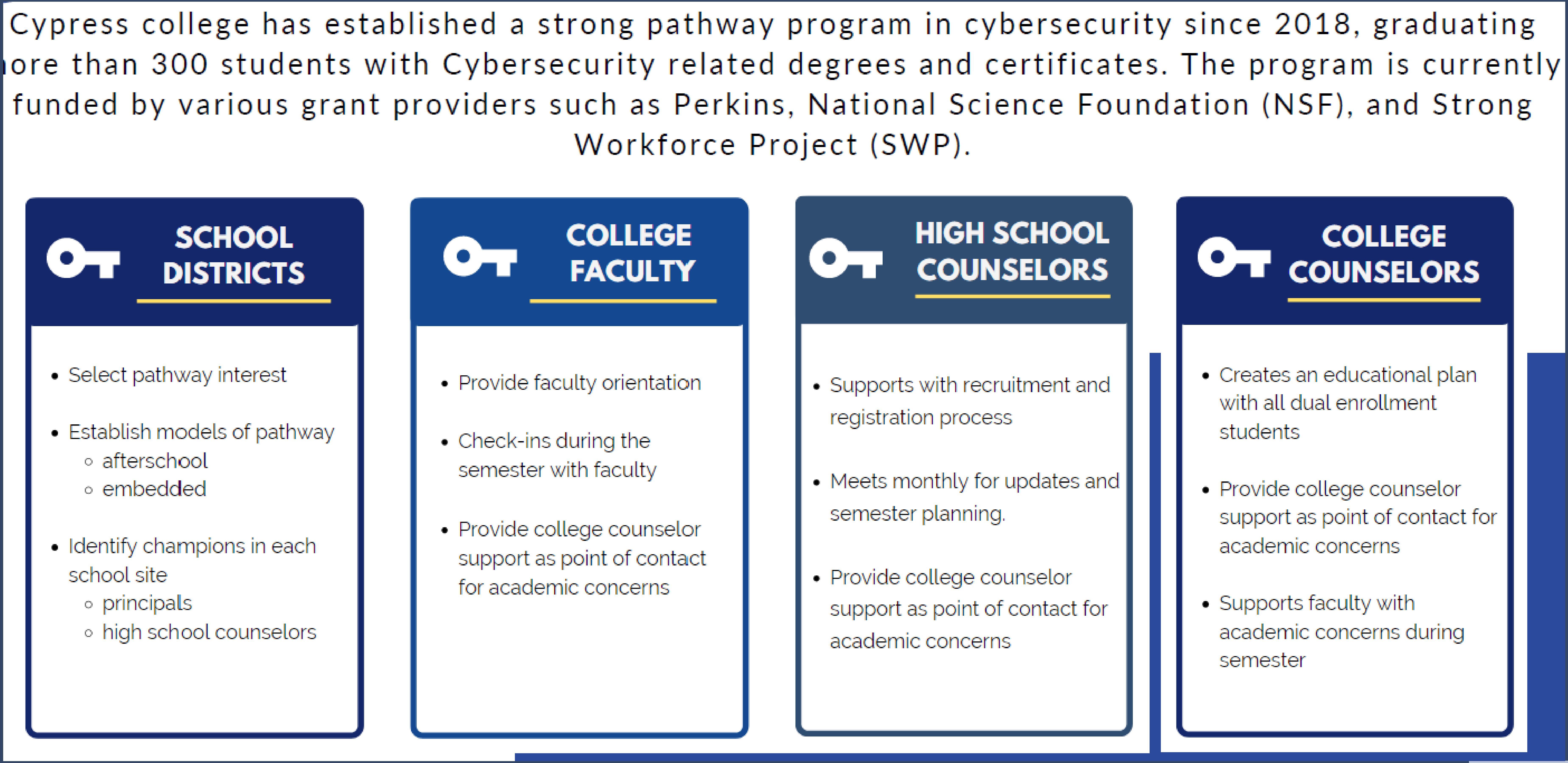
PACE Results: Industry Certification



PACE Results: CyberPatriot Participation



Best Practices: Establishing a Strong Dual Enrollment



Cypress college has established a strong pathway program in cybersecurity since 2018, graduating ore than 300 students with Cybersecurity related degrees and certificates. The program is currently funded by various grant providers such as Perkins, National Science Foundation (NSF), and Strong Workforce Project (SWP).

SCHOOL DISTRICTS

- Select pathway interest
- Establish models of pathway
  - afterschool
  - embedded
- Identify champions in each school site
  - principals
  - high school counselors

COLLEGE FACULTY

- Provide faculty orientation
- Check-ins during the semester with faculty
- Provide college counselor support as point of contact for academic concerns

HIGH SCHOOL COUNSELORS

- Supports with recruitment and registration process
- Meets monthly for updates and semester planning.
- Provide college counselor support as point of contact for academic concerns

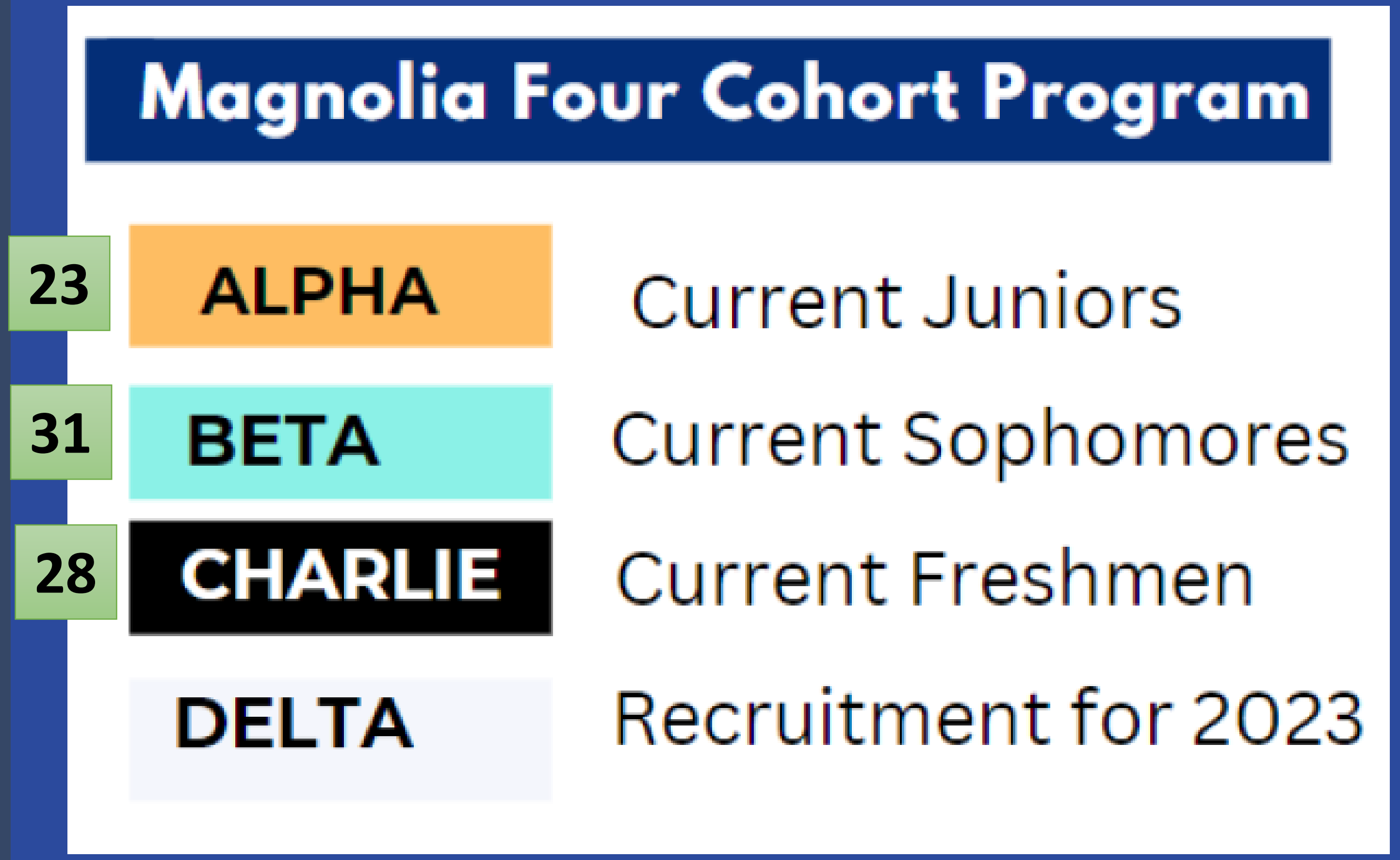
COLLEGE COUNSELORS

- Creates an educational plan with all dual enrollment students
- Provide college counselor support as point of contact for academic concerns
- Supports faculty with academic concerns during semester

Best Practices: Partnership with Magnolia High School

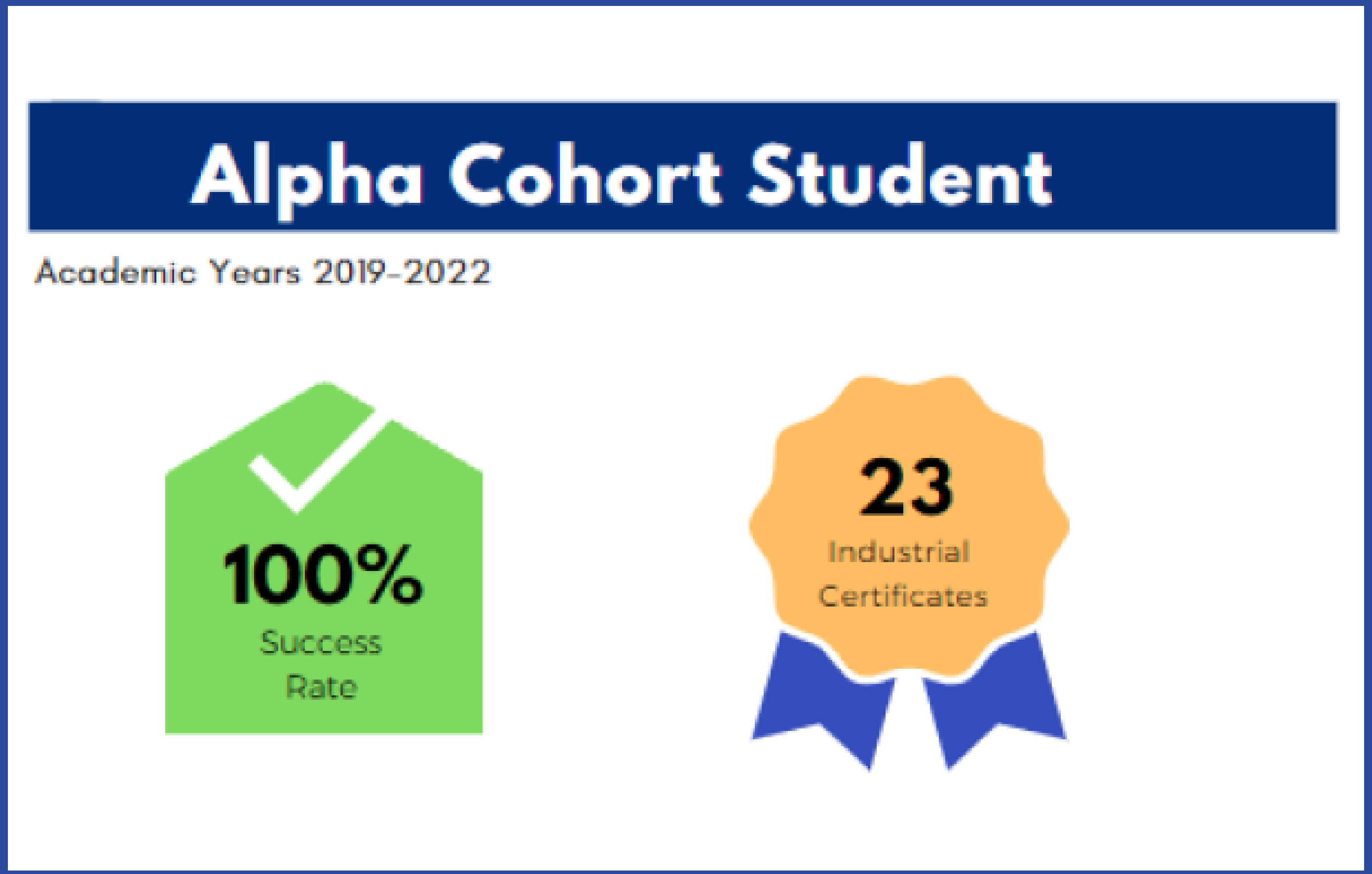
Cybersecurity Pathway is housed at Magnolia High School in the AUHSD. It is currently the Center of Excellence for Technology and Innovation. Students have the opportunity to take cyber elective classes in junior high school to continue in high school.

- Provide support for five years (9 – 12th grade)
- Complete ONE year of community college (Cypress College) during high school
- Completion of industry certifications
- Transfer to University
- Internship opportunities during high school and/or college
- Guaranteed employment in the industry upon graduation



Magnolia Four Cohort Program

23	ALPHA	Current Juniors
31	BETA	Current Sophomores
28	CHARLIE	Current Freshmen
	DELTA	Recruitment for 2023



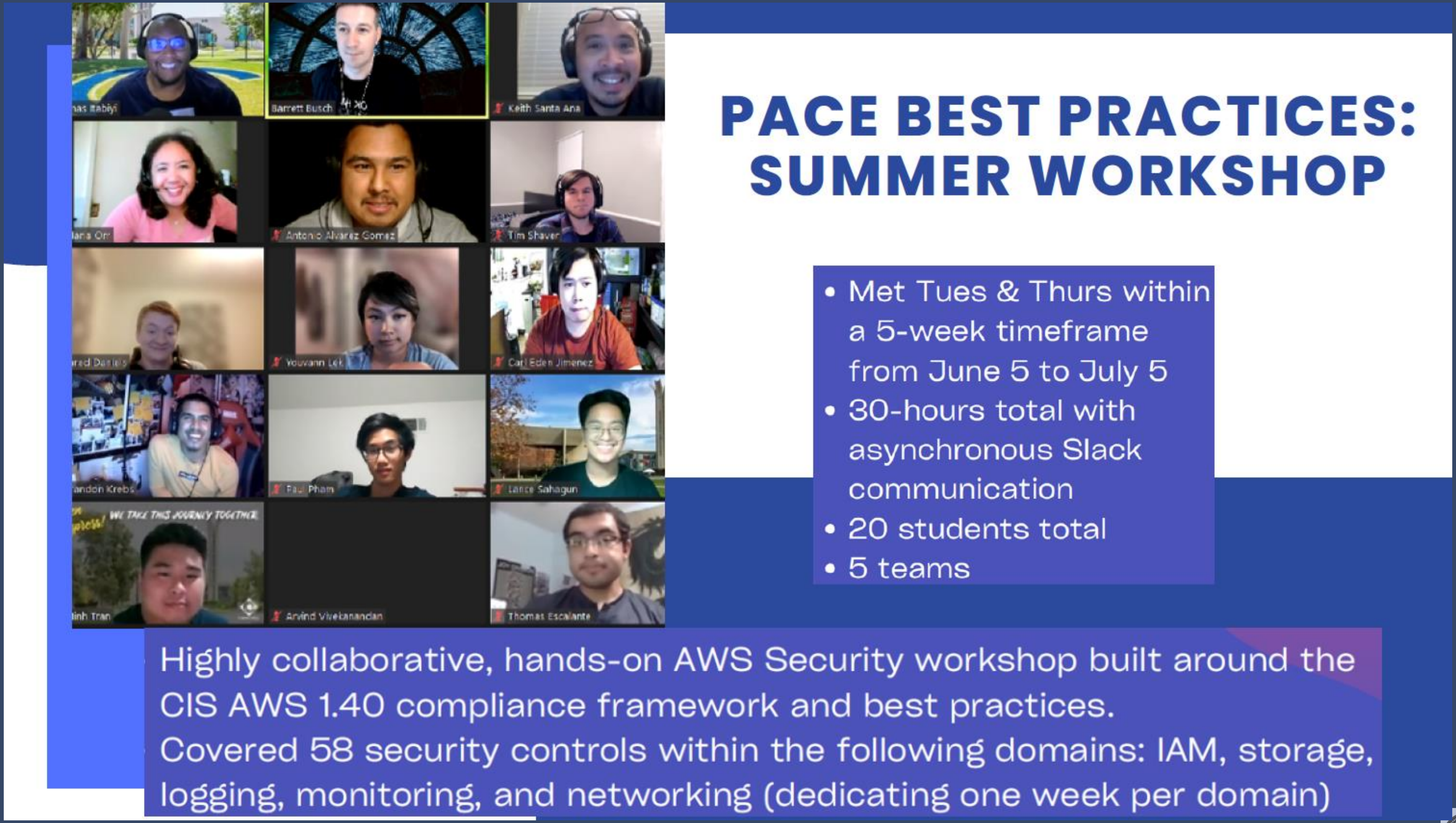
Alpha Cohort Student

Academic Years 2019-2022

100% Success Rate

23 Industrial Certificates

Best Practices: Summer Technical Workshops

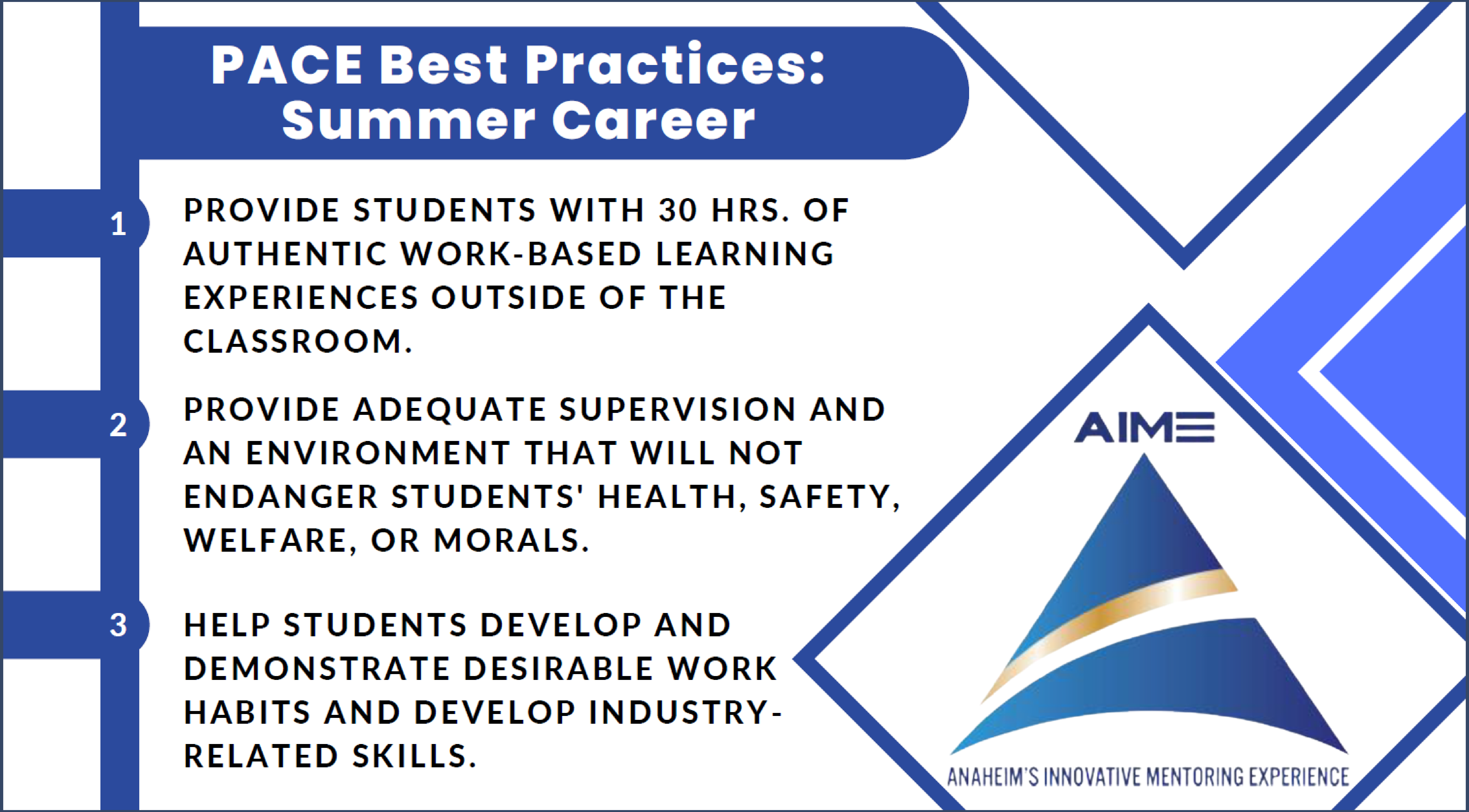


PACE BEST PRACTICES: SUMMER WORKSHOP

- Met Tues & Thurs within a 5-week timeframe from June 5 to July 5
- 30-hours total with asynchronous Slack communication
- 20 students total
- 5 teams

Highly collaborative, hands-on AWS Security workshop built around the CIS AWS 1.40 compliance framework and best practices.
Covered 58 security controls within the following domains: IAM, storage, logging, monitoring, and networking (dedicating one week per domain)

Best Practices: Summer Career Workshops



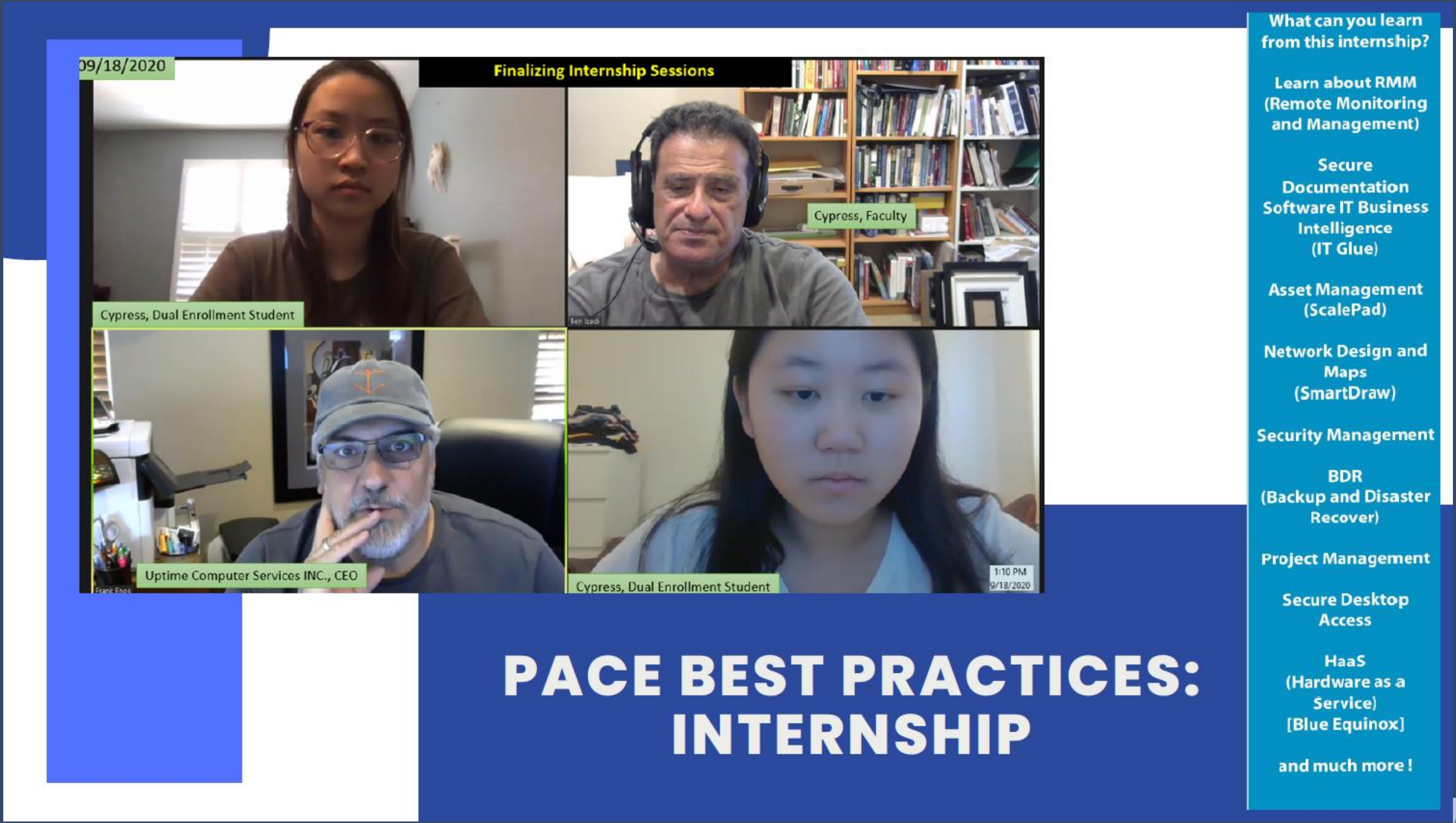
PACE Best Practices: Summer Career

1. PROVIDE STUDENTS WITH 30 HRS. OF AUTHENTIC WORK-BASED LEARNING EXPERIENCES OUTSIDE OF THE CLASSROOM.
2. PROVIDE ADEQUATE SUPERVISION AND AN ENVIRONMENT THAT WILL NOT ENDANGER STUDENTS' HEALTH, SAFETY, WELFARE, OR MORALS.
3. HELP STUDENTS DEVELOP AND DEMONSTRATE DESIRABLE WORK HABITS AND DEVELOP INDUSTRY-RELATED SKILLS.

AIME

ANAHEIM'S INNOVATIVE MENTORING EXPERIENCE

Best Practices: Individual Internship


09/18/2020
Finalizing Internship Sessions
Cypress, Dual Enrollment Student
Cypress, Faculty
Ben Izack
Uptime Computer Services INC., CEO
Frank Enos
Cypress, Dual Enrollment Student
1:10 PM
9/18/2020

PACE BEST PRACTICES: INTERNSHIP

What can you learn from this internship?

Learn about RMM (Remote Monitoring and Management)

Secure Documentation Software IT Business Intelligence (IT Glue)

Asset Management (ScalePad)

Network Design and Maps (SmartDraw)

Security Management

BDR (Backup and Disaster Recover)

Project Management

Secure Desktop Access

HaaS (Hardware as a Service) [Blue Equinox]

and much more !

Best Practices: Group Internship

PACE BEST PRACTICES: INTERNSHIP

06/03/2021
Internship – First Session
Cypress, Student Mentor
Cypress, Faculty
Cypress, Faculty
Cypress, Special Projects Coordinator
Intelligints, CISO
Cypress, Dual Enrollment Student
Cypress, College Student
Cypress, Dual Enrollment Student
Cypress, College Student
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Cypress, Dual Enrollment Student
Cypress, Dual Enrollment Student
Cypress, Dual Enrollment Student
Cypress, Dual Enrollment Student
Cypress, College Student
Cypress, IT Specialist
Cypress, College Student
Cypress, Dual Enrollment Student
Cypress, Dual Enrollment Student
Leave

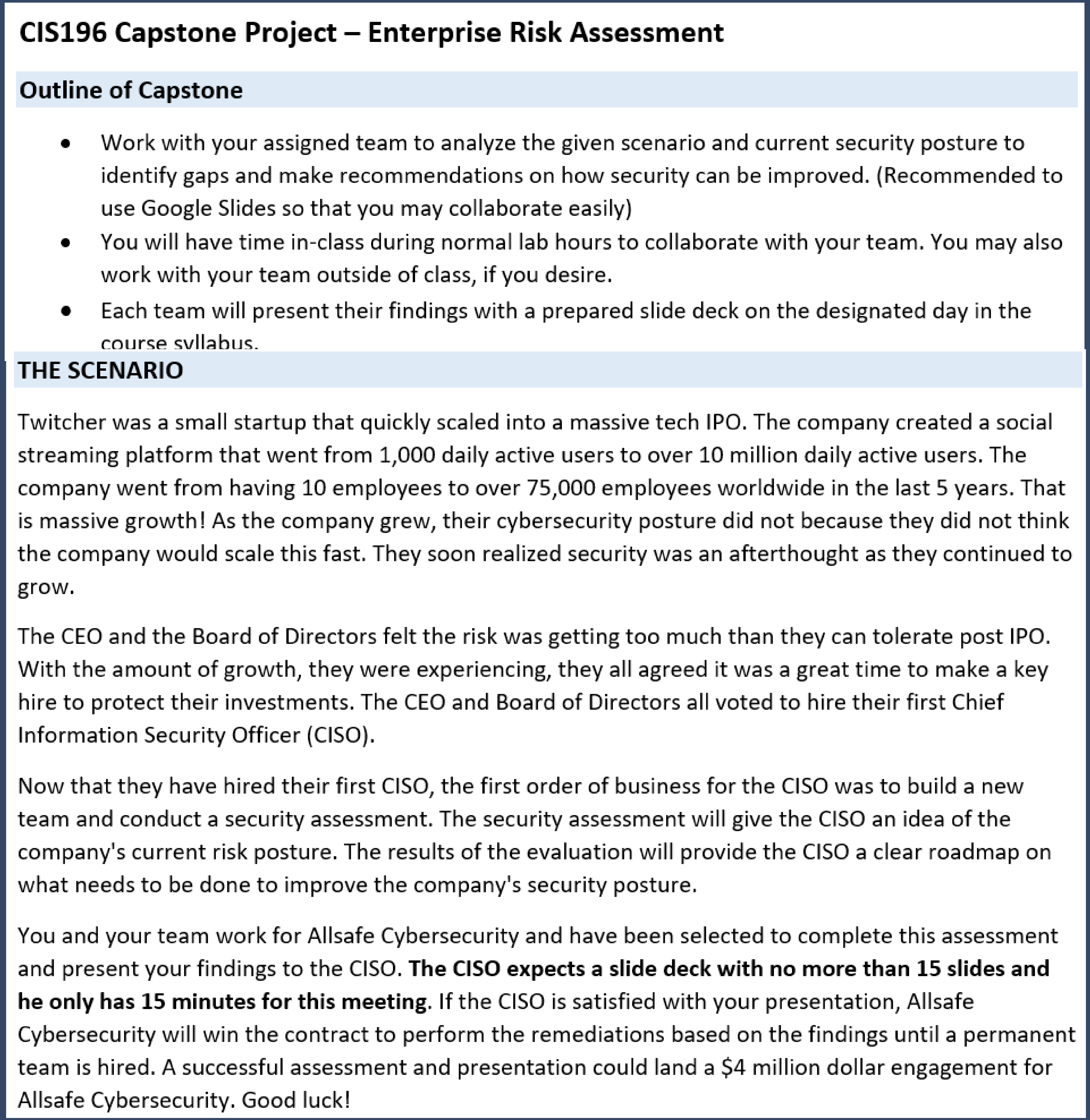
Intelligints

IntelligInts

75 hours in 5 weeks

1. Bring up a Web Server and multiple desktops in AWS
2. What do you need in terms of security, email security and multi factor authentication
3. Build the security environment within the AWS system
4. Deploy and calibrate the security components
5. Install the SIEM platform Alien Vault
6. How to collect logs from the infrastructure and security tools
7. Simulating an attack by injecting malware
8. Find the options and how to remediate
9. Additional Exercises, i.e. installing application and calibrating the anti-virus

Best Practices: Project-based Learning



CIS196 Capstone Project – Enterprise Risk Assessment

Outline of Capstone

- Work with your assigned team to analyze the given scenario and current security posture to identify gaps and make recommendations on how security can be improved. (Recommended to use Google Slides so that you may collaborate easily)
- You will have time in-class during normal lab hours to collaborate with your team. You may also work with your team outside of class, if you desire.
- Each team will present their findings with a prepared slide deck on the designated day in the course syllabus.

THE SCENARIO

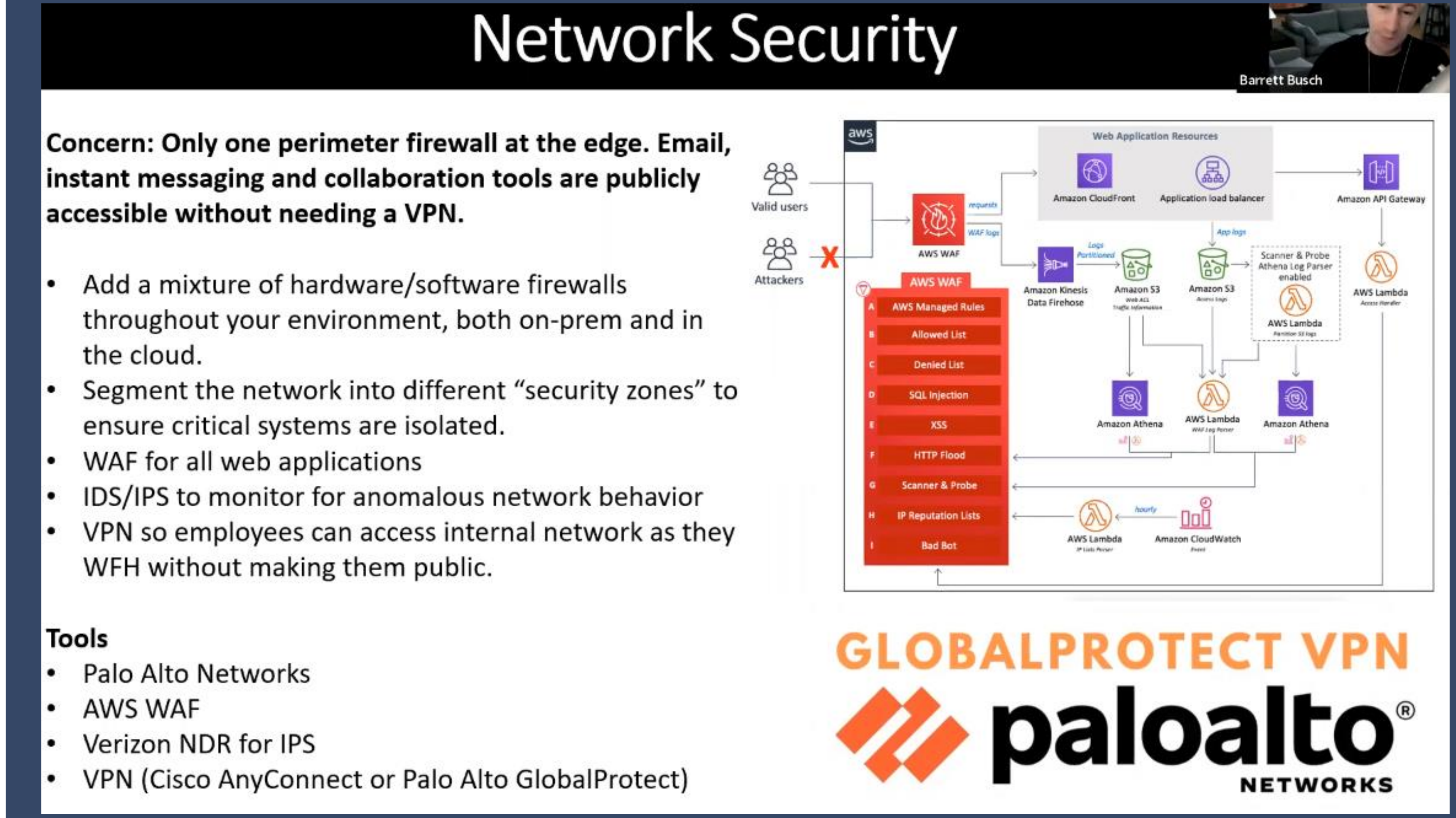
Twitcher was a small startup that quickly scaled into a massive tech IPO. The company created a social streaming platform that went from 1,000 daily active users to over 10 million daily active users. The company went from having 10 employees to over 75,000 employees worldwide in the last 5 years. That is massive growth! As the company grew, their cybersecurity posture did not because they did not think the company would scale this fast. They soon realized security was an afterthought as they continued to grow.

The CEO and the Board of Directors felt the risk was getting too much than they can tolerate post IPO. With the amount of growth, they were experiencing, they all agreed it was a great time to make a key hire to protect their investments. The CEO and Board of Directors all voted to hire their first Chief Information Security Officer (CISO).

Now that they have hired their first CISO, the first order of business for the CISO was to build a new team and conduct a security assessment. The security assessment will give the CISO an idea of the company's current risk posture. The results of the evaluation will provide the CISO a clear roadmap on what needs to be done to improve the company's security posture.

You and your team work for Allsafe Cybersecurity and have been selected to complete this assessment and present your findings to the CISO. **The CISO expects a slide deck with no more than 15 slides and he only has 15 minutes for this meeting**. If the CISO is satisfied with your presentation, Allsafe Cybersecurity will win the contract to perform the remediations based on the findings until a permanent team is hired. A successful assessment and presentation could land a $4 million dollar engagement for Allsafe Cybersecurity. Good luck!

Cybersecurity Analyst



Network Security

Barrett Busch

Concern: Only one perimeter firewall at the edge. Email, instant messaging and collaboration tools are publicly accessible without needing a VPN.

- Add a mixture of hardware/software firewalls throughout your environment, both on-prem and in the cloud.
- Segment the network into different "security zones" to ensure critical systems are isolated.
- WAF for all web applications
- IDS/IPS to monitor for anomalous network behavior
- VPN so employees can access internal network as they WFH without making them public.

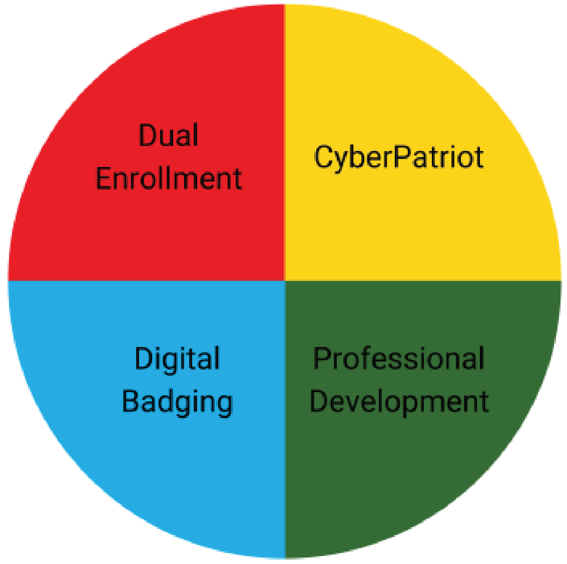
Tools

- Palo Alto Networks
- AWS WAF
- Verizon NDR for IPS
- VPN (Cisco AnyConnect or Palo Alto GlobalProtect)

Sample presentation slide

Best Practices: Summary

Programs



Technologies

- aws educate
- CTFd
- NDG
- Try Hack Me
- eKadence LEARNING FOUNDATION
- NICE Challenge PROJECT

Summary of Program Activities

Industry Advisory Meetings

CyberPatriot & Superintendent's Cup Award Ceremony

Summer Workshops

AWS CLOUD SECURITY CAPSTONE

Summer 2023

Presented by Barrett Busch

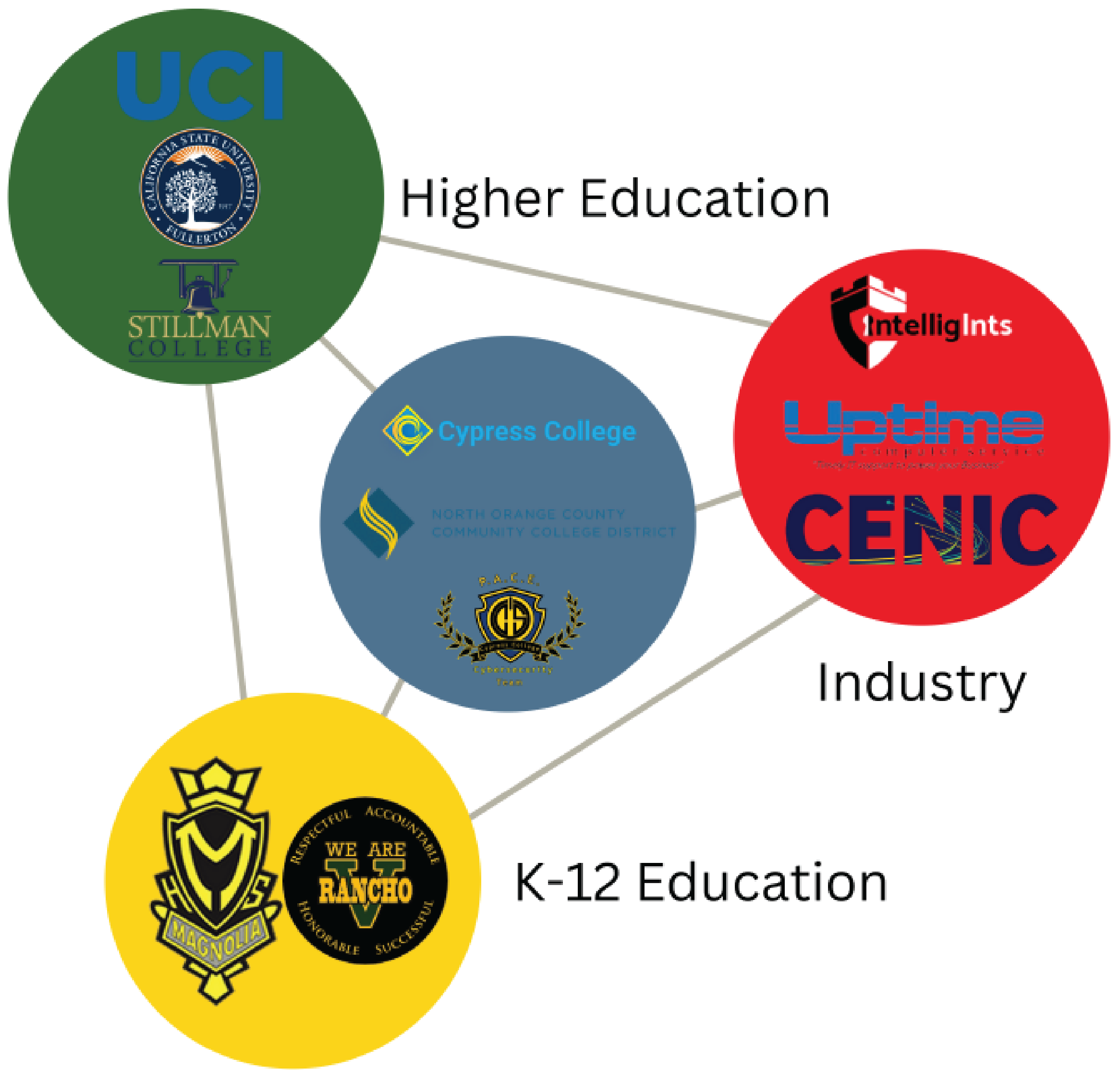
When: June 6
(every Tues/W
PST)

Where: Zoom

What: Gain ha
security expe
CIS AWS 1.50

Certification Bootcamps

Partnerships



UCI
CALIFORNIA STATE UNIVERSITY FULLERTON
STILLMAN COLLEGE
Cypress College
NORTH ORANGE COUNTY COMMUNITY COLLEGE DISTRICT
IntelligInts
Uptime
CENIC
MAGNOLIA
WE ARE RANCHO

Higher Education

Industry

K-12 Education

Thank you