PCAGE.edu

# Internetwork Engineering Core Track

On-Campus Hybrid Remote

**960 Clock hours / 54 Credits**

**Prepares students for:**

**CompTIA® A+, Network+, Security+, Cybersecurity Analyst (CySA+), Splunk® Fundamentals**
**Microsoft® Azure Fundamentals, Linux Fundamentals & Server Fundamentals**

## Internetwork Engineering II: Concentration on Cybersecurity

**1200 Clock Hours/69 Credits**
**CompTIA Pentest+ Splunk Cybersecurity Defense Analyst**

## Internetwork Engineering II: Concentration on Cloud Computing

**1200 Clock Hours/69 Credits**
**AWS Certified Architect Associate, AWS Certified Developer Associate & HashiCorp Terraform**

**Vocational Objectives:**

This program with residential and on-line delivery provides comprehensive training, including theoretical concepts and hands-on practice, to provide students with the expertise and skills to work as a Network Administrator/Engineer; Computer/-Network Support Specialist; Cybersecurity Specialist; or Cloud Computing Professional. The graduate will have working familiarity with network hardware and software including Microsoft Windows Desktop and Server operating systems, and will be able to design, install, troubleshoot and support Microsoft and Cisco networks, implement Network Security and manage Cloud based platforms.

PC AGE programs are designed around one main objective: **Preparation for Industry Certifications**. The **Internetwork Engineering** program includes preparation for CompTIA A+, Network+, Security+, CySA+, Splunk Fundamentals and Azure Fundamentals. Test vouchers for 4 certification exams are included (CySA+ not included).

Students who wish to pursue additional concentration courses in **Cybersecurity and Cloud Computing** may take the **Internetwork Engineering II** program, consisting of additional courses for each emphasis.

**Job Placement** assistance is provided and incorporated into the program. Students will learn how to create an effective resume, job searching methods, and how to get ready for a technical interview. The Technical Career Preparation Workshop also includes **Life Skills** on goal setting, self-improvement, and time and money management that are so important to navigate successfully in today's world.

Interested graduates are encouraged to pursue **further learning**.

*Live Online Classes!*

Students are required to spend a minimum of 15-20 hours per-week, per-subject, on out-of-class learning activities that include reading and writing assignments, quizzes and projects. Outside work will be assessed toward final grade.

# Course Outline

| Code | Major Courses | Clock Hours | Credit Hours | Prepares for |
|---|---|---|---|---|
| IE 100 | Introduction to Computers and Internet Fundamentals | 120 | 6 |  |
| IE 110 | Computer Hardware Installation and Troubleshooting | 96 | 6 | |
| IE 115 | Networking Fundamentals | 72 | 4 |  |
| IE 115C | Networking Fundamentals | 72 | 4 | |
| IE 122 | Supporting Microsoft Windows Server Operating System | 72 | 4 | |
| UN 100 | Linux System Administration I | 72 | 4 | |
| IE 180 | Implementing & Managing Security in a Microsoft Windows Network I | 72 | 4 |  |
| IE 180C | Implementing & Managing Security in a Microsoft Windows Network II | 72 | 4 | |
| IE 230 | Implementing Advanced Network Security I | 72 | 4 | |
| IE 230C | Implementing Advanced Network Security II | 72 | 4 |  |
| IE 240 | Cybersecurity Defense Fundamentals | 72 | 4 |  |
| IE 170 | Technical Career Preparation Workshop | 30 | 2 | Career Workshop & Final Project |
| IE 200 | Designing, Implementing & Troubleshooting Project | 21 | 1 |  |
| IE 210 | Fundamentals of Cloud Computing | 45 | 3 | |
| | **Internetwork Engineering Total Hours** | **960** | **54** | |

**Internetwork Engineering II: Concentration on Cybersecurity**

| | | | | |
|---|---|---|---|---|
| IE 300 | Penetration Testing I | 70 | 5 |  |
| IE 300C | Penetration Testing II | 70 | 5 | |
| IE 310 | Cybersecurity Defense Analyst | 100 | 5 |  |
| | **Internetwork Engineering II Total Hours** | **1200** | **69** | |

**Internetwork Engineering II: Concentration on Cloud Computing**

| | | | | |
|---|---|---|---|---|
| IE 400 | Cloud Solutions | 70 | 5 |  |
| IE 410 | Cloud DevOps Associate | 70 | 5 |  |
| IE 420 | Cloud as a Service | 100 | 5 |  |
| | **Internetwork Engineering II Total Hours** | **1200** | **69** | |

Note: Taking any industry certification exam is optional. The school does not award any industry certification. Certification is not a precondition of employment nor required to perform employable functions represented in PC AGE's programs.

## Leverage Your Training

### Associate in Applied Science (AAS) - Applied Computer Studies or Bachelors in Information Technology

(https://www2.tesu.edu/oplr/client2.php?client=PCAGE-3)

| Thomas Edison State University | | PC AGE.edu Internetworking Engineering | |
|---|---|---|---|
| **II. Administrative Studies (6 Credits)** | | **Program Option** | |
| Applied Computer Studies | 6 | | |
| ITS-140 | 3 | IE115 Network Fundamentals | 4 |
| CMP-122 | 3 | IE122 Microsoft Server Operating System | 4 |
| **III. Electives (3 Credits)** | 3 | **Electives** | |
| CYB-220 | 3 | IE180 Microsoft Security & | 8 |
| | | IE230 Advanced Network Security | |
| Total Credits toward TESU Degree | 9 | | |

PC AGE has an articulation agreement creating a college degree pathway with Thomas Edison State University (TESU), a regionally accredited institution of higher education. Successful PC AGE graduates of the Internetwork Engineering program may be awarded credits toward TESU's Associate of Applied Science (AAS) in Applied Computer Studies or Bachelors in Information Technology. TESU has one of the most flexible transfer credit policies in the country, so PC AGE graduates may also be able to apply credit earned at other regionally accredited colleges and universities toward this degree. TESU Featured Courses are listed as a guide. Please contact your admissions representative for eligibility details. Courses and credits transferred may be subject to change.

## Bachelors in Cybersecurity & Informational Assurance (BS)

(https://www.wgu.edu/online-it-degrees/cybersecurity-information-assurance-bachelors-program.html)

| WGU Western Governors University | | PC AGE.edu Internetworking Engineering | |
|---|---|---|---|
| **I. IT, Network & Security (200 Credits)** | | **Program Option** | |
| IT Foundations | 4 | IE110 Computer Hardware Installations & Troubleshooting | 6 |
| IT Applications | 4 | IE100 Introduction to Computers & Internet Fundamentals | 6 |
| Networks | 4 | IE115 Network Fundamentals | 4 |
| Network & Security - Applications | 4 | IE180 Microsoft Security | 4 |
| Cyber Defense & Countermeasures | 4 | IE230 Advanced Network Security | 4 |
| Total Credits toward WGU Degree | 20 | | |

# Internetwork Engineering Program

**IE100: Intro to Computers & Internet Fundamentals**

Objective: Gives students an overview of the personal computer, operating systems, Internet technologies, Network Security and Professional Ethics. This course, together with IE110, prepares students for CompTIA A+ Exam 220-1102.
Learning Outcomes: Upon successful completion of this course, the student will be able to:
a. Understand Microsoft Operating System fundamentals
b. Install, configure, and upgrade Microsoft Operating Systems
c. Perform diagnosing and troubleshooting of Microsoft Operating Systems
d. Understand basic wired/wireless networking
e. Understand and configure Internet web browsers

**IE110: Computer Hardware Installation & Troubleshooting**

Objective: Gives students the essential operating competencies for an entry-level IT professional or PC Service Technician. This course, together with IE100, prepares students for CompTIA A+ Exams 220-1201.
Learning Outcomes: Upon successful completion of this course, the student will be able to:
a. Install, configure and upgrade computers
b. Diagnose and troubleshoot computer related problems
c. Configure the motherboard, processor, and memory
d. Troubleshoot printers
e. Understand Basic Networking

**IE115: Networking Fundamentals i**

Objective: A typical candidate would have CompTIA's A+ certification or equivalent knowledge and would be able to install, configure and troubleshoot basic networking hardware, protocols and services. This course, together with IE115C, prepares students for CompTIA Network+ Exam N10-008.
Learning Outcomes: Upon successful completion of this course, the student will be able to:
A. Understand Media and Topologies
b. Understand Protocols and Standards
c. Understand the Terminology of Network Implementation
d. Understand Network Support
e. Understand Wired/Wireless technologies

**IE115C: Networking Fundamentals ii**

Objective: A typical candidate would have CompTIA's A+ certification or equivalent knowledge and would be able to install, configure and troubleshoot basic networking hardware, protocols and services. This course, together with IE115, prepares students for CompTIA Network+ Exam N10-008.
Learning Outcomes: Upon successful completion of this course, the student will be able to:
a. Understand Media and Topologies
b. Understand Protocols and Standards
c. Understand the Terminology of Network Implementation
d. Understand Network Support
e. Understand Wired/Wireless technologies

**IE122: Supporting Microsoft Server Operating System**

Objective: Students will learn to operate in medium to very large computing environments that use the Windows 2022 Server operating system.
Learning Outcomes: Upon successful completion of this course, the student will be able to:
a. Configure TCP/IP settings
b. Install Windows Server 2022
c. Deploy and configure network core services
d. Implement address management
e. Deploy and configure network access services in the cloud

**IE180: Implementing & Managing Security in Microsoft Windows Network I**

Objective: Give students the knowledge and skills to design, implement, administer, and troubleshoot network security. This course, together with IE180C, prepares students for the CompTIA Security+ exam SY0-701.
Learning Outcomes: Upon successful completion of this course, the student will be able to:
a. Understand the concepts of authentication, encryption, access control and logging
b. Implement hardening practices and procedures
c. Differentiate between different network devices and their roles
d. Conduct risk assessments and implement risk mitigation
e. Identify and implement appropriate disaster recovery procedures

**IE180C: Implementing & Managing Security in Microsoft Windows Network II**

Objective: Give students the knowledge and skills to design, implement, administer, and troubleshoot network security. This course, together with IE180, prepares students for the CompTIA Security+ exam SY0-701.
Learning Outcomes: Upon successful completion of this course, the student will be able to:
a. Understand the concepts of authentication, encryption, access control and logging
b. Implement hardening practices and procedures
c. Differentiate between different network devices and their roles
d. Conduct risk assessments and implement risk mitigation
e. Identify and implement appropriate disaster recovery procedures

**IE230: Implementing Advanced Network Security I**

Objective: Provide students with skills on risk management, research and identification of threats and applicable countermeasures and learn how to collaborate securely. This course, together with IE230C, prepares students for the CompTIA Cybersecurity Analyst (CySA+) exam CS0-003.
Learning Outcomes: Upon successful completion of this course, the student will be able to:
a. Analyze network security concepts, components, and architectures, and implement controls
b. Use research and analysis to secure the enterprise
c. Implement security controls
d. Conduct vulnerability assessments
e. Conduct incident and emergency responses

**IE230C: Implementing Advanced Network Security II**

Objective: Provide students with skills on risk management, research and identification of threats and applicable countermeasures and learn how to collaborate securely. This course, together with IE230, prepares students for the CompTIA Cybersecurity Analyst (CySA+) exam CS0-003.
Learning Outcomes: Upon successful completion of this course, the student will be able to:
a. Analyze network security concepts, components, and architectures, and implement controls
b. Use research and analysis to secure the enterprise
c. Implement security controls
d. Conduct vulnerability assessments
e. Conduct incident and emergency responses

**IE240: Cybersecurity Defense Fundamentals**

Objective: Provides students with hands-on skills on security network management using tools such as Splunk and Wireshark. This course prepares students for the Splunk Core Certified User SPLK-1001 exam.
Learning Outcomes: Upon successful completion of this course, the student will be able to:
a. Basic searching
b. Transforming commands
c. Creating visualizations
d. Using Wireshark to capture live network traffic
e. Applying the use of capture filters

**UN100: Linux System Administration I**

Objective: Enable a student to install and support Linux environments and provide fundamental support to networked Linux environments.
Learning Outcomes: Upon successful completion of this course, the student will be able to:
a. Install Linux Operating System
b. Install Linux software packages and patches
c. Manage user and Group accounts
d. Manage files and directory structure, file permissions and ownership
e. Perform administrative tasks and customize the shell environment

## Internetwork Engineering Program (contd.)

**IE170: TCPW Technical Career Preparation Workshop**
This workshop prepares students to seek employment in the computer networking field. Students will learn how to create an effective resume, methods for job search, and how to get ready for a job interview. Includes on-line modules on Life Skills such as goal setting and time and money management.

**IE200: Designing, Implementing & Troubleshooting Project**

Objective: Enable the student to Design, Implement, and Troubleshoot Local and Wide Area networks working as a team.
Learning Outcomes: Upon successful completion of this course, the student will be able to:
a. Design and Implement a TCP/IP Network for a medium sized company
b. Install and configure all the components of a network including application servers
c. Implement firewall and Internet Access
d. Install and configure Cisco routers for public network access
e. Implement Remote Access to access company network through Internet

**IE210: Fundamentals of Cloud Computing**

Objective: Students will learn how to manage, monitor, configure, and troubleshoot a Microsoft Azure cloud infrastructure. This course prepares students for Microsoft Exam AZ-900.
Learning Outcomes: Upon successful completion of this course, the student will be able to:
a. Define cloud computing and concepts
b. Implement core solutions and tools
c. Configure general security and network settings
d. Implement basic identity, governance and privacy
e. Manage Azure costs and Service Level Agreements

Certification Test Preparation courses are provided as additional exposure to testing objectives. Please refer to the School Catalog for the description of the Certification Test Preparation and Lab Companion courses.

Program contents may change any time, for the most updated listing please go to PCAGE.edu - Student Resources – School Catalog.

## Internetwork Engineering II: Cybersecurity (Optional Track I)

**IE300: Penetration Testing I**

Objective: Provide students with advanced hacking tools and techniques used by penetration testers to evaluate the security of an organization. This course, together with IE300C, prepares students for the CompTIA Pentest+ exam PT0-003.
Learning Outcomes: Upon successful completion of this course, the student will be able to:
a. Engagement Management
b. Reconnaissance and Enumeration
c. Attacks and Exploits
d. Post-exploitation and Lateral Movement
e. Vulnerability Discovery and Analysis

**IE300C: Penetration Testing II**

Objective: Provide students with advanced hacking tools and techniques used by penetration testers to evaluate the security of an organization. This course, together with IE300, prepares students for the CompTIA Pentest+ exam PT0-003.
Learning Outcomes: Upon successful completion of this course, the student will be able to:
a. Engagement Management
b. Reconnaissance and Enumeration
c. Attacks and Exploits
d. Post-exploitation and Lateral Movement
e. Vulnerability Discovery and Analysis

**IE310: Cybersecurity Defense Analyst**

Objective: Provide students with an intermediate-level standard for users of Splunk Enterprise and Enterprise Security. This course prepares students for the Splunk Certified Cybersecurity Defense Analyst SPLK-5001 exam.
Learning Outcomes: Upon successful completion of this course, the student will be able to:
a. Security Operations and the Defense Analyst
b. Data and Tools for Defense Analysts
c. The Art of Investigation
d. Using Splunk Enterprise Security
e. Introduction to Splunk Security Essentials

## Internetwork Engineering II: Cloud Computing (Optional Track II)

**IE400: Cloud Solutions Architect**

Objective: Prepares the student to perform a solutions architect role, designing solutions based on the AWS Well-Architected Framework. This course prepares students for the Certified Cloud Practitioner SAA-C03 exam.
Learning Outcomes: Upon successful completion of this course, the student will be able to:
a.. Describe basic/core characteristics of deploying and operating in the AWS Cloud
b. Design Secure Architectures
c. Design Resilient Architectures
d. Design High-Performing Architectures
e. Design Cost-Optimized Architectures

**IE410: Cloud DevOps Associate**

Objective: Prepares the student to perform a developer role, demonstrating proficiency in developing, testing, deploying, and debugging AWS Cloud-based applications. This course prepares students for the Certified SysOps Administrator Associate DVA-C02 exam.
Learning Outcomes: Upon successful completion of this course, the student will be able to:
a. Design and Create CI/CD Pipeline and AWS architectures (distributed system /microservices/database schemas and modeling)
b. Design AWS networking infrastructure (for example, DNS, TCP/IP, firewalls)
c. Monitor, log and troubleshoot systems and make sure of business continuity and also the disaster recovery procedures are followed.
d. Implement security controls to meet compliance requirements.

**IE420: Cloud as a Service**

Objective: Provides the student with the knowledge to specialize in operations, IT, and/or development skills associated with Terraform. This course prepares students for the HashiCorp Certified Terraform Associate TA-C03 exam.
Learning Outcomes: Upon successful completion of this course, the student will be able to:
a. Understand Infrastructure as Code (IaC)
b. Understand Terraform basics
c. Use the core Terraform workflow
d. Use Terraform outside the core workflow
e. Understand HCP Terraform capabilities

PC AGE graduates may earn a degree from our partner college TESU upon transferring a portion of the required credits. PC AGE does not award any degree.

PC AGE EDU

## Advisory Committee

Khalid Zia; M.S. Computer and Information Systems; Director, Network Management
Dr. Ajaz Rana; Ph.D. Computer and Information Systems; IT Principal
Sahir Sarwar; M.S. Computer and Information Systems; Sr. Systems Engineer
Kavita Joshi; M.S. Computer and Information Systems; Lead Systems Analyst


## Faculty - All Campuses

**Faculty members teach at all campuses, as required by class schedules.**

**Alizeh Jafri:** M.S. Cybersecurity Engineering [Middlesex University], CompTIA A+ Certified, CompTIA Network+ Certified, CompTIA Security+ Certified.

**Andrew Peruzzi:** A.S. Computer Science [Sussex County Community College], Certified Ethical Hacker (CEH), Certified Network Associate (CCNA): Routing & Switching, VMware Certified Professional (VCP6-DCV), Microsoft Certified Educator (MCE), Microsoft Certified Solutions Associate (MCSA): Server 2012/2016/Windows 10, CompTIAA+ Certified, Network+ Certified, Linux+ Certified, Security+ Certified, CompTIAAdvanced Security Practitioner (CASP) Certified.

**Carlos Bayron:** A.S. Applied Science [Hudson County Community College], RHCE - Red Hat Certified Engineer RHEL 4, MCSA - Microsoft Certified Systems Administrator Windows 2000, CompTIA A+ Certified, CompTIA Network+ Certified.

**Dennis Lovatt:** CompTIA A+ Certified, CompTIA Network+ Certified, CompTIA Security+ Certified, CompTIA Linux+ Certified.

**Humberto Hilario:** M.S. Information Technology Management [Western Governors University], Certified Information Systems Security Professional (CISSP), Certified Ethical Hacker (CEH), Cisco Certified Network Associate (CCNA): Routing & Switching/Security, Certified Design Associate (CCDA), Microsoft Certified Trainer (MCT), Microsoft Certified Solutions Associate (MCSA): Server 2012/2008, VMware Certified Professional (VCP6-DCV), CompTIA A+ Certified, Network + Certified, Security+ Certified, Linux+ Certified, Cybersecurity Analyst (CySA+), CompTIA Advanced Security Practitioner (CASP) Certified.

**Nihal Siriwardane:** M.S. Energy Management [New York Institute of Technology], CompTIA A+, CompTIA Network+ Certified, CompTIA Security+ Certified, Microsoft Certified Trainer (MCT), Microsoft Certified Solutions Associate (MCSA): Server 2012/2008.

**Mohamed Ismail:** B.S. Business Marketing [Blida University], CompTIA A+ Certified, Network + Certified, Security+ Certified, Cisco Certified Network Associate (CCNA): Routing & Switching, MS Azure Certified.

**Robert Dolan:** MBA Information Technology Management [Keller Graduate School – DeVry], CompTIA A+ Certified, CTT+ Certified, MCP: Windows 2000, MCTS: Windows 7, HDI Support Center Analyst Certified.

## Instructional Support Staff – All Campuses

**Humberto A. Hilario:** CompTIA A+ Certified, Network+ Certified, CompTIA Security+ Certified, MS Azure Certified, VMware Certified Associate (VCA6-DCV).

**Paul Stillitano:** CompTIA A+ Certified, CompTIA Network+ Certified, Cybersecurity Analyst (CySA+) Certified.

## PC AGE grads continue to get the jobs and salaries they need for the life they envision.

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