



**Cover Sheet for In-State Institutions
New Program or Substantial Modification to Existing Program**

Institution Submitting Proposal	
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Each action below requires a separate proposal and cover sheet.

- | | |
|-----------------------------|---|
| New Academic Program | Substantial Change to a Degree Program |
| New Area of Concentration | Substantial Change to an Area of Concentration |
| New Degree Level Approval | Substantial Change to a Certificate Program |
| New Stand-Alone Certificate | Cooperative Degree Program |
| Off Campus Program | Offer Program at Regional Higher Education Center |

Payment Submitted:	Yes No	Payment Type:	R*STARS # Check # 30173198	Payment Amount:	Date Submitted:
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Department Proposing Program			
Degree Level and Degree Type			
Title of Proposed Program			
Total Number of Credits			
Suggested Codes	HEGIS:	CIP:	
Program Modality	On-campus	Distance Education (fully online)	Both
Program Resources	Using Existing Resources	Requiring New Resources	
Projected Implementation Date <small>(must be 60 days from proposal submission as per COMAR 13B.02.03.03)</small>	Fall	Spring	Summer Year:
Provide Link to Most Recent Academic Catalog	URL:		

Preferred Contact for this Proposal	Name:
	Title:
	Phone:
	Email:

President/Chief Executive	Type Name:
	Signature: <i>Jermaine J. Williams</i> Date:
	Date of Approval/Endorsement by Governing Board:



OFFICE OF THE PRESIDENT

February 15, 2023

Dr. James D. Fielder, Jr.
Secretary of Higher Education
Maryland Higher Education Commission
6 North Liberty Street
Baltimore, MD 21201

Dear Dr. Fielder:

Montgomery College respectfully requests approval of the following academic program action:

Substantial modifications to the CISCO certified network associate + security lower division certificate, CIP 11.1003, HEGIS 5101.05, effective fall 2023.

Montgomery College is prepared to offer the revised CISCO certificate as a stand-alone certificate program. The certificate prepares students to install, operate, and troubleshoot medium-sized router and switched networks, including implementation and verification of connections to remote sites in a WAN. The program also provides the foundation for students to sit for the following industry-recognized certifications: Network+, Security+, and CCNA (CISCO certified network associate).

The associated fee of \$50 for substantial modifications to a certificate program will be sent to the Maryland Higher Education Commission via U.S. mail.

Thank you for your time and consideration of this request. If you have questions, please contact Dr. Carolyn Terry, associate senior vice president for academic affairs, at 240-567-4226 or Carolyn.Terry@montgomerycollege.edu.

Sincerely,

A handwritten signature in cursive script that reads "Jermaine F. Williams".

Dr. Jermaine F. Williams
President

Montgomery College
CISCO Certified Network Associate + Security Certificate

A. Centrality to Institutional Mission and Planning Priorities:

1. Provide a description of the program, including each area of concentration (if applicable), and how it relates to the institution's approved mission.

Montgomery College is prepared to offer the newly-titled and revised CISCO certified network associate + security certificate (CISCO certificate) as a stand-alone certificate. The certificate will no longer fall under the cybersecurity associate of applied science (HEGIS 5101.01, CIP 11.1003).

Intended for those already employed in computing or who have a computing background, the certificate prepares students to install, operate, and troubleshoot medium-sized router and switched networks, including implementation and verification of connections to remote sites in a WAN. The curriculum emphasizes core security technologies and the installation, troubleshooting, and monitoring of network devices to maintain integrity, confidentiality and availability of data and devices. It also provides the foundation for students to sit for the following industry-recognized certifications: [Network+](#), [Security+](#), and [CCNA](#).

The revised CISCO certificate supports Montgomery College's mission, which is to empower our students to change their lives, enrich the life of the community, and hold ourselves accountable for our results. CISCO students are empowered by gaining exposure to major technology and cybersecurity platforms and computer networking coursework structured to prepare students who ultimately plan to work in the cloud/network/system architect/cybersecurity professions. Montgomery College is serving the needs of our community by providing an educated workforce to help meet the diverse needs of our citizens and community. Finally, the CISCO program holds itself accountable through curriculum and workforce alignment, program assessment, faculty evaluations, and student feedback through evaluations.

2. Explain how the proposed program supports the institution's strategic goals and provide evidence that affirms it is an institutional priority.

The CISCO certificate is a priority at Montgomery College. Montgomery College stands as a national leader for the quality and relevancy of its academic programs by offering programs that reflect the needs of both students and the community. Per the [Montgomery College 2025](#) strategic plan, Goal III: Fuel the Economy and Drive Economic Mobility ensures the needs of all local employers are met and learners of all ages are prepared to compete in the economy. Students enrolled in the CISCO certificate are provided opportunities to gain experiential and community learning, including internships, mentorships, real-world projects, and experimental joint learning spaces. The CISCO curriculum includes four core courses designed to prepare students for the CCNA certification exam, and a network security course reinforces real-world scenarios. A combination of academic and practical instruction, collaboration with local business partners, and use of industry-standard best practices provide individuals with knowledge and skills that are necessary for success in this profession.

3. Provide a brief narrative of how the proposed program will be adequately funded for at least the first five years of program implementation. (Additional related information is required in section L.)

The revised CISCO certificate will be implemented with existing institutional resources currently supporting the program. Outstanding faculty, state-of-the-art facilities, equipment, and library resources are already in place as the program is currently being offered to students.

4. Provide a description of the institution's commitment to:

a) ongoing administrative, financial, and technical support of the proposed program

This academic proposal is proceeding with the full support of the department chair, dean, and provost under which the program was developed. The program also has the full support of the offices of the

senior vice president for academic affairs, the Montgomery College president, as well as the Board of Trustees.

Montgomery College has a commitment to excellence and innovation and the administration is supportive of cutting-edge programs. The College collaborates with business and industry leaders, WorkSource Montgomery, and Lightcast Data to determine Montgomery County's workforce needs and how the influx of Montgomery College students will impact the County's economy. As a result of this needs assessment, the CISCO program is an integral part of Montgomery College's strategic plan. The College's current and forecasted operational budgets include funding for the administrative, financial, and technical support for the revised program; Section L includes forecasted resources and expenditures for the program.

b) continuation of the program for a period of time sufficient to allow enrolled students to complete the program.

Montgomery College is committed to provide all students an opportunity to complete their program of study. Students may elect to complete a program by meeting the curriculum requirements as outlined in any catalog in effect during their enrollment, provided they complete the program within seven years of the chosen catalog. Since courses and programs may be discontinued at the discretion of the College, the College and administering academic department will provide all students affected by such decisions with assistance in choosing appropriate courses and programs for completion.

B. Critical and Compelling Regional or Statewide Need as Identified in the State Plan:

1. Demonstrate demand and need for the program in terms of meeting present and future needs of the region and the State in general based on one or more of the following:

a) The need for the advancement and evolution of knowledge

b) Societal needs, including expanding educational opportunities and choices for minority and educationally disadvantaged students at institutions of higher education

c) The need to strengthen and expand the capacity of historically black institutions to provide high quality and unique educational programs

According to [Montgomery County Demographics](#) from Montgomery Planning (April 2021), Montgomery County is home to over one million residents (p 3). [Montgomery County Public Schools](#) state their 2021 high school population is 25.3 percent White, 33.4 percent Hispanic/Latino, 21.9 percent Black or African American, 14.1 percent Asian, and 5 percent two or more races. Montgomery College expects the demographics of the CISCO certificate to mirror that of Montgomery County Public Schools.

In comparison, EMSI data in Appendix A reports the cybersecurity occupation rate within a 50-mile radius of Montgomery College at 53.2 percent White, 26 percent Black or African American, 10.9 percent Asian, and 6.1 percent Hispanic or Latino (p 12). There remains a need for more diversity in race/ethnic breakdown within the field.

The CISCO certificate contributes to Montgomery College's stated [values](#) of inclusion by offering equal opportunity for every student, "regardless of ability, background, economic status, race, or age," to access CISCO networking careers through higher education. The program also provides an excellent opportunity for Maryland students wanting to reskill, improve their marketability, prepare for a career in the field, or advance their professional career by supplementing their work experience or an existing college degree with CISCO networking knowledge.

2. Provide evidence that the perceived need is consistent with the [2022 Maryland State Plan for Higher Education](#).

The [2022 Maryland State Plan for Higher Education](#) lists eight priorities and numerous action items to meet the goals of access, success, and innovation to support student success with less debt. Following are Montgomery College actions in support of those goals:

Priority 6, develop and publicize credit for prior learning policies: Montgomery College offers all students the opportunity to apply credit earned outside the College towards graduation or program completion. Students may transfer prior credits from other institutions, take exams, and/or gain credit for life experiences, including military service or industry credentials. Every course in the CISCO certificate offers a credit by examination option for students, thus saving time to completion and money for the student.

Priority 8, consider alternatives to the traditional academic credentials, such as stackable credentials: As one of the most in-demand careers in the information technology field, the CISCO certificate is a stackable credential. Five core courses and a networking or computer science elective enables students to progress through program completion quickly and efficiently, thus expanding lifelong academic and professional opportunities. The 18-credit curriculum can be completed in two semesters. Upon certificate completion, students will be prepared to sit for the following industry-recognized certifications: [Network+](#), [Security+](#), and [CCNA](#).

C. Quantifiable and Reliable Evidence and Documentation of Market Supply and Demand in the Region and State:

1. Describe potential industry or industries, employment opportunities, and expected level of entry (ex: *mid-level management*) for graduates of the proposed program.

The CISCO certificate prepares students for entry-level positions in networking and cybersecurity. Potential occupations include IT help desk technician, junior/associate network engineer, network administrator, systems or applications engineer, cybersecurity analyst, or associate sales specialist/account manager. These positions are offered in a variety of industries and settings, whether it be in a government, private, or non-profit industry.

2. Present data and analysis projecting market demand and the availability of openings in a job market to be served by the new program.

Completion of the CISCO certificate provides the curricula required to apply to many entry-level positions in the computer/information technology field or pursue further industry certification. According to August 2022 EMSI data in Appendix B, the Maryland-Virginia-Washington, DC area is a hotspot for cybersecurity positions (p 3). The national average is 4,207 positions, while there are 17,954 positions in the region, with 44.2 percent of jobs in the computer systems design and related services industry sector (p 5). Job posting activity is high in the region (p 3). The national average is 342 job postings/month, while there were 1,760 job postings in the region. Earnings are also high in the Maryland-Virginia-Washington, DC area (p 3). The national median salary for network technology occupations is \$102,606, compared to \$131,820 locally. Retirement risk is high in the Maryland-Virginia-Washington, DC area (p 11). The national average is 3,163 employees 55 and older, while there are 3,505 locally. EMSI data is derived from official government sources such as the United States Census Bureau, the Bureau of Economic Analysis, and the Bureau of Labor Statistics.

3. Discuss and provide evidence of market surveys that clearly provide quantifiable and reliable data on the educational and training needs and the anticipated number of vacancies expected over the next 5 years.

Employees with [Network+](#), [Security+](#), and [CCNA](#) credentials are responsible for the day-to-day operation of computer networks in a variety of business organizations. They may provide technical help to computer users or plan and carry out security measures to protect an organization's computer networks and systems. According to the United States Bureau of Labor Statistics Occupational Outlook Handbook, [computer support specialists](#), or IT help desk technicians, typically need an associate's degree or a high school diploma plus relevant certification. [Network and computer systems administrators](#) and [information security analysts](#) typically need a bachelor's degree in a computer science field, along with related work experience; however, some employers prefer to hire candidates who have information security certification, such as [Security+](#) or [CCNA](#) certification. These credentials validate the knowledge and use of best practices required in the cybersecurity and network industry.

The employment outlook is excellent for CISCO networking jobs because there is a growing demand for qualified professionals in this field. Networking and cybersecurity are two of the fastest-growing industries in the United States and the impact on the workforce has been sudden and dramatic. Over the last 10 years, new jobs have emerged, and many other existing jobs have been altered to reflect new responsibilities. The following reflects the projected employment growth from 2021 to 2031 for several occupations:

Occupation	2021 Projected Employment	2031 Projected Employment	Increase by Percent
Computer Support Specialist	875,700	932,100	6%
Network and Computer Systems Administrator	333,200	344,500	3%
Information Security Analyst	163,000	219,500	35%

4. Provide data showing the current and projected supply of prospective graduates.

The following table reflects the projected number of graduates for the revised CISCO certificate:

	Year 1	Year 2	Year 3	Year 4	Year 5
Projected Graduates	3	3	4	4	5

D. Reasonableness of Program Duplication:

1. Identify similar programs in the state and/or same geographical area. Discuss similarities and differences between the proposed program and others in the same certificate to be awarded.

Several community colleges offer lower division certificates for CISCO preparation:

- Anne Arundel Community College offers a [CISCO certified network associate \(CCNA\) preparation certificate](#), a [CISCO certified network professional \(CCNP\) preparation certificate](#), and a [planner for CISCO certified network associate \(CCNA\) preparation certificate](#).
- Community College of Baltimore County offers a [preparation for CISCO certificate](#).
- Prince George’s Community College offers a [CISCO certified network associate \(CCNA\) certificate](#).

Although comparable programs exist at other community colleges in Maryland, none have the same focus as Montgomery College’s CISCO program. The revised CISCO certificate curriculum provides a combination of networking with elements of security. Furthermore, there is such a high demand for certified networking professionals in the Maryland-Virginia-Washington, DC area, program duplication is not a concern.

2. Provide justification for the proposed program.

Montgomery College’s CISCO curriculum must align with industry standards and best practices to properly prepare students for success. When CISCO modified their curriculum, it prompted a revision to Montgomery College’s certificate curriculum. Revisions to the certificate include the removal of two three-credit networking courses no longer relevant in the cybersecurity field and the addition of two vital courses that focus on network security and a three-credit program elective in either networking or computer science. Total credits for the certificate will increase from 16 to 18 credits.

This revision is just one step to meet the industry demand for this training and certification. A new title—Cisco Certified Network Associate + Security Certificate—was approved for fall 2023 by the Commission to better reflect the purpose of the program. Additionally, a change of modality submission is forthcoming to offer a fully online delivery option for this program. These modifications will align with the industry standard and bolster student interest, which leads to an increase in enrollment and a higher completion rate.

E. Relevance to High-Demand Programs at Historically Black Institutions (HBIs)

- 1. Discuss the program’s potential impact on the implementation or maintenance of high-demand programs at HBIs.**

This stand-alone certificate does not impact Maryland’s HBIs.

F. Relevance to the identity of Historically Black Institutions (HBIs)

- 1. Discuss the program’s potential impact on the uniqueness and institutional identities and missions of HBIs.**

This stand-alone certificate does not impact Maryland’s HBIs.

G. Adequacy of Curriculum Design, Program Modality, and Related Learning Outcomes (as outlined in COMAR 13B.02.03.10):

- 1. Describe how the proposed program was established, and describe the faculty who will oversee the program.**

The CISCO certificate was established in 2013 and has been revised throughout the years to benefit students. This newest revision provides students with the skills necessary to gain entry-level employment in areas such as network administration, computer and information systems support/management, and information security. The revised program allows students greater flexibility and course options for timely and efficient program completion, while offering the specific networking and cybersecurity coursework needed for workforce entry or continued certification.

Four full-time and one part-time faculty position currently support the CISCO certificate. In addition to having strong academic credentials, most faculty either served, or are currently serving, as practitioners in education, system administration and development, or customer support. The department chair and dean oversee the program.

- 2. Describe educational objectives and learning outcomes appropriate to the rigor, breadth, and (modality) of the program.**

Following are the program outcomes and the courses supporting those outcomes:

	Upon completion of this program a student will be able to:	Courses Supporting Program Outcomes:
1	Describe common network devices; the OSI model; common network protocols; features of LANs and WANs; types of network topologies; bandwidth.	NWIT 151
2	Describe characteristics of Ethernet networks; client/server networks; function of network devices; router serial ports; characteristics of WAN technologies.	NWIT 245 , NWIT 252
3	Describe basics of Ethernet technologies; framing process; MAC; CSMA/CD; types of duplex; 10/100/1000/10000BPS Ethernet technologies.	NWIT 253
4	Describe commands used to name a router, how administrators set passwords on a router, the use of the show commands, the command and steps required to configure a serial interface, the command and steps required to configure an Ethernet interface, how an administrator executes changes to a router, how an administrator saves changes to a router, the command and steps required to configure an interface description, the command and steps required to configure a log-in banner, the command and steps	NWIT 253 , NWIT 173

	Upon completion of this program a student will be able to:	Courses Supporting Program Outcomes:
	required to configure host tables, the purpose of backup documentation, and the steps for password recovery on a router.	
5	Describe the basic principles of routing, the difference between routed and routing protocols, what interior and exterior protocols are used for in routing, the difference between static versus dynamic routes, how static routes are configured, how default routes are configured, some methods for troubleshooting static route configurations, why dynamic routing protocols are necessary, distance vector routing, link-state routing, and how different routing protocols are used in context.	NWIT 151
6	Describe classless interdomain routing (CIDR); calculate subnets with variable length subnet masking (VLSM); describe route aggregation with VLSM and Routing Information Protocol version 2 (RIPv2); configure, verify and troubleshoot RIPv2, EIGRP, and OSPF.	NWIT 252
7	Describe micro-segmentation, how a switch learns addresses, and switch forwarding; describe switches and collision domains and switches and broadcast domains; configure LAN switches; verify LAN switch configuration; and manage LAN switches.	NWIT 252
8	Describe the goals of redundant topologies; define Spanning Tree Protocol (STP); describe the stages of spanning-tree port states and election of designated ports; describe the stages of selecting a root bridge; describe Path cost; set STP timers; explain how STP helps convergence; and describe Rapid Spanning Tree Protocol (RSTP).	NWIT 253
9	Explain what VLANs are; cite reasons to create VLANs and describe the benefits of VLANs; name and describe the methods of VLAN implementation; create, verify, and delete VLAN configurations; describe basic VLAN troubleshooting methods.	NWIT 252
10	Explain the differences between LANs and WANs; identify the devices used in a WAN; list WAN standards; describe WAN encapsulation; classify the various WAN link options; differentiate between packet-switched and circuit-switched WAN technologies; describe the steps in WAN design.	NWIT 151
11	Identify and describe the basic components that define Point-to-Point Protocol (PPP) communication; define and describe the use of link control protocol (LCP) and Network Control Protocol (NCP) frames in PPP; describe the process for configuring and verifying PPP; describe and explain PPP authentication; define and describe the use of password authentication; define and describe the use of Challenge Handshake Authentication Protocol (CHAP).	NWIT 151
12	Describe Frame Relay services, standards, and components; describe Local Management Interface (LMI) features; describe the use of Frame Relay sub-interfaces; configure, verify, and troubleshoot basic Frame Relay.	NWIT 252
13	Describe industry security terminology and acronyms, basic security vulnerabilities, and design and manage a security policy.	NWIT 173
14	Design and implement trust and identity technology at layer 2 and 3 of the OSI Model.	NWIT 253

	Upon completion of this program a student will be able to:	Courses Supporting Program Outcomes:
15	Configure, monitor, and maintain advanced router firewall installation.	NWIT 252
16	Implement Secure Network Design.	NWIT 173 , NWIT 245 , NWIT 252

3. Explain how the institution will:

a) provide for assessment of student achievement of learning outcomes in the program

Program learning outcomes will be assessed through final projects in each of the program's required program courses: [NWIT 151](#), [NWIT 173](#), [NWIT 245](#), [NWIT 252](#), and [NWIT 253](#).

b) document student achievement of learning outcomes in the program

There are several comprehensive and multifaceted assessment processes for all disciplines across the College. Montgomery College's Office of Assessment supports the College's mission and vision by providing leadership in the area of assessment and evaluation. This is achieved by:

- Providing leadership, guidance, and data support for the College's assessment of student learning outcomes for programs.
- Coordinating a comprehensive system of program reviews for academic areas.
- Collecting, analyzing, and distributing reports and information to the College about assessment results.
- Consulting with administrative areas, disciplines, and academic programs on assessment and evaluation projects.

Following is an overview of assessment processes at Montgomery College:

Assessment Type	Purpose	Cycle
General Education Outcomes Assessment	To examine student acquisition of General Education competencies.	Once every three years
Program Assessment	To assess student attainment of the program's student learning outcomes for the purpose of discovering what is working well and where improvements can be made to increase student learning.	Once every three years
Program Review (also referred to as the College Area Review)	To examine the current alignment and relevance of a program's curriculum and success with retaining and matriculating students.	Once every five years
Administrative Assessment	To review an administrative area's success with achieving outcomes and institutional priorities.	Once every five years

4. Provide a list of courses with title, semester credit hours and course descriptions, along with a description of program requirements.

Program Title: [Certified Network Associate + Security Preparation Certificate \(2022 Curriculum\)](#)

This career curriculum prepares students for entry-level positions in cybersecurity. Intended for those already employed in computing or who have a computing background, the certificate prepares the student to install, operate, and troubleshoot medium-sized router and switched networks including implementation and verification of connections to remote sites in a WAN. It includes basic introduction to wireless networking concepts and hands-on performance-based skills. The certificate instructs the student in basic and intermediate cybersecurity skills, such as how to develop a security infrastructure,

recognize vulnerabilities to networks, and mitigate security threats. This cybersecurity curriculum emphasizes core security technologies and the installation, troubleshooting, and monitoring of network devices to maintain integrity, confidentiality and availability of data and devices. It provides the foundation for students to sit for the following industry-recognized certifications: Network+, Security+, and CCNA (Cisco Certified Network Associate).

Course	Title	Credits
NWIT 151	Introduction to Networking	3
NWIT 252	CISCO Networking 2	3
NWIT 253	CISCO Networking 3	3
NWIT 254	CISCO Networking 4	3
NWIT 261	CCNA Security	4
Total Credits		16

Program Title: Certified Network Associate + Security Certificate (Proposed 2023 Curriculum)

This career curriculum prepares students for entry-level positions in cybersecurity. Intended for those already employed in computing or who have a computing background, the certificate prepares the student to install, operate, and troubleshoot medium-sized router and switched networks including implementation and verification of connections to remote sites in a WAN. It includes basic introduction to wireless networking concepts and hands-on performance-based skills. The certificate instructs the student in basic and intermediate cybersecurity skills, such as how to develop a security infrastructure, recognize vulnerabilities to networks, and mitigate security threats. This cybersecurity curriculum emphasizes core security technologies and the installation, troubleshooting, and monitoring of network devices to maintain integrity, confidentiality and availability of data and devices. It provides the foundation for students to sit for the following industry-recognized certifications: Network+, Security+, and CCNA (Cisco Certified Network Associate).

Course	Title	Credits
NWIT 151	Introduction to Networking	3
NWIT 173	Network Security	3
NWIT 245	Defending the Network	3
NWIT 252	Cisco Networking 2	3
NWIT 253	CISCO Networking 3	3
Elective	NWIT or CMSC Elective, 3 credit hours *	3
Total Credits		18

* Students may select a 3-credit or 4-credit NWIT or CMSC elective to fulfill this requirement.

Summary of Changes:

Action	Description and Course	Credits
Remove	NWIT 254 – CISCO Networking 4	3
Remove	NWIT 261 – CCNA Security	4

Action	Description and Course	Credits
Add	NWIT 173 – Network Security	3
Add	NWIT 245 – Defending the Network	3
Add	NWIT or CMSC Elective	3
	Total Modified Credits	16

List of Courses with Title, Semester Credit Hours, and Course Descriptions:

CE: Credit available by examination

[NWIT 151 - Introduction to Networking](#) (CE)

An introduction to networking technologies. This course covers the basics of networking, the open systems interconnection (OSI) reference model, transmission control protocol/Internet protocol (TCP/IP) addressing, electricity, specifications and techniques of building data cabling, and local area network/wide area network (LAN/WAN) technologies. In addition, this course is also the first in a series of courses designed to prepare students for the Cisco Certified Network Associate (CCNA) examination. May not be taken concurrently with [MATH 017](#) or [MATH 020](#) or [MATH 030](#) or [MATH 045](#) without appropriate Math assessment score. Assessment Level(s): [MATH 050](#). Three hours each week.

[NWIT 173 - Network Security](#) (CE)

An in-depth review of systems security, access control, network infrastructure, assessments and audits, cryptography and organizational security across both private and public enterprises. Real-world scenarios reinforce material covered. This course will help prepare students for the CompTIA Security+ certification exam. Assessment Level(s): [MATH 050](#). Three hours each week.

[NWIT 245 - Defending the Network](#) (CE)

An overview of network defense and countermeasures and the fundamentals of defending networks, such as layered defense. The course introduces students to protective technologies commonly deployed on today's networks, such as system hardening, enterprise firewalls, VPNs, IDS, and antivirus. The course also develops and examines risk analysis and security policies to help build a secure network within Windows and Linux operating systems. PREREQUISITE(S): [NWIT 173](#) or consent of department. Three hours each week.

[NWIT 252 - Cisco Networking 2](#) (CE)

Describe basic switching concepts and technologies such as Switching, VLANs, and trunking. Learn Spanning Tree Protocol and EtherChannel architecture. Configure and troubleshoot a small switched network. Describe the purpose and operation of a router. Perform basic router configurations, including static routing, default routing, and Inter-VLAN routing. Describe the concepts of FHRP and Switch Security Configuration. It also describes the WLAN concepts and configuration. Describe the operations and benefits of Dynamic Host Configuration Protocol (DHCP) and SLAAC/DHCPv6. In addition, this course is the second in a series of courses designed to prepare students for the Cisco Certified Network Associate (CCNA) examination. PREREQUISITE(S): [NWIT 151](#) or completion of Cisco Academy Semester 1 (Exploration 1), or consent of department. Three hours each week.

[NWIT 253 - Cisco Networking 3](#) (CE)

An examination of initial switch configuration, Cisco ISO Software managements, and LAN design. Students configure Virtual LANs (VLANs), Virtual Trunking Protocol (VTP), Spanning Tree Protocol (VTP), Inter-VLAN Routing, and are introduced to basic Cisco wireless concepts and configuration. This course is the third in a series of four designed to help prepare students to take the CCNA certification exam. This course is equivalent to CyberWATCH course CW 250. PREREQUISITE(S): [NWIT 252](#) or completion of Cisco Academy Semester 2 (Exploration 2), or consent of department. Three hours each week.

5. Discuss how general education requirements will be met, if applicable.

General Education courses are not required in this certificate.

6. Identify any specialized accreditation or graduate certification requirements for this program and its students.

Not applicable.

7. If contracting with another institution or non-collegiate organization, provide a copy of the written contract.

There are no written contracts with other institutions or non-collegiate organizations for this program.

8. Provide assurance and any appropriate evidence that the proposed program will provide students with clear, complete, and timely information on the curriculum, course and certificate requirements, nature of faculty/student interaction, assumptions about technology competence and skills, technical equipment requirements, learning management system, availability of academic support services and financial aid resources, and costs and payment policies.

Montgomery College's online catalog helps students quickly locate and save details about the current schedule of classes, courses, and programs. The catalog is dynamic, meaning a live document that reflects changes in real time. The online catalog is located on the official policies and documents page of the College's website at montgomerycollege.edu/catalog.

To determine program-specific information, students can view the [program advising guide](#) aligned with any program in the catalog. These guides directly link to the catalog so they reflect real-time information. They are meant to supplement the advising process and should be used in conjunction with the Montgomery College catalog and other College resources. The program advising guide for the current [CISCO certificate](#) is already published.

Students may find general information such as availability of academic support services, financial aid resources, tuition rates, and payment policies by using the search function at montgomerycollege.edu.

9. Provide assurance and any appropriate evidence that advertising, recruiting, and admissions materials will clearly and accurately represent the proposed program and the services available.

Upon approval, the revised CISCO certificate curriculum will be published in the College catalog. The Office of the Senior Vice President for Academic Affairs oversees publication and maintenance of the online catalog.

Advertising and recruitment for the CISCO certificate will occur at College events such as new student orientation, major-specific fairs, guest speaker series, symposia, college recruitment fairs, and networking opportunities from outside agencies and organizations. The Office of Communications oversees publication of electronic and hard copy marketing materials.

H. Adequacy of Articulation

1. If applicable, discuss how the program supports articulation with programs at partner institutions. Provide all relevant articulation agreements.

The CISCO certificate is a stand-alone certificate and is intended for knowledge advancement, workforce entry, or further certification. The program does not transfer to the College's partner institutions.

I. Adequacy of Faculty Resources (as outlined in COMAR 13B.02.03.11).

1. Provide a brief narrative demonstrating the quality of program faculty. Include a summary list of faculty with appointment type, terminal certificate title and field, academic title/rank, status (full-time, part-time, adjunct) and the course(s) each faculty member will teach (in this program).

Montgomery College appoints faculty that are experienced educators and working professionals in the CISCO networking industry. The current faculty continue to engage in professional development opportunities, present at related conferences, and foster community partnerships in the region to improve curriculum development and design. Furthermore, because of the College's close proximity to the Washington, DC, metropolitan area, numerous active CISCO networking professionals serve as part-time faculty as well as guest speakers.

Following is a list of faculty with terminal certificate title and field, academic title/rank, and the courses each faculty member will teach:

Name	Terminal Certificate	Academic Title And Rank	Courses Taught
Hui-Mei Tseng	M.S. in computer science	Full-Time Faculty	NWIT 151
Tesfaye Lemma	M.S. in computer science	Full-Time Faculty	NWIT 173 , NWIT 245
Ping-Wei Tsai	M.S in information technology	Full-Time Faculty	NWIT 173
Hsi-Mien Wu	M.S. in computer science	Full-Time Faculty	NWIT 151 , NWIT 252 , NWIT 253
Robert Densock	M.S. in computer science	Part-Time Faculty	NWIT 151

2. Demonstrate how the institution will provide ongoing pedagogy training for faculty in evidenced-based best practices, including training in:

a) Pedagogy that meets the needs of the students

Montgomery College offers numerous in-person and online course offerings for best practices in pedagogy, content delivery, and course assessment. The College also offers an educational assistance program (EAP) that provides faculty funds to support graduate and doctoral coursework and professional conferences and workshops. Faculty also attend conferences and continuing education programs through internal and external training. CISCO faculty maintain active memberships in professional organizations related to the discipline.

b) The learning management system

Montgomery College's E-Learning, Innovation, and Teaching Excellence (ELITE) department offers online and in-person training sessions for the College's learning management system (Blackboard), as well as Quality Matters training and semester-long training to prepare faculty for distance education courses. Faculty are also encouraged to use the learning management system to help support their in-person courses.

c) Evidenced-based best practices for distance education, if distance education is offered.

ELITE offers numerous training opportunities in distance education pedagogy and instructional technology. A team of instructional designers works closely with individual faculty, academic departments, and committees to design and deliver faculty professional development. All online

instructional faculty are required to complete Blackboard training prior to teaching in the online setting.

J. Adequacy of Library Resources (as outlined in COMAR 13B.02.03.12).

1. Describe the library resources available and/or the measures to be taken to ensure resources are adequate to support the proposed program.

Library resources are adequate to support the program and all proposed courses for the revised CISCO certificate. Students have ready access to current and relevant books, journals, and reference materials needed to meet the requirements of the curriculum.

In addition to its robust online presence, the Montgomery College Library has three physical locations with comfortable facilities that are conducive to academic work. In-person library services are available 73 hours per week. The library supports the academic goals of the College's students and employees through group instruction sessions, personal research consultations, and online support. Technology available in the library includes computers, printers, charging stations, high-speed scanners, laptops, tablets, One Button Studios for easy video creation, and collaborative workstations for group projects. Web-delivered subscription databases cover many academic disciplines, including CISCO networking.

K. Adequacy of Physical Facilities, Infrastructure and Instructional Equipment (as outlined in COMAR 13B.02.03.13)

1. Provide an assurance that physical, infrastructure and instruction equipment are adequate to initiate the program, particularly as related to spaces for classrooms, staff and faculty offices, and laboratories for studies in the technologies and sciences.

The revised CISCO certificate will be implemented with existing institutional resources currently supporting the program. Outstanding faculty, state-of-the-art facilities, equipment, and library resources are already in place as the program is currently being offered to students.

2. Provide assurance and any appropriate evidence that the institution will ensure students enrolled in and faculty teaching in distance education will have adequate access to:

a) An institutional electronic mailing system, and

b) A learning management system that provides the necessary technological support for distance education

Upon admission, every student receives a Montgomery College email account; this is the primary method for receiving correspondence and information from various College offices and departments. The College utilizes Blackboard as its learning management system. Additionally, Montgomery College promotes distance learning by providing access to online counseling, advising, library resources, tutoring, and more.

Students enrolled in the CISCO certificate can complete all required coursework on campus and online. A change of modality submission is forthcoming to offer a fully online delivery option for this program.

L. Adequacy of Financial Resources with Documentation (as outlined in COMAR 13B.02.03.14)

1. Complete [Table 1: Resources and Narrative Rationale](#). Provide finance data for the first five years of program implementation. Enter figures into each cell and provide a total for each year. Also provide a narrative rationale for each resource category. If resources have been or will be reallocated to support the proposed program, briefly discuss the sources of those funds.

TABLE 1: PROGRAM RESOURCES

1. Reallocated Funds:

- Reallocated funds include faculty, administrator, and support staff salaries currently supporting the CISCO certificate.

2. Tuition and Fee Revenue:

- The credit hour rate is based on [2022 in-county tuition](#) and includes both tuition and fees. The first credit hour is \$201 (\$132 plus minimum \$50 consolidated fee and other fees); the credit hour rate is \$177.40 for two or more hours.
- Full-time enrollment is equivalent to 30 credit hours for the academic year; part-time enrollment is equivalent to 15 credit hours for the academic year.

3. Grants and Contracts:

- No grants or external funding needed to implement this program.

4. Other Sources:

- No additional funds needed to implement this program.

5. Total Year:

- Program resources reflect a conservative projection of full-time and part-time student enrollment over five years and are based on student enrollment and completion rates for years 2017 through 2021.

Table 1: Program Resources					
Resource Categories	Year 1 (2023-24)	Year 2 (2024-25)	Year 3 (2025-26)	Year 4 (2026-27)	Year 5 (2027-28)
1. Reallocated Funds	\$80,811	\$82,861	\$84,968	\$87,134	\$93,085
2. Tuition/Fee Revenue (c + g below)	\$10,644	\$16,398	\$25,245	\$34,524	\$44,235
a. Number of F/T Students	1	2	3	4	5
b. Annual Tuition/Fee Rate	\$5,322	\$5,466	\$5,610	\$5,754	\$5,898
c. Total F/T Revenue (a x b)	\$5,322	\$10,932	\$16,830	\$23,016	\$29,490
d. Number of P/T Students	2	2	3	4	5
e. Credit Hour Rate	\$177.40	\$182.20	\$187.00	\$191.80	\$196.60
f. Annual Credit Hour Rate	15	15	15	15	15
g. Total P/T Revenue (d x e x f)	\$5,322	\$5,466	\$8,415	\$11,508	\$14,745
3. Grants, Contracts & Other External Sources	\$0	\$0	\$0	\$0	\$0
4. Other Sources	\$0	\$0	\$0	\$0	\$0
TOTAL (Add 1 - 4)	\$91,455	\$99,259	\$110,213	\$121,658	\$137,320

2. Complete [Table 2: Program Expenditures and Narrative Rationale](#). Provide finance data for the first five years of program implementation. Enter figures into each cell and provide a total for each year. Also provide a narrative rationale for each expenditure category.

TABLE 2: PROGRAM EXPENDITURES

1. Faculty (# FTE, Salary, and Benefits):

- The faculty below support the CISCO certificate. Part-time faculty are hired as needed per semester.
- Faculty salaries based on an annual increase of 2.75 percent.
- Benefits include 7.65 percent for FICA and \$9,000 per FTE for insurance.

Name	Appointment/Status	Program Time
Hui-Mei Tseng	Full-time Professor	10%
Ping-Wei Tsai	Full-time Processor	10%
Hsi-Mien Wu	Full-Time Faculty	30%
Tesfaye Lemma	Full-Time Faculty	10%
Robert Densock	Part-Time Faculty	10%

2. Administrative Staff (# FTE, Salary, and Benefits):

- The following administrators support the CISCO certificate. All serve the department as a whole and are not exclusive to the certificate program.
- Administrative staff salaries based on an annual increase of 3 percent.
- Benefits include 7.65 percent for FICA and \$9,000 per FTE for insurance.

Name	Appointment/Status	Program Time
Dr. Alla Webb	Department Chair	5%
Dr. Nawal Benmouna	Dean	2%

3. Support Staff (# FTE, Salary, and Benefits):

- The following support staff support the CISCO certificate. All serve the department as a whole is are not exclusive to the certificate program.
- Support staff salaries based on an annual increase of 3 percent.
- Benefits include 7.65 percent for FICA and \$9,000 per FTE for insurance.

Name	Appointment/Status	Program Time
Grace Chen	Administrative Aide III	2%
John Reid	Lab Coordinator	2%

4. Equipment:

- No additional equipment needed to implement this program.

5. Library:

- No additional library resources needed to implement this program.

6. New and/or Renovated Space:

- No additional facilities needed to implement this program.

7. Other Expenses:

- No other expenses anticipated to implement this program.

8. Total Year:

- Expenditures include faculty, administrator, and administrative staff salaries that support the CISCO certificate.

Table 2: Program Expenditures					
Expenditure Categories	Year 1 (2023-24)	Year 2 (2024-25)	Year 3 (2025-26)	Year 4 (2026-27)	Year 5 (2027-28)
1. Faculty (b + c below)	\$68,597	\$70,311	\$72,071	\$73,880	\$75,738
a. Number of FTE	0.70	0.70	0.70	0.70	0.70
b. Total Salary	\$57,870	\$59,462	\$61,097	\$62,777	\$64,503
c. Total Benefits	\$10,727	\$10,849	\$10,974	\$11,102	\$11,235
2. Admin. Staff (b + c below)	\$10,679	\$10,980	\$11,291	\$11,610	\$11,940
a. Number of FTE	0.07	0.07	0.07	0.07	0.07
b. Total Salary	\$9,335	\$9,615	\$9,903	\$10,200	\$10,506
c. Total Benefits	\$1,344	\$1,366	\$1,388	\$1,410	\$1,434
3. Support Staff (b + c below)	\$1,535	\$1,570	\$1,607	\$1,644	\$1,682
a. Number of FTE	0.04	0.04	0.04	0.04	0.04
b. Total Salary	\$1,091	\$1,124	\$1,158	\$1,193	\$1,228
c. Total Benefits	\$443	\$446	\$449	\$451	\$454
4. Technical Support and Equipment	\$0	\$0	\$0	\$0	\$2,042
5. Library	\$0	\$0	\$0	\$0	\$1,682
6. New or Renovated Space	\$0	\$0	\$0	\$0	\$0
7. Other Expenses	\$0	\$0	\$0	\$0	\$0
TOTAL (Add 1 - 7)	\$80,811	\$82,861	\$84,968	\$87,134	\$93,085

M. Adequacy of Provisions for Evaluation of Program (as outlined in COMAR 13B.02.03.15).

1. Discuss procedures for evaluating courses, faculty, and student learning outcomes.

The College assesses and reviews programs on a regular basis based on the information noted in section G.3. All courses and programs at Montgomery College have clearly stated learning outcomes. The program learning outcomes align with and support the student learning outcomes of the individual courses that form a program's curriculum. The program assessment process involves assessment planning, data collection, review of results, action plan development and implementation, and reassessment. The cyclical loop is closed by using the assessment results to improve teaching and learning experiences.

College faculty undergo an extensive and comprehensive evaluation process in compliance with the agreements between the College and Montgomery College's Chapter of American Association of University Professors (full-time faculty) and the Service Employees International Union (part-time faculty). This process includes student evaluations, self-evaluations, peer reviews, classroom observations, department chair reviews, and dean evaluations. The evaluation schedule varies from annually to every five years, depending on the faculty contract type and contract year. Evaluations determine if faculty members demonstrate high-quality performance in their teaching assignments, seek professional growth in their teaching area, are available to students, meet special objectives from preceding evaluations, and demonstrate substantial progress in service to their campus, College, and/or community. The purpose of a performance review is to promote the highest quality teaching techniques, ensure knowledge of subject matter, encourage professional growth and development of faculty, assess strengths and weaknesses in faculty performance, and assess service to the College community.

2. Explain how the institution will evaluate the proposed program's educational effectiveness, including assessments of student learning outcomes, student retention, student and faculty satisfaction, and cost-effectiveness.

All programs at Montgomery College go through an academic program review every five years to determine program viability. The academic program review ensures all programs support the College's mission, effectively use the College's instructional resources, and serve the needs of students and the

College community. The revised CISCO certificate will go through the same academic program review process as all other programs at Montgomery College.

Montgomery College is proud to be selected as an Achieving the Dream (ATD) institution. ATD is a nationwide network of higher education institutions committed to systemic change to increase student success and completion, especially among disadvantaged students. As an ATD institution, Montgomery College works to build a culture of evidence that uses data to make informed decisions for student success. One example of the College's use of data is the [Student Success Score Card](#), which is a summary of indicators used to track student achievement.

The academic program review process and the Student Success Score Card provide actionable information to help the College assess and improve its focus on achievement and the success of every student.

N. Consistency with the State's Minority Student Achievement Goals (as outlined in COMAR 13B.02.03.05).

1. Discuss how the proposed program addresses minority student access & success, and the institution's cultural diversity goals and initiatives.

Montgomery College is committed to creating a welcoming and inclusive environment for all students. As a whole, the Montgomery College community promotes an equity and inclusion focus where radical inclusion—or deeply rooted values of welcoming all individuals seeking higher education or continuing education—are essential elements of the College's fabric. The College's steadfast commitment to radical inclusion creates an inclusive, respectful learning environment that fosters critical thinking and civil discourse.

The CISCO program is committed to serving Montgomery College's diverse student body and promoting equity and inclusion by (1) encouraging student participation in real-world activities and experiences, (2) providing a safe forum for students to debate controversial ethical and social topics related to CISCO networking and security, and (3) providing a solid, skills-based curriculum designed for student success, retention, completion, and access to career opportunities.

O. Relationship to Low Productivity Programs Identified by the Commission:

1. If the proposed program is directly related to an identified low productivity program, discuss how the fiscal resources (including faculty, administration, library resources and general operating expenses) may be redistributed to this program.

Not applicable. This program is not related to low-productivity programs identified by the Maryland Higher Education Commission.

P. Adequacy of Distance Education Programs (as outlined in COMAR 13B.02.03.22)

1. Provide affirmation and any appropriate evidence that the institution is eligible to provide Distance Education.

Montgomery College received Commission approval to provide distance education programs. Montgomery College currently offers numerous degrees and certificates with a fully online delivery option, all of which have been approved by the Commission.

2. Provide assurance and any appropriate evidence that the institution complies with the C-RAC guidelines, particularly as it relates to the proposed program.

A change of modality submission is forthcoming to offer a fully online delivery option for this program.

The Middle States Commission on Higher Education is the accrediting body for Montgomery College. The College follows the appropriate guidelines and adheres to the national standards and integrity for our distance education programs. Montgomery College received a positive outcome at the 2018 reaccreditation.

Appendix A
EMSI Data

 Lightcast Occupation Overview

Cybersecurity CAR Report for Montgomery College

Lightcast Q3 2022 Data Set | www.economicmodeling.com

Run by John Hamman
8/5/2022

Contents

What is Lightcast Data?	1
Report Parameters	2
Executive Summary	3
Jobs	4
Compensation	6
Job Posting Activity	7
Demographics	11
Occupational Programs	14
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What is Lightcast Data?

Lightcast data is a hybrid dataset derived from official government sources such as the US Census Bureau, Bureau of Economic Analysis, and Bureau of Labor Statistics. Leveraging the unique strengths of each source, our data modeling team creates an authoritative dataset that captures more than 99% of all workers in the United States. This core offering is then enriched with data from online social profiles, resumé, and job postings to give you a complete view of the workforce.

Lightcast data is frequently cited in major publications such as *The Atlantic*, *Forbes*, *Harvard Business Review*, *The New York Times*, *The Wall Street Journal*, and *USA Today*.

The Atlantic

Forbes

**Harvard
Business
Review**

*The
New York
Times*

WSJ

**USA
TODAY**

Report Parameters

1 Occupation

Information Security Analysts

20 Counties

11001	District of Columbia County, DC	24021	Frederick County, MD
24003	Anne Arundel County, MD	24027	Howard County, MD
24005	Baltimore County, MD	24031	Montgomery County, MD
24013	Carroll County, MD	24033	Prince George's County, MD
24017	Charles County, MD	<i>See Appendix B for all 20 Counties</i>	

Class of Worker

QCEW Employees, Non-QCEW Employees, and Self-Employed

The information in this report pertains to the chosen occupation and geographical areas.

Executive Summary

Aggressive Job Posting Demand Over a Deep Supply of Regional Jobs



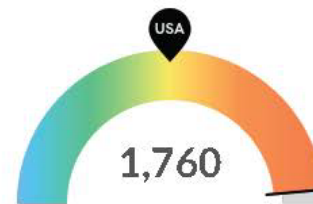
Jobs (2020)

Your area is a hotspot for this kind of job. The national average for an area this size is 4,207* employees, while there are 17,954 here.



Compensation

Earnings are high in your area. The national median salary for Cybersecurity Analysts is \$102,606, compared to \$131,820 here.



Job Posting Demand

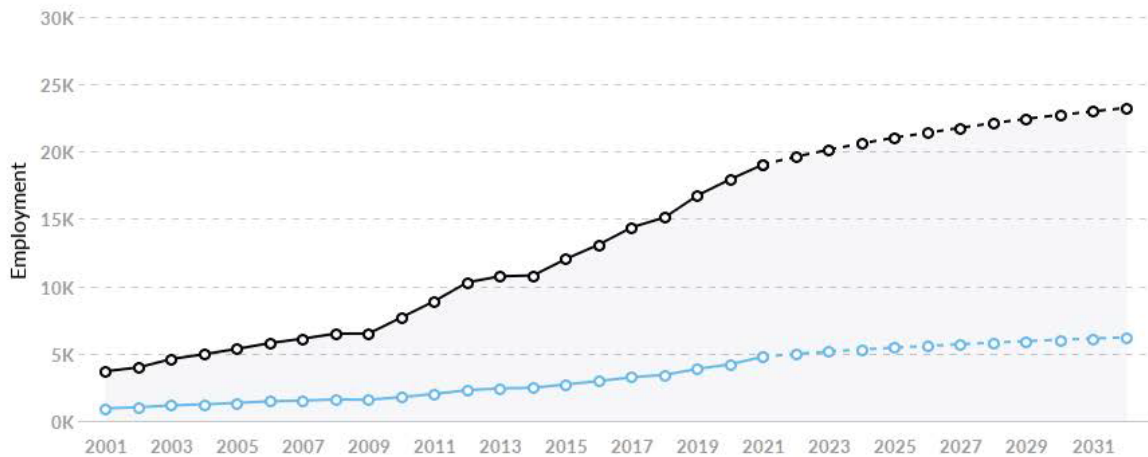
Job posting activity is high in your area. The national average for an area this size is 342* job postings/mo, while there is 1,760 here.

*National average values are derived by taking the national value for Cybersecurity Analysts and scaling it down to account for the difference in overall workforce size between the nation and your area. In other words, the values represent the national average adjusted for region size.

Jobs

Regional Employment Is Higher Than the National Average

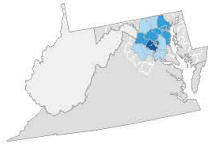
An average area of this size typically has 4,207* jobs, while there are 17,954 here. This higher than average supply of jobs may make it easier for workers in this field to find employment in your area.



Region	2020 Jobs	2021 Jobs	Change	% Change
● 50-Mile Radius from the College	17,954	19,055	1,101	6.1%
● National Average	4,207	4,781	574	13.6%

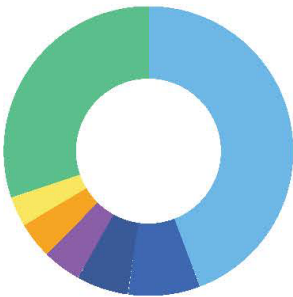
*National average values are derived by taking the national value for Cybersecurity Analysts and scaling it down to account for the difference in overall workforce size between the nation and your area. In other words, the values represent the national average adjusted for region size.

Regional Breakdown



County	2020 Jobs
Fairfax County, VA	6,607
District of Columbia County, DC	2,062
Arlington County, VA	1,659
Loudoun County, VA	1,070
Anne Arundel County, MD	987

Most Jobs are Found in the Computer Systems Design and Related Services Industry Sector

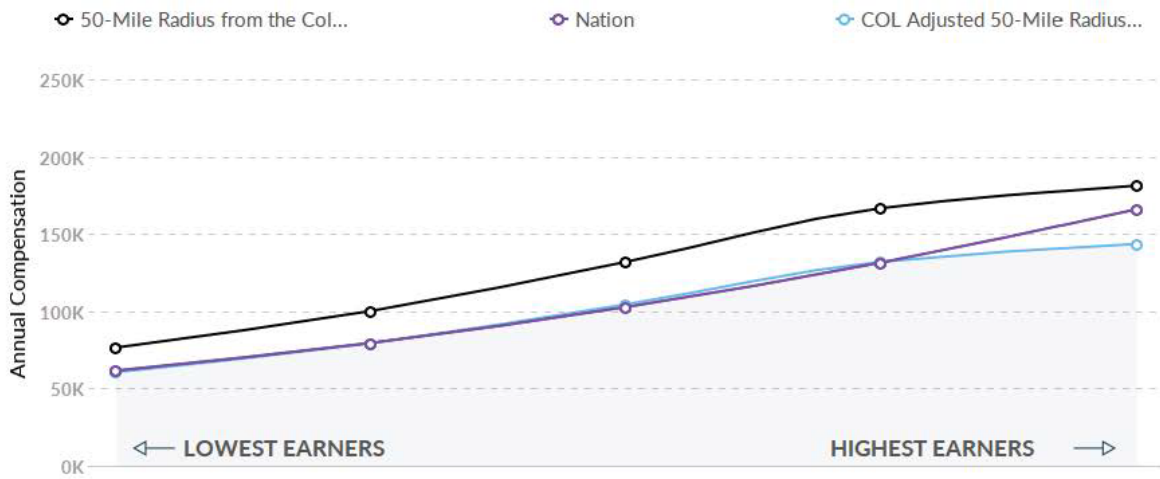


Industry	% of Occupation in Industry (2020)
Computer Systems Design and Related Services	44.2%
Management, Scientific, and Technical Consulting Services	8.0%
Management of Companies and Enterprises	5.8%
Architectural, Engineering, and Related Services	4.3%
Scientific Research and Development Services	4.0%
Data Processing, Hosting, and Related Services	3.3%
Other	30.3%

Compensation

Regional Compensation Is 28% Higher Than National Compensation

For Cybersecurity Analysts, the 2021 median wage in your area is \$131,820, while the national median wage is \$102,606.



Job Posting Activity



42,230 Unique Job Postings

The number of unique postings for this job from Jan 2020 to Dec 2021.



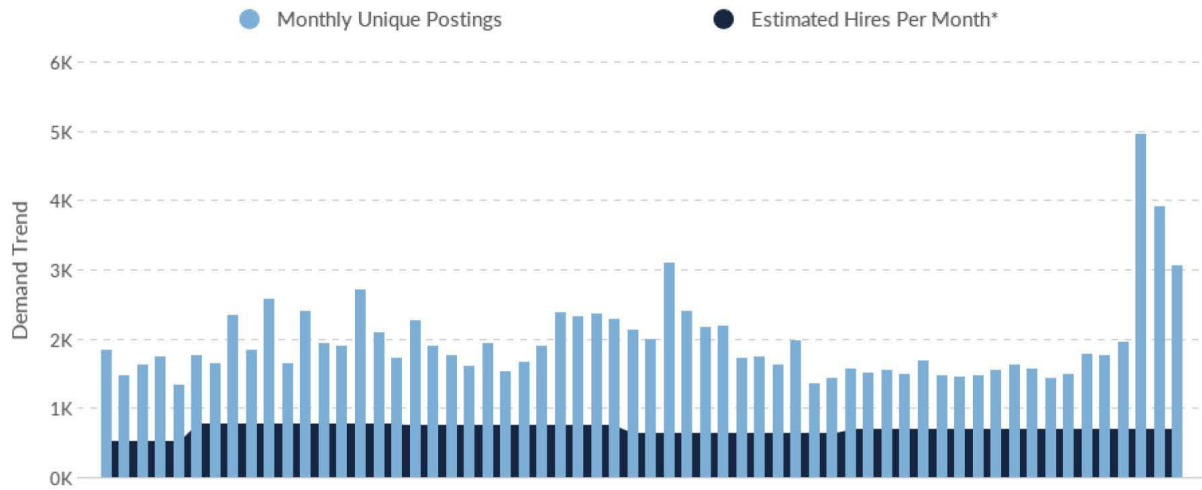
3,958 Employers Competing

All employers in the region who posted for this job from Jan 2020 to Dec 2021.



2 Out of 5 Positions Filled

The ratio of estimated hires* to unique postings for this job from Jan 2020 to Dec 2021.

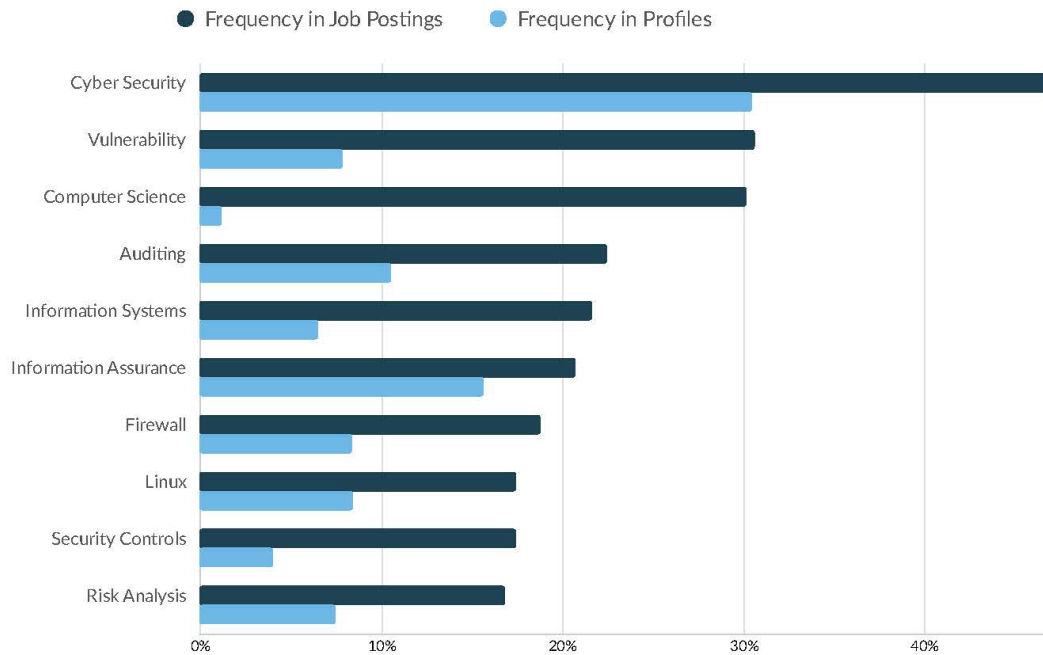


Occupation	Avg Monthly Postings (Jan 2020 - Dec 2021)	Avg Monthly Hires (Jan 2020 - Dec 2021)
Information Security Analysts	1,760	659

*A hire is reported by the Quarterly Workforce Indicators when an individual's Social Security Number appears on a company's payroll and was not there the quarter before. Lightcast hires are calculated using a combination of Lightcast jobs data, information on separation rates from the Bureau of Labor Statistics (BLS), and industry-based hires data from the Census Bureau.

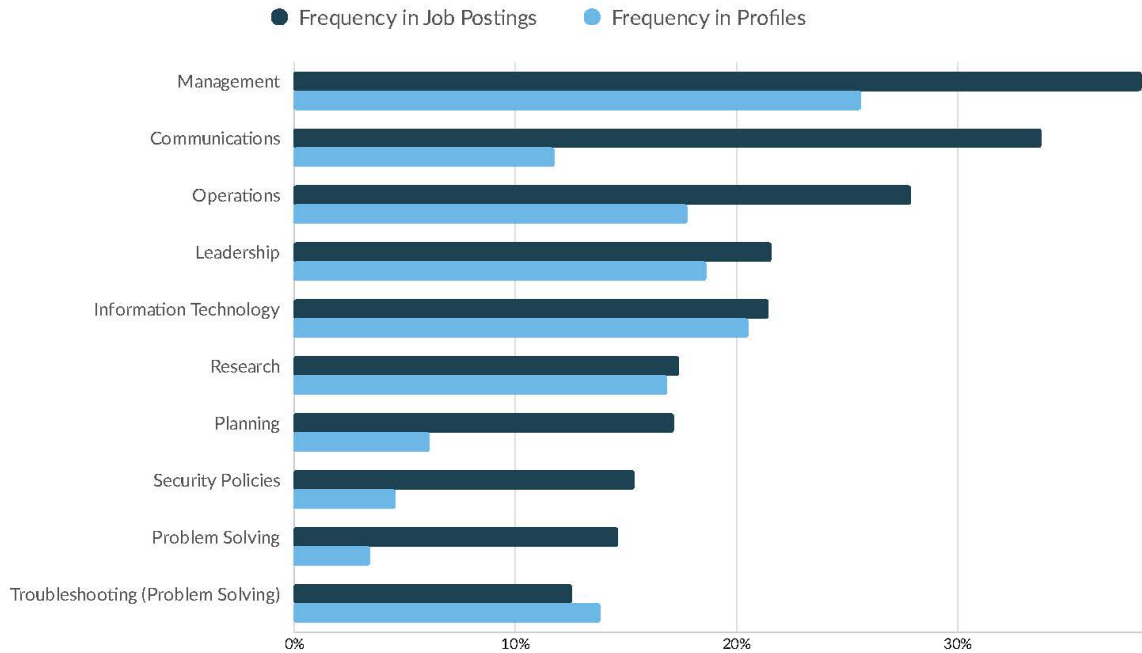
Top Companies	Unique Postings	Top Job Titles	Unique Postings
General Dynamics	1,515 	Cybersecurity Engineers	2,488 
Leidos	1,504 	Information Systems Security Of...	2,367 
Perspecta	944 	Security Engineers	1,819 
CACI International	934 	Cybersecurity Analysts	1,692 
Booz Allen Hamilton	876 	Cybersecurity Specialists	1,116 
ManTech	853 	Information Systems Security En...	1,000 
SAIC	653 	Information Security Analysts	928 
Northrop Grumman	590 	Security Analysts	841 
Raytheon Technologies	491 	Network Security Engineers	828 
Deloitte	475 	Cloud Security Engineers	704 

Top Specialized Skills



Skills	Postings	% of Total Postings	Profiles	% of Total Profiles
Cyber Security	19,766	47%	9,909	30%
Vulnerability	12,920	31%	2,552	8%
Computer Science	12,734	30%	389	1%
Auditing	9,484	22%	3,437	11%
Information Systems	9,125	22%	2,131	7%
Information Assurance	8,761	21%	5,093	16%
Firewall	7,923	19%	2,719	8%
Linux	7,378	17%	2,757	8%
Security Controls	7,358	17%	1,315	4%
Risk Analysis	7,114	17%	2,429	7%

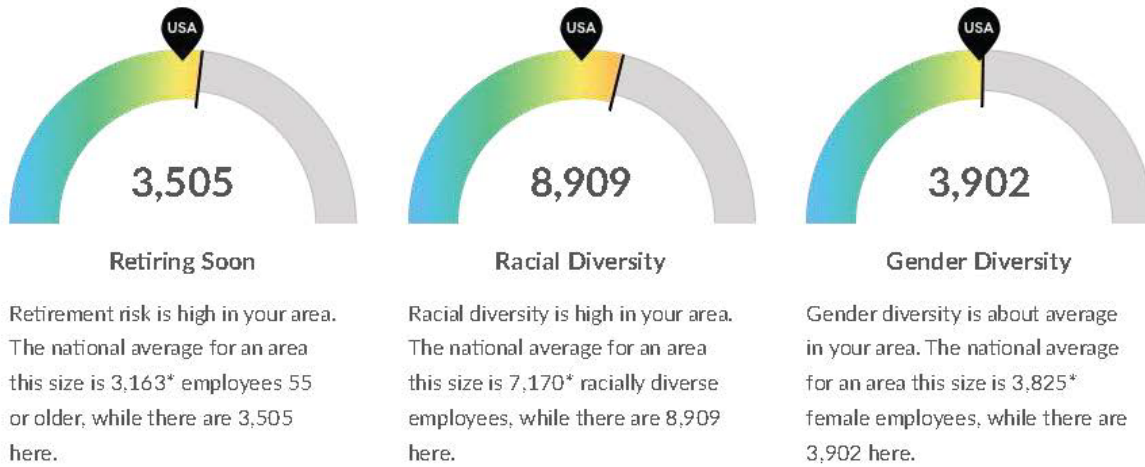
Top Common Skills



Skills	Postings	% of Total Postings	Profiles	% of Total Profiles
Management	16,202	38%	8,346	26%
Communications	14,289	34%	3,842	12%
Operations	11,797	28%	5,789	18%
Leadership	9,137	22%	6,072	19%
Information Technology	9,072	21%	6,692	21%
Research	7,357	17%	5,486	17%
Planning	7,247	17%	2,002	6%
Security Policies	6,515	15%	1,500	5%
Problem Solving	6,203	15%	1,121	3%
Troubleshooting (Problem Solving)	5,316	13%	4,517	14%

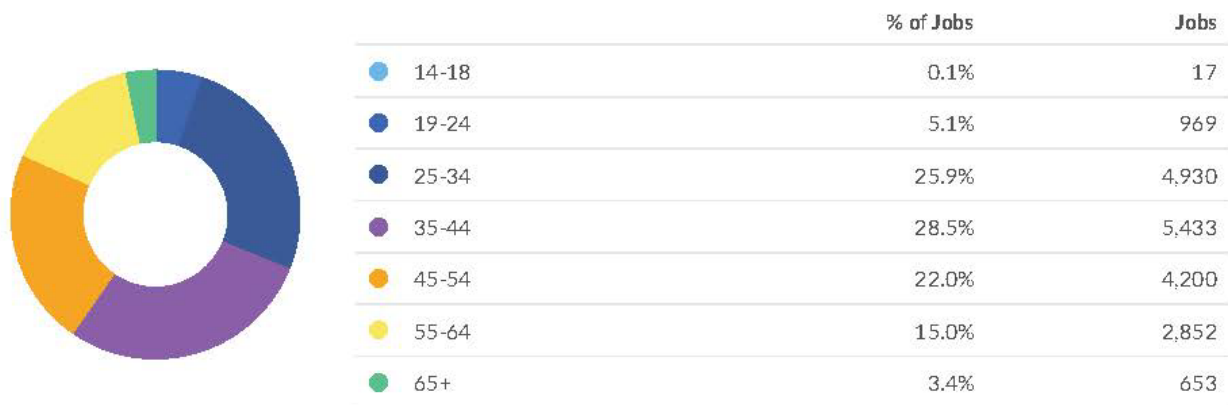
Demographics

Retirement Risk Is High, While Overall Diversity Is High

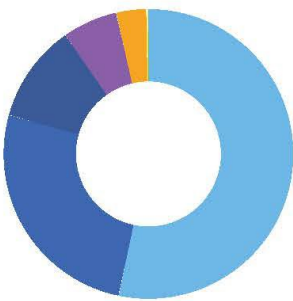


*National average values are derived by taking the national value for Cybersecurity Analysts and scaling it down to account for the difference in overall workforce size between the nation and your area. In other words, the values represent the national average adjusted for region size.

Occupation Age Breakdown

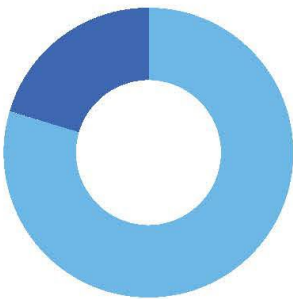


Occupation Race/Ethnicity Breakdown



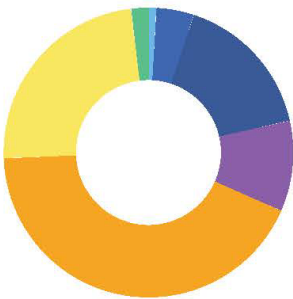
	% of Jobs	Jobs
White	53.2%	10,145
Black or African American	26.0%	4,958
Asian	10.9%	2,082
Hispanic or Latino	6.1%	1,170
Two or More Races	3.4%	641
American Indian or Alaska Native	0.2%	32
Native Hawaiian or Other Pacific Islander	0.1%	26

Occupation Gender Breakdown



	% of Jobs	Jobs
Males	79.5%	15,152
Females	20.5%	3,902

National Educational Attainment



	% of Jobs
● Less than high school diploma	0.8%
● High school diploma or equivalent	4.2%
● Some college, no degree	16.4%
● Associate's degree	10.1%
● Bachelor's degree	42.8%
● Master's degree	23.7%
● Doctoral or professional degree	2.0%

Occupational Programs



21 Programs

Of the programs that can train for this job, 21 have produced completions in the last 5 years.













14,894 Completions (2020)

The completions from all regional institutions for all degree types.



2,396 Openings (2020)

The average number of openings for an occupation in the region is 890.

CIP Code	Top Programs	Completions (2020)
11.0401	Information Science/Studies	3,701 
11.1003	Computer and Information Systems Security/Auditing/Infor...	2,868 
11.0701	Computer Science	2,130 
11.0101	Computer and Information Sciences, General	1,948 
11.0103	Information Technology	1,743 
43.0104	Criminal Justice/Safety Studies	710 
52.1201	Management Information Systems, General	520 
11.0802	Data Modeling/Warehousing and Database Administration	326 
11.0901	Computer Systems Networking and Telecommunications	248 
43.0403	Cyber/Computer Forensics and Counterterrorism	218 

Top Schools	Completions (2020)
University of Maryland Global Campus	4,343 
University of Maryland-College Park	1,546 
George Mason University	1,126 
Northern Virginia Community College	1,083 
University of Maryland-Baltimore County	866 
George Washington University	802 
Johns Hopkins University	624 
Towson University	570 
Anne Arundel Community College	364 
Montgomery College	273 

Appendix A

Information Security Analysts (SOC 15-1212):

Plan, implement, upgrade, or monitor security measures for the protection of computer networks and information. Assess system vulnerabilities for security risks and propose and implement risk mitigation strategies. May ensure appropriate security controls are in place that will safeguard digital files and vital electronic infrastructure. May respond to computer security breaches and viruses. Excludes Computer Network Architects (15-1241).

Sample of Reported Job Titles:

- Data Security Analyst
- Computer Security Specialist
- Information Systems Security Officer (ISSO)
- Security Analyst
- Network Security Analyst
- Information Security Analyst
- Computer Systems Security Analyst
- Security Specialist
- Information Technology Security Analyst (IT Security Analyst)
- Information Technology Analyst (IT Analyst)

Related O*NET Occupation:

Information Security Analysts (15-1212.00)

Appendix B (Geographies)

Code	Description	Code	Description
11001	District of Columbia County, DC	51013	Arlington County, VA
24003	Anne Arundel County, MD	51059	Fairfax County, VA
24005	Baltimore County, MD	51061	Fauquier County, VA
24013	Carroll County, MD	51107	Loudoun County, VA
24017	Charles County, MD	51153	Prince William County, VA
24021	Frederick County, MD	51510	Alexandria City County, VA
24027	Howard County, MD	51600	Fairfax City County, VA
24031	Montgomery County, MD	51610	Falls Church City County, VA
24033	Prince George's County, MD	51683	Manassas City County, VA
24510	Baltimore City County, MD	51685	Manassas Park City County, VA