Frederick Community College

June 16, 2025

Sanjay Rai, PhD
Secretary of Higher Education
Maryland Higher Education Commission
6 N. Liberty St.
Baltimore, MD 21201

Dear Dr. Rai,

Frederick Community College (FCC) is requesting MHEC approval of the substantial modification to the following degree program: Information Security and Assurance Certificate

The modifications update a program that has not been significantly updated since 2011. The revised certificate aligns with industry requirements wherein learning outcomes are based on industry accepted standards bound in certifications. The program has been updated to remove deeper level software engineering and refocused on hardware, software, cloud, and cybersecurity foundations. The program prepares students for industry certifications but does not require the certifications for graduation. We emphasize access and affordability using open educational resources (OERs) where appropriate, industry accepted learning tools when required, virtual lab environments.

The program will now better prepare students to enter the workforce at the entry level or higher depending on which certifications they obtain, or transfer to four-year institutions in information technology.

Thank you for your consideration of this proposal. If you have any questions regarding this request for approval, please do not hesitate to call me at 301-846-2491.

Payment in the amount of $50 has been submitted in accordance with the MHEC fee schedule.

Sincerely,

Anne P. Davis

Dr. Anne P. Davis
Provost and Vice President for Teaching, Learning and Student Success
adavis@frederick.edu

pc: Erin Peterson, FCC (epeterson@frederick.edu)
Dr. Sandy McCombe Waller, FCC (smccombewaller@frederick.edu)

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

Institution Submitting Proposal	Frederick Community College

Each action below requires a separate proposal and cover sheet.

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

Payment Submitted: ◉ Yes ○ No | Payment Type: ○ R*STARS # ◉ Check # 205633 | Payment Amount: $50 | Date Submitted: 6/16/25

Department Proposing Program	Computing & Business Technology	
Degree Level and Degree Type	Lower Division Certificate	
Title of Proposed Program	Information Security and Assurance Certificate	
Total Number of Credits	21	
Suggested Codes	HEGIS: 5101.12	CIP: 11.1003
Program Modality	○ On-campus ○ Distance Education (fully online) ◉ Both	
Program Resources	◉ Using Existing Resources ○ Requiring New Resources	
Projected Implementation Date (must be 60 days from proposal submisison as per COMAR 13B.02.03.03)	~~◉ Fall~~ ◉ Spring ○ Summer	Year: ~~2025~~ 2026 EP
Provide Link to Most Recent Academic Catalog	URL: https://frederick-public.courseleaf.com/	
Preferred Contact for this Proposal	Name: Erin Peterson	
	Title: Assistant Dean, Curriculum Systems and Scheduling	
	Phone: (301) 846-2651	
	Email: epeterson@frederick.edu	
President/Chief Executive	Type Name: Dr. Annesa Cheek	
	Signature: Annesa Z P Cheek Date: 6/12/25	
	Date of Approval/Endorsement by Governing Board: 06/11/2025	

Revised 1/2021

MHEC Academic Program Proposal
Frederick Community College
Information Security and Assurance Certificate (within the STEM Technology A.A.S. degree and Information Technology Specialist Area of Concentration)
Substantial Modification

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.

The Information Security & Assurance (IS&A) Certificate is designed to meet the growing demand in the field. The IS&A Certificate is designed to prepare students to start their career in cybersecurity and information technology as a multi-skilled practitioner and analyst who is competent in information security, with skills developed around detecting and mitigating threats, designing and implementing policy and procedure, and hardening systems from unauthorized access. The substantial modification to the certificate program directly supports the mission of Fredrick Community College by preparing an increasingly diverse student body to complete their goals of workforce preparation, in response to the needs of our local, regional, and global communities.

The certificate program has been updated to align more closely with industry needs by updating relevant IT content and focusing on core information security competencies. The streamlined certificate allows students to receive the most up-to-date and applicable skills necessary to succeed in an industry-certification-led domain. The certificate is aligned with industry certifications of CompTIA including A+, Net+, Security+, and certifications in Amazon Web Services (AWS).

By focusing the Information and Security Assurance Certificate on its core competencies, FCC helps ensure that our programming is responsive both to the needs of our learners (who deserve the best preparation possible for their field) and our community, which increasingly requires highly qualified cybersecurity and IT professionals equipped with the most current information possible.

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

This substantial modification focuses the certificate pathway on essential information security and assurance competencies. The revised requirements provide students with a clear, accessible pathway to obtaining the industry certifications that effectively demonstrate the knowledge, skills, and abilities needed to defend networks and systems from unauthorized access.

The proposed revisions replace less relevant coursework with industry-accepted cloud certification-based classes. The certificate now includes expanded cloud security content through

CMIS 111V, CMIS 266, and CMIS 295, which directly align with AWS and CompTIA Cloud+ certifications.

These proposed program updates directly support the mission of Frederick Community College by helping students meet their career goals, and by working towards continuous improvement and the highest standards for academic content. In particular, the changes align with the following institutional goals, as set forth in the "FCC Forward Strategic Plan 2020-2025:"

1) Enhance student success and completion through collaborative and effective academic support.

    Students in the core courses of the IT program have frequent access to instructors who are industry professionals and speak the language. In-person, online, virtual lab, pseudo-real-world environment lab settings exist for support on their assignments in an on-demand fashion. There are no high-stakes tests in the classes. This allows students to step through the coursework without risk of failing at any single point. The IT Specialist pathway encourages group work as there are multiple ways to solve problems; each class has discussions, interactive assignments, and group labs. Assignments can typically be resubmitted within the deadlines outlined, which again addresses the risk and mitigates any high stakes failure. There are multiple avenues for additional support provided through the College.

    By removing CS content unrelated to the IT core, these revisions enable both an expansion and an enhancement of career relevance (more classes will relate directly to a student's subject area and career development needs). By improving the quality and relevance of the content, the likelihood of students succeeding – and feeling a sense of progress and motivation to continue towards completion – will be enhanced as well.

2) Increase access, affordability, and retention through planned academic advising and degree pathways.

    The IT Specialist program now focuses on its domain primarily, eliminating most of the more complex Software Engineering aspects of Computer Science (CS) allowing resources to be more focused. By eliminating superfluous courses to the core application of IT Specialist knowledge, skills, and abilities, a student will have a far better chance of taking a class that leads directly to an industry certification and promotes their goal of employment. As noted above, this will naturally help develop student motivation and resilience, and thus improvements in retention can be expected.

    By increasing the amount of core IT coursework that can lead to industry certifications, the revisions also boost the ability of students to land jobs in the IT field while studying, and thus aid their ability to pay for school.

In addition, by better clarifying the divide between our CS program and our IT program (which are similar fields that require quite different career preparation and student resource needs), we will be better able to identify students who specifically wish to pursue an IT career. This will, in turn, help ensure that College-provided resources (e.g., loaner hardware, FCC technology offerings, targeted advising, career coaching) can be efficiently provided to them, that they will not receive superfluous information about CS programs, and that marketing of the IT program can be more efficiently and better targeted to ensure students know (1) that it exists as a distinct option from CS, (2) what it is, and 3) how the College will help them, specifically, succeed in it. All of this will serve to enhance both student access and student retention.

3) Promote excellence in the design and delivery of curriculum, and support of student learning.

The revised IT Specialist curriculum is now completely aligned with industry expectations that focus on certifications that meet baseline industry need, rather than spending time on questionably applicable CS material.

These certifications also expire periodically so recertification is necessary, and any changes lead to the requirement to update our courseware. By clarifying the focus of the program on IT content exclusively, we will be better able to devote resources to monitoring and responding to these changes, thereby ensuring better, faster, and more thorough provision of updated content to students.

Likewise, an exclusive IT focus allows repurposing of extraneous resources and teaching time to no longer provide misaligned CS material, but instead expand our array of tools for enhancing learning delivery, including but not limited to the bolstering of our integrated virtual lab environments, the adaptation of industry accepted learning solutions (to ensure students have more and better access to the latest industry tools, hands-on), and our use of custom-built master courses to ensure consistent delivery of up-to-date content matched with the current demands of both academic rigor and industry need.

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 IT Specialist program has traditionally been funded by tuition and fees collected by students enrolled within the program, and it will continue to be under the proposed revisions. FCC currently has full-time and part-time faculty and administrative staff sufficient to meet the needs

of the program. No new courses are being created through this revision – it merely takes existing IT courses and adds them to the degree in place of CS courses – so our existing roster will remain sufficient. The one course change being executed is an expansion (from to 2 to 3 credits) of a single course in the Python programming language; this change does not necessitate any new faculty hires.

Even before the COVID-19 pandemic's period of extended remote operations, the IT Specialist program had already moved to a predominantly online set of classroom and lab environments. Conveniently, this matches the "beyond-arms-reach" environment most IT professionals now operate in after initial system installation; it also helps to ensure FCC reliably has enough lab and classroom space to continue managing the program without incurring any additional space costs – currently budgeted resources should still be sufficient.

Additionally, the IT Specialist program's connections to industry – as well as its alignment with industry certifications – help maintain both a consistent flow of interested students and a consistent readiness to compete for external supplemental funding for further enhancements when such opportunities arise. The proposed revisions will enhance these dynamics and allow for more efficient and effective utilization of institutional resources.

Provide a description of the institution's commitment to:

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

The current Program Manager for IT Specialist programs reports to the Associate Vice President of Teaching, Learning and Student Success/Dean of Health, Business, Technology, and Science. The Program Manager leads the development of specific curriculum and courses, procurement of programmatic equipment and supplies, and will actively contribute to the ongoing administrative, financial, and technical support of the proposed program. The program is supported by an academic office manager who is shared with other programs. Each of these roles is established and fully funded by FCC, and the College has committed demonstrably to continue their existence. Both items reflect the institution's willingness to ensure program support will be continuous through the revision and beyond.

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

FCC is committed to the success of all students. The current IT Specialist program has been offered continuously since its transition to an Area of Concentration within STEM Technology in 2017. The program has become ever more important over the years, and FCC is in full support of the efforts to provide resources needed for students to complete the program. FCC policy requires maintenance of courses to facilitate up to a five-year teach-out period and program faculty, staff, and advisors have all been briefed on the effort. The College also offers a variety of support programs including tutoring, academic success notifications, program specific advisors, and faculty advisors, all of which will be made readily available to students navigating any challenges related to completion.

B. Critical and Compelling Regional or Statewide Need as Identified in the State Plan (effective December 2022, must reference new plan & specific outcomes):

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**

The proposed revisions carry on the necessary tradition of regular adjustments/updates to the IT Specialist program to match the current state of the IT field – as the field grows at a rapid pace, failing to execute these revisions would degrade the College's and region's support of both knowledge advancement and response to societal need. (A, B)

The previous iteration of the related IT Specialist program required introductory courses in Java programming and other software engineering courses. These created barriers for students seeking focused cybersecurity and information assurance training. The Information Security and Assurance Certificate removes these barriers entirely, providing a streamlined 21-credit pathway focused exclusively on information security competencies.

As a result, the College discovered that it has been unintentionally limiting our region's ability to train the IT professionals needed to support the growing technology industry base. This was especially true for our educationally disadvantaged student population – who often did/do not have robust IT learning opportunities at their high schools – and only makes the impact more severe and the change more necessary (B). Revising the program to remove these barriers and replace them with additional useful IT certification-oriented content not only satisfies the necessary academic duty of ensuring our students can keep up with the knowledge of their industry (A), it also reinvigorates the College's ability to support the region's employment throughput needs in this professional area (B).

Looking beyond our local region to the state level, IT is an oft-cited focus area of the Moore-Miller administration's effort to rebuild Maryland's economic competitiveness. To do this, our state must produce a great number of skilled professionals in a highly competitive field, where industrial certifications dominate, and speed governs. Outsourcing, globalization, and certification mean that our students will be eligible for jobs in – and compete with – areas around the world, and professionals with 2-year degrees, 1-year certificates, or micro-credentials of varying sizes. If we are to advance the interests of our students and our state by competing in this environment, we must organize our IT training to be just as insistently relevant and as certification-oriented as the competition. By removing unrelated coursework since IT Specialists do not need knowledge of software engineering or development, and adding new pathways for IT certifications, such as cloud computing, the proposed revisions modernize and realign the outdated program with current industry needs (B).

2. **Provide evidence that the perceived need is consistent with the 2022 State Plan (be sure to relate at least one priority)**

The Maryland State Plan for Postsecondary Education outlines the below goals and strategies-
Access: Ensure equitable access to affordable and quality postsecondary education for all Maryland residents.
Success: Promote and implement practices and policies that will ensure student success.
Innovation: Foster innovation in all aspects of Maryland higher education to improve access and student success.

GOAL ALIGNMENT

To increase access and success in IT coursework that can be challenging for entering students, a core feature of our program is that work is evaluated, returned to the student, and allowed for rework where appropriate. This growth mindset allows students to overcome initial conceptual, process, and other obstacles and not be a barrier at the early stages of knowledge, skill, and ability habit forming. By removing unnecessary non-IT coursework, we help keep students within the supportive IT program environment, allowing them to engage more fully and benefit more consistently. (Success, Innovation)

As with all technology domains, not all students have access to technology at all, or technology which fulfills the need (e.g. one may have a Chromebook laptop, but it cannot run the requisite software to explore IT at the college level). This fails to meet the educational requirements needed to properly prepare students for entry-level work in the IT workforce. FCC has unique programs to provide laptops and other technology resources specifically designed to facilitate the Cybersecurity and Information Technology programs. These efforts help all students, but especially those for whom cost may be a barrier. However, to ensure this program operates effectively, we must first ensure that we know which students need assistance, and second, we must ensure that the technology tools being provided will actually serve their needs (the hardware and software needs of an IT Specialist and a Software Developer can be very different). By eliminating the confusing overlap between IT and computer science coursework, the proposed revisions help to clarify which students benefit most from our supportive IT programs (Access) and in turn ensure that the tools we provide are well suited to their specific needs. (Success, Innovation)

The program described above is only one example – additional supports are provided to students through Perkins grant funding for IT certification testing vouchers, open educational resources customized for IT learners, and more. However, as is true above, the effectiveness of any of these interventions is minimized if IT students are less distinguishable from their CS colleagues, or if students are being deterred from the program due to unnecessarily difficult coursework before they can progress to the point of taking advantage of a support like a testing voucher. Be refocusing the program on core IT coursework and removing existing barriers, these revisions allow all types of interventions – whether innovative (e.g., OERs), traditional (e.g., financial vouchers), or otherwise – to more effectively targeted, ultimately improving access and success for the students who need them most. (Access, Innovation, Success)

As the demand for a statewide cohort of highly skilled IT professionals capable of driving and supporting a new industrial base continues to grow, so too does the need to provide high quality IT education to as many people as possible. The proposed revisions will play a critical role in meeting that need and delivering lasting benefits to the region and the state.

PRIORITY ALIGNMENT

Priority 5: Maintain the commitment to high-quality postsecondary education in Maryland.

The discussion above refers to ongoing curriculum improvement through continuous assessment and the integration of industry-driven changes, using third-party tools aligned with certification standards to support instruction. The previous pathway was based on an integration of computer science fundamentals which are not needed for the Information Technology Specialist position. The new pathway will allow students to avoid hurdles that will not aid them in seeking positions focused on information technology, information assurance, or cybersecurity. The new pathway aligns better with the need to fill positions needing focused, skilled workers.

Priority 6: Improve systems that prevent timely completion of an academic program

The proposed program modifications create a streamlined pathway to graduation and provide a transferrable foundation for the field of Information Technology. The previous program demanded a programming foundation that was burdensome and misaligned with IT industry requirements. Students who struggled with a single class often faced stalled progress in their program -- sometimes indefinitely -- until a substitute course could be arranged. This would be a red flag, even in a course bearing necessary industry knowledge. However, in this case, where the coursework is not relevant to the field, the barrier it creates to timely completion and student progress is particularly problematic. Knowing this, the new pathway eliminates the requirement for software engineering courses entirely and removes entry-level barriers, ensuring students have access to the relevant content courses, and instructor support they need to make progress.

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 U.S. Bureau of Labor Statistics projects this field to grow “much faster than average” for all occupations to its reporting range of 2033. About 356,700 openings for information technology, computer science, and cybersecurity are projected. A review of the labor market on a local and regional level (eight counties including Baltimore, Carroll, Frederick, Howard, Montgomery, Washington, and Adams) shows aggressive job posting demand over a deep supply of jobs. In fact, our area is a “hotspot” for this type of job. According to Lightcast.io (2025) the national average for a geographical area this size is 1,897 employees, while there are 5,040 in our region. Additionally, the projected job growth from 2025 to 2033 is 14.2% for the eight counties and 24.6% for Frederick County alone. This exceeds the projected national growth average (which is

18.6%) over the same period. The median salary advertised for entry-level positions in our area is $76,000.

Due to the prevalence of IT in modern life, graduates in Information Technology can be employed in myriad industries, roles, and levels - from independent contracting to small-office, home-office sole proprietorship businesses, to Fortune 100 and government agencies at the local, state, and Federal levels. This is true in a cross-cutting fashion: a public safety agency will need IT support the same as a retail store, a restaurant chain, or an industrial farm. Each will need the same core fundamental principles, supplemented by knowledge of field-specific hardware and software. Accordingly, the potential employment opportunities for an IT graduate are potentially endless. Particularly notable of late has been the additional expansion of cybersecurity as an employment option (and societal need).

The proposed program positions itself specifically to address this multifaceted employment landscape. By refocusing the curriculum on IT, and increasing certification preparation opportunities, the proposed IT Specialist program will provide a holistic foundation of essential IT skills, replacing unnecessary content with deeper exploration of technology, its security, and its deployment. This deeper-dive capability, the organizational alignment at FCC (where IT and cybersecurity fall under the same program area), not only prepares graduates for various opportunities, but also to facilitate a seamless connection to the world of cybersecurity. This deeper-dive capability, combined with the focused nature of the certificate program, prepares graduates for various opportunities in information security, information assurance, and cybersecurity roles.

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

According to research from the Bureau of Labor Statistics, computer and IT occupations are expected to grow much faster than average between now and the latest analysis limit (2033), to the tune of a projected 356,700 job openings annually across the nation. Many IT jobs are now conducted optionally by distance, and/or with limited travel to perform a task and then return to a central or remote place of operation. In that sense, students in this program can compete for jobs offered anywhere in the world.

Maryland specifically is in the top 10 states for IT workforce density according to CompTIA's "State of the Tech Workforce 2024," standing at 8% job density, and having nearly 100,000 tech openings focused on IT at the time of the report. CompTIA is the premiere IT credentialling organization, so their evaluation of growth is important to understanding the potential for the IT market in Maryland. Their state-by-state analysis reflects a growth of 2.4% in Maryland alone. It is also first in Tech Wage premium, meaning that the state's demand is sufficient to create an additional financial benefit to choosing to be a tech worker specifically, relative to another industry.

The salary projections below for specific positions, from the Department of Labor, are for the Delaware-Maryland-DC-Virginia area, but graduates in this field also have access to global opportunities, with many in the tech industry embracing the gig economy and getting hired

anywhere to install language- and culturally-agnostic equipment with the only real barrier being industry certification and dedication to work.

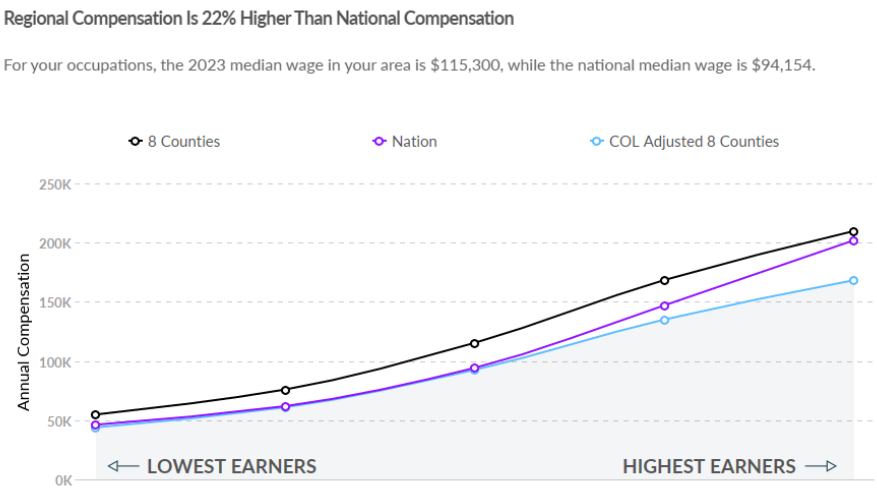
Computer Support - $61,550;
Network and Computer Admin - $124,910
Network Architects - $130,390
Computer and Information Systems Managers - $171,200

A review of the labor market on a local and regional level (eight counties including Baltimore, Carroll, Frederick, Howard, Montgomery, Washington, and Adams) shows aggressive job posting demand over a deep supply of jobs. Additionally, the projected job growth from 2025 to 2033 is 2.2% for the eight counties listed and 11.8% for Frederick County alone. This exceeds the projected national growth average (which is 6.2%) over the same period.

From Lightcast.io 2025:

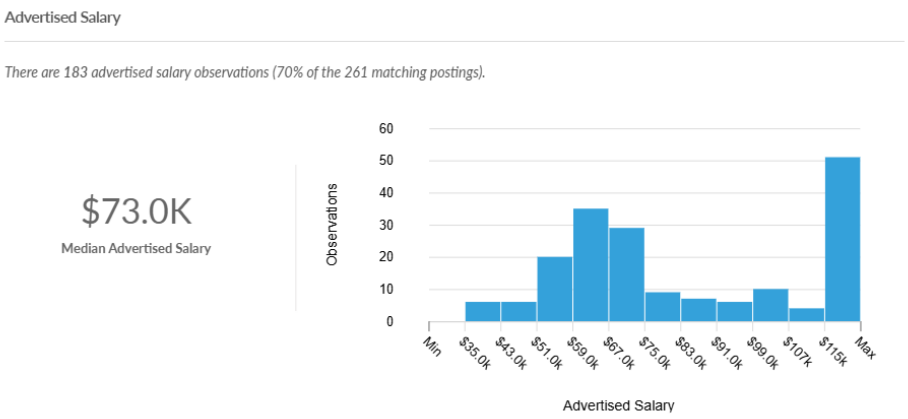
	Region	2025 Jobs	2033 Jobs	Change	% Change
●	8 Counties	27,913	28,519	607	2.2%
●	National Average	19,513	20,716	1,204	6.2%
●	Frederick County, MD	1,983	2,218	235	11.8%

Regional compensation is 22% above the national average. From Lightcast.io 2025:



Furthermore, at the time of this report (May 2025) there were active postings for 261 unique entry-level positions, with an advertised median salary of $73K for applicants with an associate degree.

From Lightcast.io 2025:



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.**

Because of the location of Frederick Community College, there are in-demand positions both hyper-local and within a two-hour drive of the institution across Maryland, Virginia, and DC Metro areas. However, while our ensuing analysis will focus on those areas, it should also be emphasized that IT and its related cybersecurity focus domain are not limited by geography, unlike some other industries.

The Maryland-Virginia-DC (DMV) region is poised for significant growth in the technology sector over the next five years, making IT specialists increasingly essential. The following analysis provides in-text citations to support why this demand is accelerating and why the DMV is a critical hub for IT professionals.

<u>Economic Growth and Tech Job Expansion</u>

Tech jobs are a major economic driver in the DMV. In Washington, DC, tech jobs comprise 10.9% of all employment and contribute $75.6 billion to the local economy.[1][2] The region is the third-largest metro area for tech employment in the U.S., and tech jobs are growing twice as fast as other sectors, with projections showing an increase from 6 million jobs in 2024 to 7.1 million by 2034.[1] Baltimore's tech sector is also booming, with a projected 52,000 jobs and $4.2 billion in economic impact by 2030.[3] Maryland's tech workforce is over 220,000 strong, with a $36.6 billion economic impact, and Virginia's tech sector employs over 350,000, contributing $61.9 billion to the economy.[2]

<u>Federal Government and Private Sector Demand</u>

The DMV's proximity to the federal government creates unique demand for IT specialists. Federal agencies require experts in cybersecurity, data analytics, and digital transformation to secure sensitive data and modernize systems.[4][5] The private sector is equally robust, with Amazon, Google, and Apple expanding their regional presence. Amazon's HQ2 in Northern Virginia is expected to provide thousands of tech jobs, while major investments in defense technology and AI continue to fuel opportunities.[6][5]

Innovation in AI, Cybersecurity, and Cloud Computing

The region leads in artificial intelligence (AI), cybersecurity, and cloud computing. AI is a key focus, with 60% of DC tech managers hiring for AI engineering roles in 2025, up from 35% the previous year.[6] Venture capital investments reflect this trend, with more than a third of VC funding in 2025 going to AI and machine learning startups[7]. Cybersecurity is especially critical given the concentration of federal agencies and defense contractors; Maryland, in particular, is a top destination for cybersecurity professionals due to the presence of federal intelligence organizations and international corporations.[4][8] The demand for cybersecurity talent is resilient, with the U.S. needing approximately 265,000 additional experts nationwide[3]. Cloud computing skills are now "non-negotiable," with AWS, Azure, and Google Cloud expertise essential for supporting the region's digital infrastructure.[1][5]

In our immediate area, IT employment ranks high. The DC region has 11.2% of its workforce in IT related professions. It is number one for tech job postings according to The Computing Technology Industry Association (CompTIA).[9] Additionally, the same article states that the Bureau of Labor Statistics suggests that 25% of IT workers do not have nor require a bachelor's degree[9], making our ability to provide a shorter program that allows for increased certification opportunities and reduces time spent on unrelated coursework even more important if we are to both compete in and adequately support this sector.

The Maryland.gov site recently posted their observation that IT and cybersecurity, which are intimately tied together, are of great importance and are economic priorities, as enshrined in the "Cyber Maryland" project and report. The report is a collaboration with the Governor's Workforce Development Board, and it notes a 40% growth projection in Maryland's technology job market over the next 10 years.[10]

Most broadly, as discussed earlier, the Bureau of Labor statistics job openings projected nationally are approximately 350,000 across the IT and Computer Science domains.

Diversity, Inclusion, and Workforce Development

The DMV stands out for its diverse and inclusive tech workforce. In DC, 27% of technologists are Black professionals, and women hold 38% of tech jobs, making it one of the most inclusive tech hubs in the country.[1] Baltimore startups also surpass national averages in diversity.[3] Educational institutions such as Johns Hopkins University, University of Maryland, and George Mason University, along with coding bootcamps and student organizations, are actively preparing the next generation of IT professionals.[3] Taken together, these dynamics make our ability to remove unnecessary barriers to accessing this program even more essential, as it will be the job of Maryland's community colleges to help supply students to both those startups and those 4-year institutions.

Startups, Venture Capital, and Ecosystem Growth

Startup activity and venture capital investment are surging in the DMV. Baltimore is home to over 400 tech startups, supported by university partnerships and federal investments.[3] In 2023, the region attracted more than $5.6 billion in venture capital, ranking fifth nationally.[7] Major VC firms are establishing offices in DC, further fueling innovation and job creation.[7]

Persistent Skills Gap and Unfilled Positions

Despite this growth, the DMV faces a persistent skills gap. Tech job postings regularly outpace those in other top hubs, with more than 16,000 tech jobs posted in a single month in 2024.[1] Employers are increasingly prioritizing practical skills over formal degrees, making it possible for self-taught technologists and bootcamp graduates to enter the field.[1] Entry-level positions in Maryland, such as computer support specialist and information security analyst, are in high demand and offer competitive salaries and clear career progression.[3]

Sector-Specific Demand

Each sub-region within the DMV has its own tech specialties:

- *Washington, DC:* Dominated by cyber and IT, with strong demand in government contracting, policy, and AI.[1][6]
- *Maryland:* Focused on biotechnology, quantum computing, and healthcare IT, supported by federal research labs and universities.[4][3]
- *Northern Virginia*: A hub for defense technology, data infrastructure, and cloud computing, anchored by major federal contractors and tech giants.[5]

Competitive Salaries and Career Advancement

Tech salaries in the DMV are highly competitive. In DC, the average salary is $119,158-95% higher than the metro average.[1][2] Entry-level positions with 2-year degree requirements in the Frederick region have median starting salaries at $73,000, with experienced professionals earning well over $110,000[3]. The region's high salaries, career progression opportunities, and flexible work arrangements make it an attractive destination for IT talent.[1][6][3]

1. https://www.nucamp.co/blog/coding-bootcamp-washington-dc-most-in-demand-tech-job-in-washington-in-2025
2. https://technical.ly/professional-development/dc-virginia-maryland-comptia-tech-workforce/
3. https://www.nucamp.co/blog/coding-bootcamp-baltimore-md-getting-a-job-in-tech-in-baltimore-in-2025-the-complete-guide
4. https://www.coursera.org/articles/cyber-security-jobs-in-maryland
5. https://www.amazon.jobs/de/jobs/2924274/generative-ai-solutions-architect-aws-national-security-aws-national-security-solutions-architects

6. https://www.nucamp.co/blog/coding-bootcamp-washington-dc-getting-a-job-in-tech-in-washington-in-2025-the-complete-guide
7. https://www.informationweek.com/it-leadership/what-vc-investments-look-like-in-2025
8. https://blog.trainace.com/are-cybersecurity-careers-booming-in-maryland-dc-and-virginia
9. https://wtop.com/business-finance/2024/04/one-in-10-dc-area-jobs-are-in-it-no-college-degree-required/
10. https://labor.maryland.gov/whatsnews/marylandlaunchescomprehensivecybersecuritytalentstrategy.shtml

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

Enrollment in the IT Specialist AOC has grown from 17 students in Fall 2018 to 47 students in Fall 2024, a 176% increase. This certificate is entirely embedded in the AOC, so their enrollments are linked. The program crosses over with cybersecurity for a plurality of classes, so it is possible that students may transition from or to the other pathway. Additionally, the program has experienced significant growth in course-level interest since its inception in 2014. Not all students pursuing IT certification through what will be the proposed program's new required coursework have declared an IT Specialist major; accordingly, the following estimates may be more conservative than actual representative enrollment interest. Likewise, the exponentially increasing demand for IT positions – as well as a planned state-sponsored industrial policy to support this area – may lead to unexpectedly higher rates of growth than those we use below, which are only based on data available to-date.

Projected growth is based on increased growth trends in declared majors in the IT Specialist pathway (Fall 2020 to Fall 2024 saw an increase from 20 to 47 students) along with overall course enrollment over the previous 2 years.

Current and Projected Supply of Prospective Graduates					
	Year 1 (AY 2025-26)	**Year 2 (AY 2026-27)**	**Year 3 (AY 2027-28)**	**Year 4 (AY 2028-29)**	**Year 5 (AY 2029-30)**
Projected Enrollment	52	58	65	72	88
Projected Supply of Graduates*	19	19	21	23	26

*The supply of graduates is estimated at 40% graduation rate based on enrollment numbers two years prior.

This data will be collected by the Cybersecurity and Information Technology Program Manager and be reported to the Program Advisory Committee twice annually, as well as to the Dean of the School of Technology, Trades, Business and Hospitality, Provost, and Faculty and Staff.

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 degree to be awarded.

FCC's geographical area is Frederick County. There is no other public college or university within those geographic boundaries offering a similar certificate program at the 2-year level. A search of the Academic Program Inventory resulted in no other colleges specifically offering an Information Security and Assurance certificate program at this level. There are several other colleges and universities in Maryland that offer Cybersecurity and other IT related programs however, this was anticipated by the Trade Adjustment Assistance Community College and Career Training (TAACCCT) Grant to meet demand, which has still not been met at local, state, or national levels. All programs at all institutions should be meeting the minimum requirements of industry accepted certification and with the current changes, FCC extends to Cloud and Virtualization industry certifications and augments the pathway with applied Python programming.

While there are private colleges in the area that have offerings under IT or similar titles, these are different in length (exclusively 4 year offerings, e.g., Hood College, Mt. St. Mary's University), orientation (focused on theory and history of IT rather than certification pursuit), and cost (all are several times the cost of FCC courses on a per-credit basis.

The proposed program is and will be the only two-year, competitive job placement program in our geographical area.

The below information is from Maryland.gov's MHEC Academic Program Inventory located at: https://mhec.maryland.gov/institutions_training/Pages/searchmajor.aspx and provides an exhaustive list of program domains. The following three searches have been performed to identify all programs in a similar discipline and/or with the same CIP at the lower division certificate level.

Keyword: information technology
Degree: Lower Division Certificate
Total: 6

Institution	Program	Degree
Anne Arundel Community College	INFORMATION TECHNOLOGY SERVICE MANAGEMEN	Lower Division Certificate
Baltimore City Community College	INFORMATION TECHNOLOGY BASIC SKILLS	Lower Division Certificate
College of Southern Maryland	CLOUD AND INFORMATION TECHNOLOGY CERTIFI	Lower Division Certificate
Community College of Balt County	CIS GENERAL INFORMATION TECHNOLOGY	Lower Division Certificate
Community College of Balt County	INFORMATION TECHNOLOGY SUPPORT CERTIF.	Lower Division Certificate
Montgomery College-All Campuses	INFORMATION TECHNOLOGY	Lower Division Certificate

Keyword: Information
Degree: Lower Division Certificate
Total: 14

Institution	Program	Degree
Anne Arundel Community College	COMPUTER INFORMATION SYSTEMS	Lower Division Certificate
Anne Arundel Community College	INFORMATION TECHNOLOGY SERVICE MANAGEMEN	Lower Division Certificate
Anne Arundel Community College	MANAGEMENT INFORMATION SYSTEMS	Lower Division Certificate
Baltimore City Community College	INFORMATION TECHNOLOGY BASIC SKILLS	Lower Division Certificate
College of Southern Maryland	CLOUD AND INFORMATION TECHNOLOGY CERTIFI	Lower Division Certificate
Community College of Balt County	CIS GENERAL INFORMATION TECHNOLOGY	Lower Division Certificate
Community College of Balt County	INFORMATION MANAGEMENT	Lower Division Certificate
Community College of Balt County	INFORMATION TECHNOLOGY SUPPORT CERTIF.	Lower Division Certificate
Frederick Community College	INFORMATION SECURITY & ASSURANCE	Lower Division Certificate
Garrett College	COMPUTER INFORMATION TECHNLGY:E-COMMERCE	Lower Division Certificate
Hagerstown Community College	INFORMATION SYSTEMS TECHNOLOGY	Lower Division Certificate
Harford Community College	COMPUTER INFORMATION SYSTEMS	Lower Division Certificate
Harford Community College	INFORMATION ASSURANCE AND CYBERSECURITY	Lower Division Certificate
Montgomery College-All Campuses	INFORMATION TECHNOLOGY	Lower Division Certificate

Keyword: Cyber
Degree: Lower Division Certificate
Total: 15

Institution	Program	Degree
Allegany College of Maryland	CYBERSECURITY	Lower Division Certificate
Anne Arundel Community College	CYBER TECHNOLOGY	Lower Division Certificate
Anne Arundel Community College	CYBERCRIME	Lower Division Certificate
Baltimore City Community College	CYBER SECURITY AND ASSURANCE	Lower Division Certificate
Cecil College	CYBERSECURITY	Lower Division Certificate
College of Southern Maryland	CYBERSECURITY	Lower Division Certificate
Community College of Balt County	CYBERSECURITY	Lower Division Certificate
Garrett College	CYBER SECURITY	Lower Division Certificate
Hagerstown Community College	CYBER AND NETWORK SECURITY	Lower Division Certificate
Harford Community College	CYBER DEFENSE	Lower Division Certificate
Harford Community College	INFORMATION ASSURANCE AND CYBERSECURITY	Lower Division Certificate
Howard Community College	CYBER FORENSICS TECHNOLOGY	Lower Division Certificate
Montgomery College-All Campuses	CYBERSECURITY FOR IT PROFESSIONALS	Lower Division Certificate
Prince George's Community College	CYBERSECURITY	Lower Division Certificate
SANS Technology Institute	CYBERSECURITY FUNDAMENTALS	Lower Division Certificate

2. Provide justification for the proposed program.

The proposed Information Security and Assurance Certificate is designed to prepare students to enter the workforce by preparing students to obtain multiple industry certifications through a focused 21-credit program. The certificate provides an efficient pathway for students seeking to enter the cybersecurity field without completing a full associate degree.

Students are employable into entry-level information security positions upon completion of the certificate and the associated industry certifications (CompTIA A+, Security+, Cloud+, and AWS certifications) that students will earn through the program.

In a state with a stated aim to compete in a fast-paced global marketplace, and in a county with a particularly fast-growing cybersecurity sector, there is a clear need for an accessible certificate program that prepares professionals at the pace industry demands.

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 HBI's.**

We believe the proposed new program would have a positive impact on programs at HBIs, as the improved skill and quantity of FCC program graduates will, in turn, increase the number of students available to transfer to similar programs at HBIs.

As FCC is a community college in a geographical region that houses no HBIs, we do not anticipate any adverse overlap effects, or any drawing away of students who might attend similar programs at an HBI.

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.**

As noted above, there are no HBIs in our area with which to interact (positively or negatively). However, by removing barriers to access in our program as detailed in this revision, we improve the quality of all our students. If this cohort includes students who receive a better, more accessible, skill-based, and relevant education through us, the pool of transfer students from which an HBI may draw only improves in quality as well, allowing the HBI student bodies to improve in turn.

As the IT industry in Maryland grows, we are excited as well to explore articulation and other partnerships with HBIs to support the employment needs of our state. In such an event, we would also foresee (and hope for!) additional support for the HBI in question to succeed in carrying out its own mission of academic excellence.

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 also describe the faculty who will oversee the program.**

The proposed certificate modifications, as outlined below, will provide students with the knowledge, skills, and abilities necessary to begin careers in information security and assurance. Completion of the certificate courses CMIS 111V, CMIS 266, and CMIS 295 lead to distinct

industry AWS Cloud certifications as well as CompTIA Cloud+ certification, while CMIS 120/121 lead to the CompTIA A+ certification, and CMIS 218 prepares students for CompTIA Security+.

The proposed revised program was developed by James Hatch, current faculty lead for cybersecurity and IT program pathways.

The IT Specialist program was originally developed as part of the development of our cybersecurity program under a Trade Adjustment Assistance Community College and Career Training [TAACCCT] Grant that was funded in 2014. Multiple revisions have occurred, but all of them have been fundamentally centered on the need to regularly update specifics of program material and skillsets to match a rapidly evolving industry, rather than making substantive structural changes to the degree. This proposal represents the first such major refocusing, consisting of a removal of CS (programming, software engineering) elements deemed irrelevant to IT Specialists by a review of faculty, program advisory committee members, certification requirements, and industry publications.

James Hatch will continue to oversee the program in its revised state. He holds an MBA with a focus on strategic management, a Master's degree in Information Technology, a Master's degree in Digital Forensics and Cyber Investigation, and has been a full-time faculty member at FCC for 11 years. He will be supported by an instructional cadre consisting of 3 additional full-time faculty members, as well as a large stable of adjunct professors with specific experience in the IT or cybersecurity industries.

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

Program Learning Outcomes:

Graduates will:

- Apply a structured model in the Security Systems Development Life Cycle (SDLC).
- Detect and mitigate attack methodology, intrusion, and suspicious attempts to gain unauthorized access to systems and/or resources.
- Design and implement risk analyses, security policies, and damage assessments.
- Evaluate and develop plans to implement operating system security-hardening procedures across multiple environments.
- Explain the policies and procedures needed to identify, protect, detect, respond, and recover from a given information security incident.

3. **Explain how the institution will:**
    a) **provide for assessment of student achievement of learning outcomes in the program**

The College assesses the effectiveness of its academic programs using a well-structured five-year review process, facilitated by an annual "micro-review." In addition, the IT and cybersecurity domain undergoes annual maintenance assessments to maintain parity with the most current

industry certification processes. These processes consist of an analysis of program mission, goals, and objectives, assessment of the program according to internal and external data, assessment of the curriculum, assessment of student learning outcomes, assessment of resources and viability, a summary of key findings and recommendations, a review by two external reviewers, and a submission of a formal action plan. The action plan then serves as the foundation for improvements made to the program over the next four years.

b) document student achievement of learning outcomes in the program

Programs collect data from individual courses to record student achievement of learning outcomes based on the established cycles, relevant to the measures identifiable above for each of the learning objectives and program goals. The data collected are evaluated to determine the level of student achievement that has occurred based on the learning outcomes. Data will be analyzed, and updates will be made as deemed necessary.

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

At the heart of the proposed program is a series of industry certification-based courses. The materials utilized are aligned directly with industry accepted solution providers. In the courses, students' progress is scaffolded along a knowledge path from basic understanding of hardware to more complex and abstract concepts, technique, hardware, software, policy, and procedure.

Specifically, these courses are aligned with Cloud, Security, Hardware, and Software certifications (A+, Net+, Linux+, Cloud+). The bulk of the courses are taught using identical framework master classes so all students taking the class at the same time, even in different classes, are on the same pace and can serve as a resource for group work even if two students meeting up to study the material are from different classes. This way, we have a uniform student experience eliminating confusion between classes and disparate professors, times, places, modalities.

Information Security and Assurance Certificate

Current/Previous Program Requirements (2024-2025 Academic Year):

Departmental Requirements		
CMIS 106	Object Design and Programming	3
CMIS 120	PC Operating Systems	3
CMIS 121	PC Repair & Diagnostics	3
CMIS 280	Networking Fundamentals	3
or CMIS 290	Cisco 1 Introduction to Networks	
Electives		
Select three of the following courses:		**9**

CMIS 179	Cybersecurity Fundamentals	
CMIS 217	Cybercrime and Digital Forensics	
CMIS 218	Information Security	
CMIS 219	Ethical Hacking	
CMIS 281	Security Fundamentals	
CMIS 295	Cloud Security	
Total Credits		**21**

Information Security and Assurance Certificate

Proposed Program Requirements (2025-2026 Academic Year):

Departmental Requirements		
CMIS 101	Information Systems and Technology	3
CMIS 111V	Virtualization and Cloud Essentials	3
CMIS 120	PC Operating Systems	3
CMIS 121	PC Repair & Diagnostics	3
CMIS 218	Information Security	3
CMIS 266	Cloud System Administration	3
CMIS 295	Cloud Security	3
Total Credits		**21**

Summary of Proposed Program Changes:

Removing CMIS 106 and adding CMIS 101

Removing CMIS 280 or CMIS 290

Adding CMIS 111V and CMIS 266

Removing Electives and moving CMIS 218 and CMIS 295 from Electives to Departmental Requirements

Proposed Guided Pathway:

Recommended First Semester		**Credits**
CMIS 101	Information Systems and Technology	3
CMIS 120	PC Operating Systems	3
CMIS 121	PC Repair & Diagnostics	3
CMIS 111V	Virtualization and Cloud Essentials	3
	Credits	**12**
Recommended Second Semester		
Select one of the following:		3
CMIS 218	Information Security	
CMIS 266	Cloud System Administration	3
CMIS 295	Cloud Security	3
	Credits	**9**
	Total Credits	**21**

Course Descriptions:

CMIS 101 - Information Systems and Technology (3)
Gen Ed Computer Literacy
Prerequisites: ENGL 70 *or* ENGL 75 *or (ESOL 72 and ESOL 73) or* ESOL 100 *OR Co-requisite:* ENGL 75 *or* ESOL 100
(formerly CIS 101)
Explores the fundamentals of information systems and relevant technologies. This course surveys the terminologies, types, components, functions, architectures, and development life cycle of information systems. Topics include roles, values, impacts, applications, security concerns, social issues, ethics, and responsibilities related to the use of information systems in businesses. Students also learn productivity applications, such as word processing, spreadsheet, presentation, and database software.

CMIS 111V - Virtualization and Cloud Essentials (3)
Prerequisite or Co-requisite: CMIS 101 *or* CMIS 120
(formerly CIS 111V)
Surveys the virtualization technology and applications. Introduces the business value and impact of virtualization and cloud computing, essential characteristics of cloud computing, cloud technologies and applications, cloud computing architecture, and cloud service models as well as cloud adoption and deployment. Topics include virtualization concepts, virtualization infrastructure, virtualization in cloud environment, business and technical perspective of cloud

computing, cloud models, cloud economics, cloud computing services, and application as well as adoption and deployment of cloud computing. Covers the objectives of Amazon Web Services (AWS) Certified Cloud Practitioner exam and CompTIA Cloud Essentials certification exam.

CMIS 120 - PC Operating Systems (3)
Prerequisite or Co-requisite: CMIS 121 *or CIS 212*
(formerly CIS 111M)
Explores the installation, configuration, and operations of operating systems. Students learn to set up, configure, troubleshoot, and maintain hardware devices and software applications on an operating system. Covers the objectives of CompTIA A+ certification exam. It is required that students take this course and CMIS 121 PC Repair & Diagnostics in the same semester.

CMIS 121 - PC Repair & Diagnostics (3)
Prerequisite or Co-requisite: CMIS 120 *or CIS 111M*
(formerly CIS 212)
Introduces diagnosis and troubleshooting of personal computers. This course covers the hardware and software troubleshooting techniques, including diagnosis software, board replacement, storage, and memory troubleshooting. Covers the objectives of CompTIA A+ certification exam. It is required that students take this course and CMIS 120 PC Operating Systems in the same semester.

CMIS 218 - Information Security (3)
Prerequisite or Co-requisite: (CMIS 105 or CMSC 105) or (CMIS 106 or CMSC 130) or (CMIS 120 or CIS 111M)
(formerly CIS 218)
Covers the fundamentals of information security and assurance. Topics include cryptography, security architecture and controls, risk management and governance, disaster recovery planning and management, as well as security frameworks, standards, and policies. Students learn to protect information systems from unauthorized access in order to ensure confidentiality, integrity, and availability.

CMIS 266 - Cloud System Administration (3)
Prerequisite or Co-requisite: CMIS 111V *or* CMIS 120 *or CIS 111M*
(formerly CIS 266)
Explores administering cloud platforms and deploying applications on cloud platforms. Students learn to operate, manage, monitor, and secure cloud computing systems such as Amazon Web Services (AWS), as well as deploy and scale applications in cloud environments. Covers the objectives of AWS Certified SysOps Administrator Associate exam.

CMIS 295 - Cloud Security (3)
Prerequisite or Co-requisite: CMIS 111V *or* CMIS 266 *or (*CMIS 280 *or CIS 180) or (*CMIS 290 *or CIS 190)*
(formerly CIS 223)
Covers the essentials of the cloud security technologies, mechanisms, and standards/frameworks as outlined by Cloud Security Alliance (CSA) and National Institute of Standards and Technology (NIST) Cloud Computing Security Standards. Surveys cloud governance, certification compliance, and accreditation. Students learn to analyze risk in cloud environments

and cloud security solutions, create and secure public and private cloud instances, and secure cloud applications.

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

Not applicable to certificate program

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

No certification is required. Individual courses may prepare students for certification example in specific areas, such as CompTIA A+, Net+, Security+, Cloud+, AWS (varies).

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

   N/A

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 degree 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.**

Communication at the program and institutional level is accomplished through publication on the college website, brochures, semester schedules, and the College academic catalog. The College will provide resources to students in the program that other programs offer at the College to provide clear, complete, and precise information. Information regarding curriculum, courses, degree requirements, including suggested sequence pathways, program brochures and handbook, admission information, financial aid resources, and cost and payment policies are available on the college websites.

Information related to faculty/student interactions, assumption of technology competence and skills, technical equipment requirements, and the learning management system can be found under the “Resources” tab on the college website, https://www.frederick.edu.

Not only is it essential that the College measure student achievement, but it must also provide students with clear information on how they are expected to achieve each core learning outcome. This is accomplished at the course level through information communicated in the syllabi, which provides a simple matrix outlining the course outcomes being assessed by each graded assignment in a given course.

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.**

The FCC website is managed by the College marketing department and the academic catalog is managed by the Assistant Dean, Curriculum Systems and Scheduling. Updates of essential program and course information are made in collaboration with all College departments to include Teaching, Learning and Student Success, Student Affairs, Financial Aid, Registration and Records, Student Development, and Enrollment Services. This process ensures the materials available are clear and accurate and contain pertinent information regarding all program offerings and services available.

H. Adequacy of Articulation (effective December 2022, must include either a program-specific articulation agreement or a justification for why an articulation agreement is not feasible or applicable; the articulation agreement must be specific to the proposed academic program and must be with another public institution in Maryland.)

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

The certificate program supports pathways to further education at 4-year institutions. Students completing the Information Security and Assurance Certificate may apply these credits toward the STEM Technology A.A.S. degree at FCC, the Information Technology Specialist Area of Concentration within the STEM Technology A.A.S. degree at FCC, or transfer to surrounding 4-year institutions with Information Technology and/or Cybersecurity bachelor's degree programs. University of Maryland Global Campus (UMGC) accepts credits from the certificate program (agreement and degree maps attached in the Appendix).

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 degree title and field, academic title/rank, status (full-time, part-time, adjunct) and the course(s) each faulty member will teach (in this program).**

The proposed degree will require oversight by one full-time faculty member who also serves as the program manager. The current Program Manager has been managing the cybersecurity and IT Programs in various capacities of oversight for 11 years. Faculty in the cybersecurity and IT Pathways obtain credentials specific to their respective class assignments which make them uniquely suited for the classes assigned. All program faculty have appropriate degrees, applicable certifications, and practical experience in the field along with substantial teaching experience.

There are 3 full-time faculty members who teach 100% within the program pathways requirements. There is one other full-time faculty member who teaches some classes within the program's pathways. Therefore, the number of FTEs taught by full-time faculty is 3.4. There are 10 adjuncts that teach specialized classes that are required for the complex requirements of the program, at a total rate of 3 FTE. Therefore, we will have 53% of class credits taught by full-time faculty, and 47% taught by adjuncts.

Faculty Name	Appointment Type	Terminal Degree Title and Field	Academic Rank/Title	Status	Courses to be Taught
James Hatch	Faculty	M.S., Digital Forensics/Cyber Investigation; M.S., Information Technology; MBA	Associate Professor	Full-time	CMIS 101, CMIS 111V, CMIS 266, CMIS 295
Lisa Hawkins	Faculty	Ph.D., Information Technology	Professor	Full-time	CMIS 101, CMIS 120, CMIS 121
Susan Johnson	Faculty	B.S., Computer Science	Professor	Full-time	CMIS 101
Rebecca Parker	Faculty	M.S., Digital Forensics/Cyber Investigation	Associate Professor	Full-time	CMIS 111V, CMIS 120, CMIS 121
Melvin Baker	Adjunct	Maryland Masters Equivalent in IT	Adjunct	Part-time	CMIS 120, CMIS 121
David Bennett	Adjunct	M.S., Computer Forensics	Adjunct	Part-time	CMIS 111V, CMIS 218, CMIS 266, CMIS 295
Emily Corcoran	Adjunct	B.S., Biochemistry; A+ Certification; Turing School Certificate	Adjunct	Part-time	CMIS 120, CMIS 121
Rabiha Kayed	Adjunct	M.S., Computer Science	Adjunct	Part-time	CMIS 101
David Olson	Adjunct	M.S., Information Systems	Adjunct	Part-time	CMIS 111V, CMIS 266, CMIS 295
Antonio Punturiero	Adjunct	B.S., Cybersecurity; Multiple Industry Certifications	Adjunct	Part-time	CMIS 111V, CMIS 218, CMIS 295

Fernando Seminario	Adjunct	M.S., Information Systems; Networking; Several Certifications	Adjunct	Part-time	CMIS 120, CMIS 121
Stephani Stockman	Adjunct	M.S., Information Technology	Adjunct	Part-time	CMIS 101, CMIS 111V, CMIS 120, CMIS 121, CMIS 266, CMIS 295
Kevin Trigger	Adjunct	M.S., Computer Information Systems	Adjunct	Part-time	CMIS 101, CMIS 120, CMIS 121

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**

    b) **The learning management system**

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

Through the Center for Teaching and Learning (CTL) and the Diversity, Equity, and Inclusion office, Teaching, Learning and Student Success offers adjunct and full-time faculty a responsive, innovative system of professional development in teaching and learning that reflects the characteristics and needs of FCC students. Blackboard is used as the College's learning management system.

Pedagogy and evidence-based practices programming includes:

- New full-time faculty orientation, a yearlong series focused on introducing new full-time faculty to best practices in teaching and learning, and the policies, procedures, and practices of the College
- New adjunct faculty orientation, adjunct faculty professional development evenings, and for adjuncts only monthly themed gatherings
- Professional development services, provides teaching and learning resources, consultations, facilitates conference funding approval, houses Alternative Credit Approval Team (ACAT), and supports the organization of Academic Affairs Faculty and Leadership Retreats.
- Teaching and Learning Hours, four tracks of professional development sessions designed to inspire faculty to engage student minds and support their success through active learning, innovation, and scholarship, including Culturally Responsive Teaching and

Cultural and Global Competence Development; Scholarship of Teaching and Learning; Technology, Teaching and Innovation; and Faculty Leadership and Academic Management.

- CTL Faculty Scholars Program, designed to support the professional development needs of full-time and adjunct faculty by providing faculty subject matter experts the opportunity to create and deliver Teaching and Learning Hours in support of professional development priorities.
- Academic department chairs, program managers, and fellow faculty provide discipline specific training and professional development for adjunct and full-time faculty such as lab safety, clinical orientation, outcomes assessment, curricular requirements, and equipment use.
- Further, full-time faculty are supported in their pathways to promotion through the Faculty Appointment and Promotion Process. The myriad pathways to promotion include alternative credit options which are approved by ACAT.
- Finally, in collaboration with Human Resources Employee Development Advisory Team (EDAT) and other college stakeholders, Academic Affairs ensures that development of faculty and staff by supporting the orientation of new employees; the ongoing training of faculty and staff on college policies and procedures, business practices, wellness, and hiring.

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. *If the program is to be implemented within existing institutional resources,* include a supportive statement by the President for library resources to meet the program's needs.**

No new holdings will be needed for this program update. The Library has a robust collection of print and ebooks. Collection development guidelines are focused on supporting the curriculum of the College, and resources are allotted to fulfill faculty and program requests to update materials as needed. Additionally, as has already been done with the core learning materials for the main program-required courses, the IT Specialist program faculty have the ability to develop open educational resources for a variety of discipline-related topics. This capacity will further insulate the Library from being affected by this revision, as not only will the current program needs be fulfilled by current resources, any new resources that may be identified as necessary in the future will be able to be created in-house.

The President supports the adequacy of library resources to meet this program's needs. President Cheeck stated, "I fully support the updated IT Specialist program and confirm that our current library resources are sufficient to meet its needs. The College remains committed to providing ongoing support to ensure library collections continue to align with academic programs."

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

1. **Provide an assurance that physical facilities, 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. If the program is to be implemented within existing institutional resources, include a supportive statement by the President for adequate equipment and facilities to meet the program's needs.**

The program shares excellent facilities with the college's information technology and cybersecurity programs. This includes classroom/lab facilities fully equipped with computers and audiovisual instructional equipment. A robust virtual lab environment allows students to explore IT concepts digitally and helps keep the physical footprint of the program manageable, even as it expands.

The President of the College supports the adequacy of equipment and facilities to meet this program's needs. President Cheeck stated, "I affirm that the College's existing facilities and instructional resources are fully adequate to support the IT Specialist program. Classrooms, labs, and virtual environments are in place to meet current and future instructional needs, and the institution remains committed to maintaining and supporting these resources."

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**

The program is capable of distance education/fully online modalities, it is the policy of the program to have entry level classes in multiple modalities, some courses in the program may be offered online and all have a companion Blackboard course site wherein the in-person class is matched to the online/hybrid structure so there are no disparities between what is learned online versus hybrid. At the time of registration, all students will sign up for their myFCC account to gain access to the myFCC Student Portal, and are issued an FCC email address for electronic mail communication. During their respective orientations and regularly thereafter, students and faculty are strongly encouraged to sign up to the College emergency and closing alert system "FCC Alerts". In the event of a campus emergency or weather-related school closing, FCC Alert subscribers receive text, phone call, and/or email notifications.

FCC utilizes Blackboard as its Learning Management System (LMS) and provides IT assistance to students for technological support. Blackboard LMS allows faculty to administer and teach courses online by providing students with access to course materials and the ability to interact with their peers/faculty through the LMS. Blackboard Collaborate is the primary web conferencing platform for instruction. Zoom is also available for programs with specific requirements that cannot be met through Blackboard Collaborate. All faculty are issued an FCC email and expected to communicate with students through either the College's email or the LMS communication features.

The student portal has easy access links to the LMS Online Learning tool, Microsoft Outlook Email, PeopleSoft Registration and Student Account, IT Help Desk, and more.

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					
Resource Categories	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**
1. Reallocated Funds	$0	$0	$0	$0	$0
2. Tuition/Fee Revenue (c + g below)	$166,264	$184,744	$207,830	$228,627	$279,433
a. Number of F/T Students	20	22	25	27	33
b. Annual Tuition/Fee Rate	$4,606	$4,606	$4,606	$4,606	$4,606
c. Total F/T Revenue (a x b)	$92,120	$101,332	$115,150	$124,362	$151,998
d. Number of P/T Students	32	36	40	45	55
e. Credit Hour Rate	$165.50	$165.50	$165.50	$165.50	$165.50
f. Annual Credit Hours	14	14	14	14	14
g. Total P/T Revenue (d x e x f)	$74,144	$83,412	$92,680	$104,265	$127,435
3. Grants, Contracts & Other External Sources	$0	$0	$0	$0	$0
4. Other Sources	$0	$0	$0	$0	$0
TOTAL (Add 1 – 4)	$166,264	$184,744	$207,830	$228,627	$279,433

RESOURCES NARRATIVE RATIONALE

Reallocated Funds
No funds will need to be reallocated.

Staffing (Administrative, Faculty, and Support)
Currently the program has in place 4 full-time faculty members who teach courses within the certificate program and the related cybersecurity and IT pathways, as many courses are shared across programs. We suggest a simple 50% in IT Spec and 50% in cybersecurity, however it depends on teaching assignment from semester to semester. 1 full-time faculty member who teaches is about 40% committed to the two programs, and 10 adjuncts who will be used to teach courses within the IT Specialist program and the Cybersecurity program. We have one administrative and one support staff who are already assigned to work and support this program in addition to several others, and will continue to be. We anticipate no additional funding will be required in its current configuration. We reserve the opportunity to request additional funds should the landscape change requiring additional hardware and miscellany in support of program outcomes.

Tuition and Fee Revenue
Tuition revenue is estimated using projected enrollments from section C.4. with full-time and part-time students calculated based on the average percentage of full-time (38%) and part-time (62%) students at FCC and the average number of credits taken by full-time (28 credits/year) and part-time (14 credits per year). Tuition and fees were estimated at the current in-county rate of $165.50/credit.

Grants and Contracts
Not applicable

Other Sources
Not applicable

Total Year
No assumptions have been made for tuition, fees, salaries or general expenditure cost and increases.

It is important to note that the revenue estimated here is for enrollments in this program only, but the expenses in Table 2 represent expenses across multiple information technology programs. Because faculty teach across multiple programs with many shared courses, the costs are co-mingled.

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:					
Expenditure Categories	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**
1. Faculty (b + c below)	$177,954	$183,315	$188,815	$194,479	$200,314
a. Number of FTE	6.4	6.4	6.4	6.4	6.4
b. Total Salary	$145,924	$150,302	$154,811	$159,456	$164,239
c. Total Benefits	$32,029	$33,013	$34,004	$35,024	$36,075
2. Admin. Staff (b + c below)	0	0	0	0	0
a. Number of FTE	0	0	0	0	0
b. Total Salary	0	0	0	0	0
c. Total Benefits	0	0	0	0	0
3. Support Staff (b + c below)	$30,790	$31,656	$32,606	$33,595	$34,591
a. Number of FTE	0.4	0.4	0.4	0.4	0.4
b. Total Salary	$23,009	$23,699	$24,410	$25,142	$25,896
c. Total Benefits	$7,781	$7,957	$8,196	$8,453	$8,695
4. Technical Support and Equipment	0	0	0	0	0
5. Library	0	0	0	0	0
6. New or Renovated Space	0	0	0	0	0
7. Other Expenses	0	0	0	0	0
TOTAL (Add 1 – 7)	$208,744	$215,971	$221,421	$228,074	$234,905

PROGRAM EXPENDITURES NARRATIVE RATIONALE

Faculty

The students in the IT Specialist program are not the only students taking the classes in the program as listed above in section G. The faculty teaching the classes are therefore not only teaching IT specialist students. We have therefore estimated what proportion of the students the faculty members teach each year that are in the IT specialist program and used that proportion of the faculty members' full-time salaries for the above table. Using the total number of credits anticipated to be taken by IT Specialist students, and historical data on the total number of student credits taken overall by students in the listed courses, we estimate that 23% of the enrollment credits will come from IT Specialist students. Table 2 therefore uses 23% of the faculty member's salary and benefits in determining expenditures for teaching these students.

There are 2 full-time faculty members who teach 100% within the program pathways requirements. There is one other full-time faculty member who teaches some classes within the

program's pathways. Therefore, the number of FTEs is rated for the first two years at 3.4. There are 10 adjuncts that teach specialized classes that are required for the complex requirements of the program, at a rate of 3 FTE, for a total of 6.4 FTE. Ultimately, faculty across the Pathways that are intertwined teach over 1,000 student enrollments per semester.

Costs for salaried faculty include salary and 3% COLA added to current salary for year 1 and then each year after (Year 1 = $64,924, Year 2 = $66,872, Year 3 = $68,878, Year 4 = $70,945, Year 5 = $73,073). The total salary also includes adjunct faculty pay (Year 1 = $81,000, Year 2 = $83,430, Year 3 = $85,933, Year 4 = $88,511, Year 5 = $91,166), which is based on a projected cost of 90 adjunct credits in each academic year at approximately $900 per credit.

The benefits for full-time faculty are based on 7.65% FICA and 27% benefits (Year 1 = $25,832, Year 2 = $26,631, Year 3 = $27,430, Year 4 = $28,253, Year 5 = $29,101). Total benefits also include FICA for adjuncts at 7.65% (Year 1 = $6,197, Year 2 = $6,382, Year 3 = $6,574, Year 4 = $6,771, Year 5 = $6,974) but no benefits for adjuncts.

Administrative Staff

The full-time faculty member is also the program manager. The Academic Office Manager for this area is accounted for under Support Staff.

Support Staff

These figures combine costs of two employees providing support divided over 5 programs. The salaries include a 3% COLA added in each year. The salaries and the cost of benefits are divided over the 5 programs they support. It should be noted that each of the other four programs these individuals support is larger, and therefore consumes more of their time, than Computer Science; these figures are, therefore, conservative and should be thought of as upper bounds.

Other Expenses

Not applicable

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.**

In addition to the standard surveys and evaluations run by the college, each core course conducts a Retrospective discussion with the students at the end of each term, in which their feedback is respectfully solicited and discussed. Many valuable improvements have already come out of these conversations.

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.**

Continuous Program Evaluations					
Data for Review	**Frequency**	**Timeframes**	**Data Source**	**Data Collector**	**Reporting**
Student Course Evals	Each semester	1 week after term ends	Evaluation Kit in Blackboard	Faculty and HES Program Manager	Included in faculty evaluations, faculty meetings, PAC Meetings
Faculty Observations/ Evaluations	Annually for faculty	Faculty evaluations – week after term ends	Direct classroom observations, student course evals	Program Manager	Annual Faculty Evaluation
Graduation Exit Survey	Annually	Last week of graduation term	Survey results	Program Manager	Faculty Meetings, PAC Meetings
6-month graduate survey	Annually	6-months following end of graduation term	Survey results	Program Manager	Faculty Meetings, PAC Meetings
Enrollment Data	Each semester	1 week after term start	PeopleSoft (PS)	Program Manager	Faculty Meetings, PAC Meetings
Graduation Data	Annually	June	PS/OPAIR	OPAIR Staff	Faculty Meetings, PAC Meetings
Retention Rate	Annually	June	PS/OPAIR	OPAIR staff	Faculty Meetings, PAC Meetings

Data for Review	Frequency	Timeframes	Data Source	Data Collector	Reporting
Completion Rate	Annually	June	PS/OPAIR	OPAIR Staff	Faculty Meetings, PAC Meetings
Program Mission, Goals, Student Learning Outcomes	Annually	Fall PAC Meeting	Various	Program Manager and other faculty	Website, Faculty meetings, PAC Meeting
Formal Program Review	Every 5 years	October-June	All data sources identified	Faculty; PAC subcommittee	PAC Meetings; Dean of Health, Business, Technology, and Science
Additional Tracking	Ongoing	Throughout each term		HES Faculty and Staff	

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.

FCC has long been committed to the recruitment and retention of minority students and providing a learning environment that is open, welcoming, and supportive of cultural diversity. Its strategic plan includes the following goals:

- *strengthen faculty and staff technology skills, cultural competence, instructional effectiveness, leadership, and innovation*
- *eliminate the achievement and opportunity gaps for underrepresented students and emerging populations*
- *increase student cultural and global competence through innovation and alignment of curricular and co-curricular programming.*
- *optimize enrollment in all learning environments with intentional focus on underrepresented and emerging populations by enhancing access, improving success, and accelerating completion.*

We believe that this new program strongly supports these goals. The new program emphasizes hybrid instruction and one-on-one tutoring (in labs) which is better suited to these students' needs than a strictly online format. It provides a solid foundation in problem solving and programming skills spread over three semesters as opposed to two, which is a more accessible learning curve. Likewise, removing unnecessarily difficult "gate" coursework in the initial semester and replacing it with additional field-relevant skills helps to broaden access, and minimize the deterrence of a minority student who may see a gate course like that as reinforcement that they aren't welcome or "don't belong" in the IT space.

With the emphasis on pair programming and group work, the new program allows minority students to be paired up with those who may have enjoyed stronger high school preparation, which is to the benefit of both. And by replacing job-irrelevant content with additional courses leading to new certifications in the field, the pathway from start to success (whether career or transfer) for minority students involves fewer detours, and provides a stronger base of skills from which to succeed.

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. The proposed program is not related to an identified low productivity program.

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.**

While the proposed program is not a distance education/fully online, program, FCC has been approved to offer distance education programs by both the Maryland Higher Education Commission and the Middle States Commission on Higher Education.

Quality assurance of the online courses is maintained formally with the Quality Matters (QM) course review protocol. The Colleges Institutional Values, Mission, Vision, and Strategic Goals guide the delivery of all instruction regardless of the delivery format. For more than 15 years, the College has demonstrated a commitment to offering a successful, high-quality online program with an appropriate academic and technical infrastructure.

Online learning has become an integral part of teaching and learning at FCC. Budget allocations support curriculum development, Quality Matter course reviews, faculty training, and learning object database subscriptions. As part of the Center for Teaching and Learning, the Online Learning and Learning Innovation (OLLI) unit is fully integrated into the curriculum, governance, and administrative processes of the College. FCC faculty teaching online courses receive individual training and course development and guidelines from OLLI.

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

In compliance with C-RAC guidelines, all online instructors are subject to a peer course evaluation, and instructors can apply for Quality Matters certification. Students evaluate each course at the end of each semester. Program managers, department chairs, the AVP/Deans in Academic Affairs and the Provost have access to each student course evaluation in their area. Student feedback is used for course and program improvement, and faculty are expected to reflect on student evaluations in their annual self-evaluation. Program-level evaluation for Distributed Learning is ongoing and is documented in detail in a series of annual or bi-annual reports by the Center for Distributed Learning. The Quality Matters (QM) Peer Review protocol is at the center of the College's quality assurance efforts in course design. The QM protocol is based on a rubric with 43 key quality standards for an online course. The standards are used to peer-review existing online courses at FCC, to guide the design of new courses, and shape the training of online faculty. Sixty-nine percent of fully online courses have been formally QM reviewed.

A protocol for re-reviewing QM courses with expired review terms is in place. The College has made every effort to comply with relevant federal and state regulations for its Program of Online Courses, for example, the efforts to comply with Substantive Change in Degree Programs, ADA compliance requirements, compliance with the federal definition of a Credit Hour, compliance with current copy right provisions, and USDOE's State Authorization Regulations. As a member of Maryland Online (MOL), FCC is part of two interconnected contractual arrangements with MOL and Quality Matters (QM). The MOL course-sharing initiative (Seatbank) provides students from different Maryland Community Colleges with greater access to distance learning opportunities. Colleges share distance learning courses with the expectation that the shared courses meet the same quality standards as articulated in the rubric updated biannually for QM's peer review process.

APPENDIX – Articulation Agreement with UMGC and Degree Maps for Information Technology Specialist Area of Concentration (which this certificate falls under)

Frederick Community College

FCC ASSOCIATE OF APPLIED SCIENCE (CAREER) IN STEM TECHNOLOGY INFORMATION TECHNOLOGY SPECIALIST AREA OF CONCENTRATION

See community college advisor for course sequencing. Bachelor's degree requirements may change based on date of initial UMGC enrollment.

UNIVERSITY OF MARYLAND GLOBAL CAMPUS

UMGC BACHELOR OF SCIENCE IN APPLIED TECHNOLOGY

UMGC Maryland Community College Alliances

CREDITS	FREDERICK COMMUNITY COLLEGE Requirements for Associate's Degree	UNIVERSITY OF MARYLAND GLOBAL CAMPUS Requirements for Bachelor's Degree
3	ENGL 101 Gen Ed requirement	WRTG 112 (Gen Ed Communications; *must be completed with C- or better*)
3	MATH 120 recom'd Mathematics Gen Ed requirement	STAT 200 (Gen Ed Mathematics)
3	CMIS 101 Program requirement	IFSM 201 (Gen Ed Computing)
3	CMIS 120 Program requirement	♦ CMIT elec. (1st major any-level; *same*^ primary computing focus area)
3	CMIS 121 Program requirement	♦ CMIT 202 (2nd major any-level; *same*^ primary computing focus area)
3	Arts Gen Ed elective	Gen Ed Arts & Humanities
3	Humanities Gen Ed elective	Gen Ed Arts & Humanities
3	CMIS 111V Program requirement	CMIT 326* (elective)
3	CMIS 200 Program requirement	CMIT elective
3	CMIS 280 Program requirement	CMIT 265 (elective)
4	Biological & Physical Sciences w/ Lab recom'd Gen Ed elect	Gen Ed Biological & Physical Science Lab Science
3	Communication Gen Ed elective	Gen Ed Communications
3	CMIS 179 or CMIS 218 Program requirement	♦ CSIA 300* or CSIA elec. (req. for major; outside of primary focus area)
3	CMSC 105 Program requirement	♦ CMSC 105 (required for major; outside of primary focus area)
3	CMIS 266 Program requirement	CMIT elective
3	CMIS 203 Program requirement	♦ IFSM 461* (required for major; outside of primary focus area)
3	Social & Behavioral Sciences Gen Ed elective	Gen Ed Behavioral & Social Science
3	NUTR 200 P. E., Health, or Nutrition recom'd Gen Ed elect	NUTR 100 (Gen Ed Biological & Physical Science Science)
3	BMGT 281 recom'd Approved Program elective	♦ BMGT elective (required for major; outside of primary focus area)
2	Approved Program elective	Elective
60	**Total Credits Transferred**	**Total Credits Transferred**

REMAINING REQUIREMENTS FOR BACHELOR'S DEGREE	CREDITS
LIBS 150 Introduction to Research or any Gen Ed credit (to be fulfilled with 1 Gen Ed credit from FCC)	---
PACE 111T Program and Career Exploration in Technology or any PACE 111	3
WRTG 111 Foundations of Writing and Communication or any writing Gen Ed Communications (not 288, 388, 486A/B)	3
ECON 103 Economics in the Information Age or any Gen Ed Behavioral & Social Science	3
WRTG 393 Advanced Technical Writing or any upper-level writing (Gen Ed Communications)	3UL
Elective	3
♦ Any upper-level CMIT course (3rd major upper-level; *same*^ primary computing focus area)	3UL
Elective	3
Elective	3
Elective	3
♦ Any course in any discipline (required for the major; outside of the primary focus area)	3
Elective	3
Elective	3
Elective	3
Elective (must be taken upper-level)	3UL
♦ Any course in any discipline (required for the major; outside of the primary focus area)	3
Elective	3
Elective (must be taken upper-level)	3UL
Elective	3
♦ APTC 495 Applied Technology Capstone (required capstone for the major)	3UL
Elective	3
TOTAL CREDITS REMAINING AT UMGC	**60**

NOTES: Degree requirements and course articulations may change based on initial UMGC enrollment—check with a UMGC advisor in your transfer year to confirm / Minimum of 120 credits, including 30 with UMGC of which at least 15 must be upper-level, are required for the bachelor's degree with a UMGC grade point average (GPA) of 2.0 (C) or higher / UMGC does not accept grades below C (2.0) in transfer from schools outside the University System of Maryland and Maryland community colleges (except WRTG 112, which must be completed with a grade of C– (1.67) or better from all schools) / Maximum of 70 transfer credits to UMGC from two-year or community colleges and maximum of 90 transfer credits from all sources combined (actual number of transfer credits dependent on meeting all UMGC bachelor's degree requirements) / ♦[1] = Major core, major elective, or capstone: all courses within the major require a grade of C (2.0) or higher, and all majors (except APTC, GECU, and CJLE, which require only the capstone as UMGC graded coursework) must complete at least half of these as 1) traditional college courses earning a grade and 2) UMGC resident credit / *[2] = Lower-level course meets content requirement of upper-level course but does not transfer as upper-level / **UL**[3] = Upper-level course (numbered 300-499) / ^[4] = Primary focus areas: ARIN, CMIT, CMSC, CMST, CSIA, CYOP, DATA, DRON, IFSM

[1] ♦ Major core, major elective, or capstone
[2] * Lower-level course meets content requirement of upper-level course but does not transfer as upper-level
[3] UL Upper-level course (numbered 300-499)
[4] ^ Primary focus areas: ARIN, CMIT, CMSC, CMST, CSIA, CYOP, DATA, DRON, IFSM

Frederick Community College

FCC ASSOCIATE OF APPLIED SCIENCE (CAREER) IN STEM TECHNOLOGY INFORMATION TECHNOLOGY SPECIALIST AREA OF CONCENTRATION

See community college advisor for course sequencing. Bachelor's degree requirements may change based on date of initial UMGC enrollment.

UNIVERSITY OF MARYLAND GLOBAL CAMPUS

UMGC BACHELOR OF SCIENCE IN CYBERSECURITY TECHNOLOGY

UMGC Maryland Community College Alliances

CREDITS	FREDERICK COMMUNITY COLLEGE Requirements for Associate's Degree	UNIVERSITY OF MARYLAND GLOBAL CAMPUS Requirements for Bachelor's Degree
3	ENGL 101 Gen Ed requirement	WRTG 112 (Gen Ed Communications; *must be completed with C- or better*)
3	MATH 120 recom'd Mathematics Gen Ed requirement	STAT 200 (Gen Ed Mathematics)
3	CMIS 101 Program requirement	IFSM 201 (Gen Ed Computing)
3	CMIS 120 Program requirement	CMIT elective
3	CMIS 121 Program requirement	♦ CMIT 202 (required for the major)
3	Arts Gen Ed elective	Gen Ed Arts & Humanities
3	Humanities Gen Ed elective	Gen Ed Arts & Humanities
3	CMIS 111V Program requirement	♦ CMIT 326* (required for the major)
3	CMIS 200 Program requirement	CMIT elective
3	CMIS 280 Program requirement	♦ CMIT 265 (required for the major)
4	Biological & Physical Sciences w/ Lab recom'd Gen Ed elect.	Gen Ed Biological & Physical Science Lab Science
3	Communication Gen Ed elective	Gen Ed Communications
3	CMIS 179 or CMIS 218 Program requirement	CSIA 300* (elective) or CSIA elective
3	CMSC 105 Program requirement	CMSC 105 (elective)
3	CMIS 266 Program requirement	CMIT elective
3	CMIS 203 Program requirement	IFSM 461* (elective)
3	Social & Behavioral Sciences Gen Ed elective	Gen Ed Behavioral & Social Science
3	NUTR 200 P. E., Health, or Nutrition recom'd Gen Ed elect.	NUTR 100 (Gen Ed Biological & Physical Science Science)
3	CMIS 111L recom'd Approved Program elective	♦ CMIT 291 (required for the major)
3	CMIS 281 recom'd Approved Program elective	♦ CMIT 320* (required for the major)
61	**Total Credits Transferred**	**Total Credits Transferred**

REMAINING BACHELOR'S DEGREE REQUIREMENTS	CREDITS
LIBS 150 Introduction to Research or any Gen Ed credit (to be fulfilled with 1 Gen Ed credit from FCC)	---
PACE 111T Program and Career Exploration in Technology or any PACE 111	3
WRTG 111 Foundations of Writing and Communication or any writing Gen Ed Communications (not 288, 388, 486A/B)	3
ECON 103 Economics in the Information Age or any Gen Ed Behavioral & Social Science	3
♦ CMIT 321 Ethical Hacking (required for the major)	3UL
Elective	3
♦ CMIT 351 Switching, Routing, and Wireless Essentials (required for the major)	3UL
Elective	3
WRTG 393 Advanced Technical Writing or any upper-level writing (Gen Ed Communications)	3UL
Elective	3
♦ CMIT 421 Threat Management and Vulnerability Assessment or any upper-level CMIT (required for the major)	3UL
Elective	3
Elective	3
♦ CMIT 386 Penetration Testing and Cyber Red Teaming or any upper-level CMIT (required for the major)	3UL
Elective	3
Elective	3
♦ CCJS 321 Digital Forensics in the Criminal Justice System or any upper-level CMIT (required for the major)	3UL
Elective	3
Elective	3
♦ CMIT 495 Cybersecurity Technology Capstone (required capstone for the major)	3UL
Elective	2
TOTAL CREDITS REMAINING AT UMGC	**59**

NOTES: Degree requirements and course articulations may change based on initial UMGC enrollment—check with a UMGC advisor in your transfer year to confirm / Minimum of 120 credits, including 30 with UMGC of which at least 15 must be upper-level, are required for the bachelor's degree with a UMGC grade point average (GPA) of 2.0 (C) or higher / UMGC does not accept grades below C (2.0) in transfer from schools outside the University System of Maryland and Maryland community colleges (except WRTG 112, which must be completed with a grade of C– (1.67) or better from all schools) / Maximum of 70 transfer credits to UMGC from two-year or community colleges and maximum of 90 transfer credits from all sources combined (actual number of transfer credits dependent on meeting all UMGC bachelor's degree requirements) / ♦[1] = Major core, major elective, or capstone: all courses within the major require a grade of C (2.0) or higher, and all majors (except APTC, GECU, and CJLE, which require only the capstone as UMGC graded coursework) must complete at least half of these as 1) traditional college courses earning a grade and 2) UMGC resident credit / +[2] = Business core course or major related requirement / *[3] = Lower-level course meets content requirement of upper-level course but does not transfer as upper-level / **UL**[4] = Upper-level course (numbered 300-499)

[1] ♦ Major core, major elective, or capstone
[2] + Business core course or major related requirement
[3] * Lower-level course meets content requirement of upper-level course but does not transfer as upper-level
[4] UL Upper-level course (numbered 300-499)