Frederick Community College

May 1, 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: **Computer Science Associate of Science (A.S.)**

This modification represents a major revision to a program that has not been significantly updated since 2003. The revised degree aligns with current University System of Maryland transfer expectations and meets industry demands for applied, project-based learning. It features a streamlined course sequence, new milestone programming courses, and a capstone team project. The program also emphasizes access and affordability using open educational resources (OERs), extensive lab support, and enhanced academic pathways.

The updated curriculum will better prepare students to transfer to four-year institutions in computer science and related disciplines and provides them with the skills needed for entry-level employment in the technology sector.

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 **$250** 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)

Office Use Only: PP#

# 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 # 205249 | Payment Amount: $250 | Date Submitted: 5/1/25

| | | |
|---|---|---|
| Department Proposing Program | Computing & Business Technology | |
| Degree Level and Degree Type | Associate of Science (A.S.) | |
| Title of Proposed Program | Computer Science | |
| Total Number of Credits | 60-65 | |
| Suggested Codes | HEGIS: 4980.01 | CIP: 11.0101 |
| 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 |
| 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 L P Cheek | Date: 4/29/25 |
| | Date of Approval/Endorsement by Governing Board: | 04/23/2025 |

Revised 1/2021

**MHEC Academic Program Proposal**
**Frederick Community College**
**Computer Science Associate of Science (A.S.) Degree**
**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 Associate of Science in Computer Science (A.S.) transfer degree, as here revised, is designed to prepare students to transfer to 4-year institutions where they can continue their education to bachelor's and subsequently to master's degree programs in computer science and related fields and enter into professional careers in these fields thereafter. It emphasizes skills that will serve students well both in 4-year programs and in professional work. The degree supports the mission of Frederick Community College, focusing on teaching and learning, and providing affordable, flexible access to lifelong education that responds to the needs of diverse learners and the community.

The new program's revised core course sequence responds to the needs of diverse learners and the community by removing out of date content and ensuring that students receive the most current, applicable skillsets to succeed in their future goals. Designed to align with the modern transfer standards of the University of Maryland system and other nearby institutions, the revised program will improve both affordability and flexibility by maximizing the transferability of credits earned and skills learned to the state's receiving institutions.

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

FCC previously offered numerous programs in the area of computer science and IT/Cyber under various titles. Over time, most of these programs became outdated and the range of overlapping offerings created confusion for both students and advisors. In response, this revision consolidates FCC's computer science programs into a single, streamlined pathway. Additionally, Information Technology and Cybersecurity are being separated from Computer Science to provide clearer distinctions between the fields. As part of this effort, departmental Computer Science courses are also being thoroughly updated to reflect current industry standards and academic expectations as the departmental courses for Computer Science had not been updated since 2003. These updates also align with the current needs of 4-year schools and employers, providing students with the best chance to succeed.

The proposed program revisions directly support the mission of Frederick Community College by helping students meet their career goals and working towards continuous improvement with 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 new program have frequent access to instructors in a drop-in lab setting for support on their assignments. Homework can be revised in accordance with instructor comments and then resubmitted for regrading. The college maintains a system of student success alerts which can activate support services where those are needed to overcome problems such as transportation, food, housing, or mental well-being.

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

   The new program's end goal is clearer and more specific, and the learning pathway is better defined. Students now have a program focused on the goal that aligns with transfer schools, and a pathway which better supports that goal of degree completion. All materials in the core courses are now OER materials free to students. Students have daily access to an open lab where they can use the FCC computers and access faculty input/ feedback.

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

   Excellence requires a curriculum that is in line with current demands of both four-year schools and industry. The new program provides that. Excellence in delivery requires comprehensive and well-defined master courses, which the new program provides. In contrast to the old program's approach – which was too broad – the new one has a clear and agreed upon definition of how the basics of computer science should be taught at each step of the core sequence. The master courses and course materials embody this.

**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 proposed program will be funded by tuition and fees collected by students enrolled within the program. FCC currently has sufficient full-time and part-time faculty and administrative staff to meet the needs of the program, so no new hiring will be necessary. The classroom and lab facilities already used by the existing program will be sufficient for the new one. While new courses are being created in this revision, they are replacing courses of generally equal credit load in the program requirements, so the existing roster of faculty and staff will also continue to be sufficient.

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

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

The faculty member currently overseeing the Computer Science program is a recognized subject matter expert in the field of Computer Science and brings valuable experience from the programming and engineering industries. The faculty member reports to the Associate Vice President for Teaching, Learning and Student Success/Dean of Health, Business, Technology, and Science and leads the development of specific curriculum and courses, procurement of programmatic equipment and supplies, and actively contributes to the ongoing administrative, financial, and technical support of the proposed programs. The program is supported by an academic office manager who is shared with the IT, Cyber, and Business programs. These roles are established and fully funded by FCC, reflecting the institution's willingness to ensure the program's 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 and anticipates the continuation of this proposed program beyond the time needed for students to complete the program. In alignment with Maryland regulations, College policy allows up to a five-year teach-out period and program faculty, staff, and advisors have all been briefed on the effort and resources necessary to ensure this outlet is provided effectively to students, with no concerns raised about feasibility. In addition, the College offers a variety of support programs including tutoring, academic success, program specific advisors, and faculty advisors, all of which will be made readily and visibly available to students navigating any difficulties in completing the old program or transitioning to the new one.

**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**

FCC's Computer Science degree last had a major revision in 2003. Twenty-two years is an exceedingly long time in the technology field. During that time, the terrain of the field has changed significantly. Entrance to four-year programs is now highly competitive, as is the job market. The curricula of four-year programs now emphasize problems rooted in real-world experience. There is now a strong emphasis on collaborative work, following the introduction of agile development methods (2001) which are now the industry standard. The proposed revised degree program squarely aligns with all of these.

The revisions support that mission area by providing students with an educational path to be trained to a high skill level in practices proven in industry and employed in four-year programs.

While demand for graduates in computer science and related fields is strong (as documented in the following sections), competition in these job markets is difficult. This is because of the growing number of graduates across computer science programs nationwide, and a trend toward outsourcing and globalization which has affected this industry as it has affected others. By aligning our program with current demands of four-year schools and current industry demands (including best practices), students will have the best chance to compete.

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**

Students attempting to learn computer science and other technical fields often find the subject very challenging at the outset. A core feature of FCC's program is that work is evaluated and then returned to the student for rework. This competency-based approach follows the same practices students will later encounter when developing software in industry and allows students to overcome initial obstacles as well as develop iterative habits of thinking that will later become key job skills. (Success/Innovation)

Unfortunately, not all students have access to high school computer science programs of equal quality, or which satisfy the educational demands for entry to four-year schools. FCC's proposed revised program fills this gap, helping to provide our region's students with an affordable entry to more intensive computer science studies and careers, regardless of their secondary school system's offerings. (Access, Success)

Along similar lines, the cost of learning materials in technical fields is often a barrier to students from lower-income families, who may find it difficult to afford textbooks that can easily cost more than $150. Existing texts are also often written from a theoretical, as opposed to a practical viewpoint, with an eye to the needs of four-year schools that may have a theoretical orientation. In response to these problems the computer science faculty have developed OER materials, free of charge to our students, aligned with the needs of our student populations and written from a practical, project-oriented point of view. These serve as the core learning materials for this revised degree program. (Access, Success, Innovation)

FCC also recognizes that students may not be able to afford, or have access to, their own computers. FCC maintains an open lab where students may work on school machines. This lab is staffed by instructors for a significant number of hours each week to provide help with assignments so that students can succeed. (Access/ Success)

**PRIORITY ALIGNMENT**

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

All the items discussed above work independently and collectively to improve an outdated program in a key subject area and revise it into one that meets the high-quality standards of a Maryland college education. The previous program courses were based on outdated content, and in some cases, allowed students to avoid challenging but essential subject areas. These deficiencies have been remedied.

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

The proposed new program creates a clear pathway to graduation and transfer with specific course requirements in sequential order. The previous program provided a smattering of courses that could often be confusing, and in which students completing one course did not always have proper preparation for the next. All these deficiencies have been fully remedied.

**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.**

Computer science graduates have the opportunity to be employed in both government and private industry (including government contractors). Leading industries that employ computer science graduates and are well-represented in Maryland include defense, healthcare (especially healthcare information), finance, engineering, applied science, law enforcement, and education. A computer science degree provides a very solid foundation for any kind of work based on computers and software, even if one does not end up working as a software engineer.

In the same way, the deployment of artificial intelligence (AI) solutions will increase the demand for computer science graduates, by making it possible to apply software in more and more problem areas. It is one thing to interact casually with a ChatGPT website, but quite a different thing to do a serious integration of AI or any other aspects of a software solution in real-world operations.

Deployment of AI into a problem area often requires other types of software for its support: for example, a driverless ridesharing service (which uses AI to do the driving) would also require an online reservation portal (which does not involve AI), as well as other types of software. The

fundamental skills of solving problems with computers, as taught in our program, will thus be, and remain extremely valuable, even as Maryland's tech industries evolve.

In his recent State of the State speech, Governor Moore emphasized his plans to make investment in IT industries, and his belief that these industries are essential to Maryland's success. As a result of these policies, we can expect even larger growth in this field than current projections might suggest.

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 from 2023 to 2033, with a projected 356,700 job openings annually across the nation. It should be emphasized that unlike many other occupations, the computer science field is not restricted to a local marketplace. Most jobs in the field are now done remotely. In that sense, students can compete for jobs offered anywhere in the world.

Forecasting the specific breakdown of occupations in this fast-changing field more than a few years out is dubious. Job titles and roles change rapidly in response to developing technology. The list below shows some of the most popular current ones for which our program would be a first step, and their average salaries in local markets (Maryland and neighboring states). These figures (rounded and in some cases averaged) are taken from online job-seeking sites such as Indeed.

These salary projections are for the Delaware-Maryland-DC-Virginia area, but graduates in this field also have access to global opportunities because of digital environments and remote work, which may allow them to access even larger salaries.

Junior Software Engineer - $99,500

Software Engineer - $117,500

DevOps Engineer - $145,000

Software Engineering Manager - $141,000

Software Quality Assurance Engineer - $138,000

User experience (UX) Engineer - $115,000

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.**

FCC is in close proximity to the Baltimore-Washington metropolitan area, with its large concentration of government (including contracting), defense, and healthcare related jobs.

In the area of healthcare, the article "Digital Transformation in Healthcare" (Journal of Public health, 15 Feb 2023) details the expanding opportunities in this area. Healthcare in recent years has seen an increasing adoption of technology to compensate for the shortage of practitioners combined with the healthcare demands of an aging population. This has led, among other things, to the rise of telemedicine, which was little used 20 years ago but is now employed by every large healthcare enterprise and many small ones. Other areas of improvement include smart systems to support healthcare professionals in doing their jobs. Our proposed program, in fact, includes assignments drawn from these specific problem areas. And there are many others.

A US Department of Defense article published February 23, 2021 documents the essential and expanding role of computer skills of all types in our national defense. It has been said that the way America will know we have lost the next war is when all the lights go out and won't come back on. Opportunities in this field, and its importance, are projected to continue increasing.

As discussed earlier, the Bureau of Labor statistics job opening projections nationally are approximately 350,000 per year, so assuming projected growth patterns hold, we could expect to see 1.75 million vacancies for roles fillable by students in this program over the next five years.

Also as noted earlier, most vacancies in this profession are not specific to one state or region. However, the University of Maryland reported the following with respect to its class of 2023 overall:

> The University of Maryland's Department of Computer Science reported a 96% job placement rate for the class of 2023, according to a survey conducted by the University Career Center. The data, which includes graduates from August and December 2022 and May 2023, shows that most students entered the workforce with competitive salaries.
>
> The survey collected responses from 562 of 840 graduates, with 84.7% joining the workforce. Most secured full-time positions, while 11.2% opted to continue their education. Only 1.2% of graduates remained unplaced, and 2.7% were still seeking employment or finalizing plans during the survey.
>
> Salaries for graduates entering full-time employment were competitive, with a median starting salary of $110,000.

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

   The following projections are based on actual numbers of graduates from predecessor programs at FCC. The other predecessor programs have been discontinued. We believe that as more and stronger articulation programs are put in place, the actual enrollment and graduation numbers will come to exceed these projections. We have projected growth using the two lowest rates of year-to-year growth in these programs over the preceding five years; therefore, we believe these numbers are conservative projections.

| | 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 Number of Graduates** | 42 | 50 | 59 | 70 | 84 |

This data will be collected by the Computer Science program manager and be reported to the Program Advisory Committee annually, as well as to the Health, Business, Technology, and Science Dean, 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 program. This lack of similar offerings extends even to our region's secondary schools: FCC typically enrolls a substantial number of high school students under dual enrollment programs, who do not have any other alternative through which to begin studying computer science.

In support of these observations, below is a list of all Associate Degree programs mentioning Computer Science, from the Academic Program Inventory located at mhec.maryland.gov. It will be noted that none of these institutions serve Frederick County.

**Keyword:** computer science
**Degree:** Associate Degree
Total: 18

| Institution | Program | Degree |
|---|---|---|
| Allegany College of Maryland | COMPUTER SCIENCE TRANSFER | Associate Degree |
| Anne Arundel Community College | COMPUTER SCIENCE - DATA SCIENCE | Associate Degree |
| Anne Arundel Community College | COMPUTER SCIENCE TRANSFER | Associate Degree |
| Anne Arundel Community College | COMPUTER SCIENCE, DATABASE MNGT SYSTEMS | Associate Degree |
| Carroll Community College | COMPUTER SCIENCE | Associate Degree |
| Cecil College | COMPUTER SCIENCE | Associate Degree |
| Cecil College | COMPUTER SCIENCE -PROGRAMMING | Associate Degree |
| Chesapeake College | COMPUTER SCIENCE TECHNOLOGY | Associate Degree |
| College of Southern Maryland | COMPUTER SCIENCE | Associate Degree |
| College of Southern Maryland | COMPUTER SCIENCE | Associate Degree |
| Community College of Balt County | COMPUTER SCIENCE | Associate Degree |
| Garrett College | COMPUTER SCIENCE | Associate Degree |
| Hagerstown Community College | COMPUTER SCIENCE | Associate Degree |
| Harford Community College | COMPUTER SCIENCE TRANSFER | Associate Degree |
| Howard Community College | COMPUTER SCIENCE TRANSFER | Associate Degree |
| Montgomery College-All Campuses | COMPUTER SCIENCE AND TECHNOLOGIES | Associate Degree |
| Prince George's Community College | COMPUTER SCIENCE | Associate Degree |
| Washington Adventist University | COMPUTER SCIENCE | Associate Degree |

A similar search for bachelor's degree (4-year) programs yields the following. Two of the listed institutions (Hood College and Mount St. Mary's University) are within Frederick County. As explained in the next item, our proposed program is intended as preparation for students who wish to transfer into programs such as these. Hood and Mount St. Mary's are both private institutions, and therefore not accessible to many of FCC's students for financial reasons. We have a draft articulation agreement in place with Mount St. Mary's, as noted elsewhere in this document.

**Keyword:** computer science
**Degree:** Bachelor's Degree
Total: 22

| Institution | Program | Degree |
|---|---|---|
| Bowie State University | COMPUTER SCIENCE | Bachelor's Degree |
| Capitol Technology University | COMPUTER SCIENCE | Bachelor's Degree |
| Coppin State University | COMPUTER SCIENCE | Bachelor's Degree |
| Frostburg State University | COMPUTER SCIENCE | Bachelor's Degree |
| Goucher College | COMPUTER SCIENCE | Bachelor's Degree |
| Hood College | COMPUTER SCIENCE | Bachelor's Degree |
| Johns Hopkins University | COMPUTER SCIENCE | Bachelor's Degree |
| Loyola University Maryland | COMPUTER SCIENCE | Bachelor's Degree |
| McDaniel College | COMPUTER SCIENCE | Bachelor's Degree |
| Morgan State University | COMPUTER SCIENCE | Bachelor's Degree |
| Mount St. Mary's University | COMPUTER SCIENCE | Bachelor's Degree |
| Salisbury University | COMPUTER SCIENCE | Bachelor's Degree |
| St. Mary's College of Maryland | COMPUTER SCIENCE | Bachelor's Degree |
| Towson University | COMPUTER SCIENCE | Bachelor's Degree |
| Univ. of Maryland Eastern Shore | COMPUTER SCIENCE | Bachelor's Degree |
| Univ. of Maryland University College | COMPUTER SCIENCE | Bachelor's Degree |
| Univ. of Maryland, College Park | COMPUTER SCIENCE | Bachelor's Degree |
| University of Maryland, Baltimore County | COMPUTER SCIENCE | Bachelor's Degree |
| Washington Adventist University | COMPUTER SCIENCE | Bachelor's Degree |
| Washington College | COMPUTER SCIENCE | Bachelor's Degree |
| Washington College | COMPUTER SCIENCE | Bachelor's Degree |
| Women's Institute of Torah Seminary & College | COMPUTER SCIENCE | Bachelor's Degree |

2. **Provide justification for the proposed program.**

The proposed Computer Science Associate of Science (A.S.) transfer degree is designed to prepare students to transfer to 4-year institutions where they can continue their education to bachelor's, master's and Ph.D. degree programs in computer science and related fields. FCC's goal is that credits earned under our program will transfer to computer science programs at the University of Maryland (College Park), University of Maryland Baltimore, County, Towson University, and similar schools.

While designed as a transfer degree, students are employable into entry level positions in the field upon completion of the associate degree and thus can work while pursuing their bachelors.

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

**Discuss the program's potential impact on the implementation or maintenance of high-demand programs at HBI's.**

The proposed new program may 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.

**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.**

The overall outcome for HBIs may be positive because any student of color who gets a better experience from this program may then add to the pool of available students targeted by those institutions' missions. The level of interaction between this program and any elements of Maryland 4-year HBIs should increase and, as 4-year institutions enhance academic offerings, the additions of this FCC 2-year program should improve transferability.

**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 revised program was authored primarily by Jonathan Southard, assistant professor, and program manager for computer science. There was extensive input from other members of the Computing and Business Technology Faculty.

Mr. Southard also obtained review and input from former professional colleagues with whom he had worked during his 35-year career as a software engineer, software team lead, and agile development coach and scrum master. (Mr. Southard holds a certification in the last-named area.) Review and input were also obtained from former colleagues on the computer science faculty of the University of California, Santa Barbara, at which he had been an adjunct instructor. The program changes were based in large part on a review and study of the current curricula of the University of Maryland (College Park) and University of Maryland, Baltimore County (UMBC)and Towson University.

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

**Program Learning Outcomes:**

Graduates will:

1. Develop computer software (including creating, augmenting, debugging, and testing).*

2. Demonstrate mathematical and reasoning skills needed for computer science.

3. Design and implement programming projects similar to those seen in the real world.

4. Demonstrate proficient communication (individual and group) and collaborative work, in the context of programming projects.

*These skills will be built progressively through the four required core courses.

These outcomes were closely modeled to those of the University of Maryland (College Park).

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

The College assesses student learning outcomes on an annual basis. The overall effectiveness of its academic programs is assessed using a well-structured five-year review process. The process consists 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 sequence of four milestone courses. In these courses, students progress from simple projects using procedural computer programming techniques, through larger and more difficult object-oriented and recursive programs. Students then study data structures and algorithms (in which they do a single semester-long project, in multiple parts), and finally to a capstone project course in which they work in teams. This parallels the learning sequence at four-year schools. All projects are drawn from current real-world application areas including medical informatics, computer simulation, probabilistic and statistical analysis, text processing, pattern printing and pattern matching, and cryptography. In the current capstone project, students build computer simulations of proposed solutions to the problem of traffic in Frederick County.

These four core courses are to be taught the same way by all instructors using a common master syllabus and shared OER materials authored by the faculty, guaranteeing a uniform student experience which meets program objectives.

The program has a strong math requirement, in line with our belief – shared by four-year schools – that a strong mathematical preparation is fundamental to success in this field. However, we provide pathways so that even students who had weak mathematical preparation in high school can succeed and complete the required courses, if they apply themselves.

## Computer Science A.S. Degree Program Requirements:

| | | |
|---|---|---|
| **English** | | |
| **ENGL 101** | **English Composition** | **3** |
| **Mathematics** | | |
| **MATH 185** | **Calculus I** [1] | **4** |
| **Social & Behavioral Sciences** | | |
| **Social & Behavioral Sciences Elective (Gen Ed course list)** [2] | | **3** |
| **Social & Behavioral Sciences Elective (Gen Ed course list)** [2] | | **3** |
| **Arts & Humanities** | | |
| **Arts Elective (Gen Ed course list)** | | **3** |
| **Humanities Elective (Gen Ed course list)** | | **3** |
| **Communication Elective (Gen Ed course list)** | | **3** |
| **Biological & Physical Sciences** | | |
| **Biological & Physical Sciences Elective (Gen Ed course list) (Lab course)** | | **4** |
| **Biological & Physical Sciences Elective (Gen Ed course list)** | | **3** |
| **General Education Required Elective** | | |
| **MATH 195** | **Calculus II** | **4** |
| **Physical Education, Health, or Nutrition Requirement** | | |
| **Select one PHED, HLTH, or NUTR course** | | **1** |
| **Departmental Requirements** | | |
| **CMSC 130** | **Programming Fundamentals** | **4** |
| **CMSC 131** | **Programming Methods and Object Design** | **4** |
| **CMSC 230** | **Data Structures and Algorithms** | **4** |

| | | |
|---|---|---|
| **CMSC 285** | **Programming Capstone Project** | **4** |
| **Electives** | | |
| **Select 10 credits from the following areas: CMIS, CMSC, MATH [3]** | | **10** |
| **Total Credits** | | **60** |

## Guided Pathway:

| **Recommended First Semester** | | **Credits** |
|---|---|---|
| **ENGL 101** | **English Composition [1]** | **3** |
| **MATH 185** | **Calculus I [1,2]** | **4** |
| **CMSC 130** | **Programming Fundamentals (Milestone)** | **4** |
| **Social & Behavioral Sciences Elective (Gen Ed course list)** | | **3** |
| | **Credits** | **14** |
| **Recommended Second Semester** | | |
| **MATH 195** | **Calculus II** | **4** |
| **CMSC 131** | **Programming Methods and Object Design (Milestone)** | **4** |
| **Humanities Elective (Gen Ed course list)** | | **3** |
| **Biological & Physical Sciences Elective (Gen Ed course list) w/lab** | | **4** |
| | **Credits** | **15** |
| **Recommended Third Semester** | | |
| **CMIS, CMSC, or MATH Elective [3]** | | **4** |
| **CMSC 230** | **Data Structures and Algorithms (Milestone)** | **4** |
| **Communication Elective (Ge Ed course list)** | | **3** |
| **Physical Education, Health, or Nutrition Requirement** | | **1,3** |
| **Arts Elective (Gen Ed course list)** | | **3** |
| | **Credits** | **15-17** |
| **Recommended Fourth Semester** | | |
| **CMSC 285** | **Programming Capstone Project** | **4** |
| **CMIS, CMSC, or MATH Elective [3]** | | **3-4** |
| **CMIS, CMSC, or MATH Elective [3]** | | **3-4** |
| **Biological & Physical Sciences Elective (Gen Ed course list)** | | **3-4** |

| | |
|---|---|
| **Social & Behavioral Sciences Elective (Gen Ed course list) (in a different discipline from first)** | **3** |
| **Credits** | **16-19** |
| **Total Credits** | **60-65** |

[1]

Take this course within the first 24 credits.

[2]

Prerequisite: MATH 165 Precalculus

[3]

If a student does not place into MATH 185, the appropriate prerequisite courses (MATH 145 and MATH 165) should be taken prior to MATH 185 and MATH 195, and can be used to toward fulfilling the CMIS, CMSC, or MATH electives requirement.
If a student does place into MATH 185, other CMIS, CMSC, or MATH courses should be taken to fulfill the electives instead.

## Course Descriptions for Core (Milestone) Courses:

**CMSC 130 - Programming Fundamentals (4)**
*Prerequisite or Co-requisite: MATH 145 or MATH 145S*
Introduces professional-level programming techniques, designed for individuals seeking foundational knowledge in programming or aspiring to enter the field of software development. Covers the fundamentals of how to write complete computer programs of moderate size and rooted in real-world problems, using basic data types, functions, loops, if-else statements, and objects. Students will learn top-down design, functional decomposition, mathematical and reasoning skills needed for computer science, software testing, and pair programming. Requires no previous programming experience.

**CMSC 131 - Programming Methods and Object Design (4)**
*Prerequisite: Grade of C or better in CMSC 130*
Prepares students to employ the principles of object-oriented programming (abstraction, encapsulation, polymorphism, and composition) in the construction of substantial programs rooted in real-world problems. Students will formulate objects (classes) to model entities in problem spaces; construct programs using the powerful technique of recursion; test code by the professional technique of unit testing; and discuss technical solutions in the context of pair programming and code reviews.

**CMSC 230 - Data Structures and Algorithms (4)**
*Prerequisite: Grade of C or better in CMSC 131*
Introduces the fundamentals of data structures and algorithms in the context of a large, real-world project. Focuses on linked allocation structures: trees, linked lists, and stacks, and the application and mathematical analysis thereof. Structured around a semester-long project in which students iteratively design, develop, and test a significant software project built around real-world needs.

**CMSC 285 - Programming Capstone Project (4)**
*Prerequisite: Grade of C or better in CMSC 230*
Design and implement a group project focused on a relatable, real-world problem. Develop a large piece of software 'from scratch' applying techniques taught in the course and learned in predecessor courses. Collaborate in a team setting of iterative (agile) development. This course will strongly prepare students for success in team-based work in both four-year education and industry.

## Course Descriptions for Required Math Courses:

**MATH 185 - Calculus I (4)**
Gen Ed Math
*Prerequisite: Grade of C or better in MATH 165 or MA 111*
(formerly MA 210)
Presents topics including functions, limits, continuity, the derivative concept, differentiation techniques (including product rule, quotient rule, chain rule, and implicit differentiation), applications of the derivative, and definite and indefinite integral concepts. The Fundamental Theorem of Calculus is discussed and used in the context of introductory integration. Intended for students in mathematics, science, engineering, medical, and other technical programs as the first course in the three-semester calculus sequence (MATH 185, MATH 195, MATH 285).

**MATH 195 - Calculus II (4)**
Gen Ed Math
*Prerequisite: Grade of C or better in MATH 185 or MA 210*
(formerly MA 211)
Presents the second of three courses in the calculus sequence. Topics include methods and applications of integration, improper integrals, sequences and series, Taylor approximations, and an introduction to differential equations.

## Course Descriptions for Other Required Courses:

**ENGL 101 - English Composition (3)**
Gen Ed English
*Prerequisites: Grade of C in ENGL 70 or ENGL 75 or (ESOL 72 and ESOL 73) or ESOL 100, students must enroll in both ENGL 100 and ENGL 101; Grade of B or better in ENGL 70 or ENGL 75 or (ESOL 72 and ESOL 73) or ESOL 100, students may enroll in ENGL 101 without ENGL 100 but may opt to co-enroll in ENGL 100 for additional reading support; or satisfactory performance on the writing assessment and the reading assessment*
(formerly EN 101)
Develops students' ability to use writing, reading, research, and thinking processes to create documented essays that demonstrate the conventions of academic writing.

**Course descriptions for additional CMIS, CMSC, and MATH electives options and General Education options are available on this catalog page:**

**https://frederick-public.courseleaf.com/credit-course-descriptions/**

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

General Education requirements will be met in the degree as outlined in the requirements section above.

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 a particular programming language.

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 program supports transfer articulations with surrounding 4-year institutions. This would allow FCC to create articulations with any public Maryland Universities that have a Computer Science bachelor's degree. A draft articulation agreement has been reached with Mt. St. Mary's University (included in the appendix with email correspondence between both institutions regarding the agreement). Similar agreements are in progress with Towson University and University of Maryland Baltimore County (UMBC).

**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 program manager worked in the software industry for 35 years, was formerly an adjunct instructor in the Computer Science department at the University of California and is a certified Scrum Master. Further, all other program faculty have appropriate degrees, applicable certifications, and practical experience in the field along with substantial teaching experience.

The following table lists faculty currently assigned to teach in the CMSC program and specific CMSC course(s) for which they are currently responsible. Only Computer Science (CMSC) courses are listed. In most cases, the faculty members' qualifications would allow them to teach other courses if needed.

| Faculty Name | Appointment Type | Terminal Degree Title and Field | Academic Rank/Title | Status | Courses for which currently responsible |
|---|---|---|---|---|---|
| Jonathan Southard | Faculty | M.S. Computer Science | Associate Professor | Full-time | CMSC 130, CMSC 131, CMSC 230, CMSC 285 |
| Susan Johnson | Faculty | M.S. Telecommunications | Professor | Full-time | CMSC 130, CMSC 105 |
| Stephen Sell | Adjunct | M.S. Computer Science | Adjunct | Part-Time | CMSC 130, CMSC 105 |
| Richard A. Young | Adjunct | B.S. Computer Science | Adjunct | Part-Time | CMSC 130 |
| Soham Patil | Adjunct | M.S. Computer Science | Adjunct | Part-Time | CMSC 130, CMSC 131 |
| Clayton Henry | Adjunct | M.S. Cybersecurity | Adjunct | Part-Time | CMSC 130 |

**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:

1. New full-time Faculty, Staff, and Administrator orientation, a yearlong series focused on introducing new full-time faculty and learning administrators to best practices in teaching and learning, and the policies, procedures, and practices of the College.

2. New adjunct faculty orientation, adjunct faculty professional learning events, and for adjuncts only monthly themed gatherings.

3. A myriad of professional learning events, provides teaching and learning resources, consultations, facilitates conference funding approval, houses Alternative Credit Approval Team (ACAT), and supports the organization of Teaching and Learning and Student Success Faculty and Leadership events.

4. Monthly teaching, learning excellence and innovation professional learning 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.

5. Academic department chairs, program managers, and fellow faculty provide discipline specific training and professional learning for adjunct and full-time faculty such as lab safety, clinical orientation, outcomes assessment, curricular requirements, and equipment use.

6. 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.

7. Finally, in collaboration with Human Resources Employee and other college stakeholders, 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 Computer Science 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 may be able to be created in-house.

The President supports the adequacy of library resources to meet this program's needs.

**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.

The President of the College supports the adequacy of equipment and facilities to meet this program's needs.

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**

While the proposed program is not delivered fully through distance education, some courses in the program may be offered online and/or have a companion Blackboard course site. 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 calls, and/or email notifications.

FCC utilizes Blackboard as its Learning Management System (LMS) and provides IT assistance to students for technological support. The 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.

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) | $133,938 | $159,341 | $187,061 | $223,993 | $267,876 |
| a. Number of F/T Students | 16 | 19 | 22 | 27 | 32 |
| b. Annual Tuition/Fee Rate | $4,606 | $4,606 | $4,606 | $4,606 | $4,606 |
| c. Total F/T Revenue (a x b) | $73,696 | $87,514 | $101,332 | $124,362 | $147,392 |
| d. Number of P/T Students | 26 | 31 | 37 | 43 | 52 |
| 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) | $60,242 | $71,827 | $85,729 | $99,631 | $120,484 |
| 3. Grants, Contracts & Other External Sources | $0 | $0 | $0 | $0 | $0 |
| 4. Other Sources | $0 | $0 | $0 | $0 | $0 |
| TOTAL (Add 1 – 4) | $133,938 | $159,341 | $187,061 | $223,993 | $267,876 |

## RESOURCES NARRATIVE RATIONALE

**Reallocated Funds**

No funds will need to be reallocated.

**Staffing (Administrative, Faculty, and Support)**

Currently the program has in place 1 full-time faculty member 100% committed to the program, 1 full-time faculty member who teaches is about 20% committed to the program, and 4 adjuncts who will be used to teach courses within this program. We have one administrative and one support staff who are already assigned to work and support this program and will continue to do so. We anticipate no additional funding will be required.

**Tuition and Fee Revenue**

We have used the projected numbers of graduates listed earlier in the proposal. As discussed there, we believe this to be a conservative projection. Furthermore, the ratio of part-time to full-time students at FCC is 62% part-time and 38% full-time; our part-time students take an average of 7 credits per semester at $165.50 per credit (14 credits per year); and our full-time students take an average of 14 credits per semester at $2,303 tuition & fees (28 credits per year = $4,606 tuition & fees). We used the current in-county tuition and fee rates, so we believe these projections are conservative as well.

**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.

2. **Complete <u>Table 2: Program Expenditures and Narrative Rationale</u>. 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) | $110,354 | $113,023 | $121,587 | $132,171 | $142,839 |
| a. Number of FTE | 1.93 | 1.93 | 2.13 | 2.4 | 2.67 |
| b. Total Salary | $85,926 | $87,909 | $95,352 | $104,656 | $114,023 |
| c. Total Benefits | $24,428 | $25,114 | $26,235 | $27,515 | $28,816 |
| 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 | .40 | .40 | .40 | .40 | .40 |
| 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) | $141,144 | $144,679 | $154,193 | $165,766 | $177,430 |

## PROGRAM EXPENDITURES NARRATIVE RATIONALE

### Faculty

There is one full-time, salaried faculty member who teaches 100% within the program. There is one other salaried, full-time faculty member who teaches some classes within the program (almost all of them electives) but mostly teaches in other programs. We do not foresee changes

in this allocation for the immediate future. Therefore, the number of full-time, salaried faculty is rated as 1.2 across all five years. The remaining teaching load is handled by adjuncts, and the numbers of adjunct credits are shown increasing across the five-year range to account for the projected increased enrollment. The "Number of FTE" faculty includes both the salaried and adjuncts, with adjuncts rated at 1 FTE per 30 credits.

Costs for salaried faculty include salary and 3% COLA added to current salary for year 1 and then each year after (Year 1 = $66,126, Year 2 = $68,109, Year 3 = $70,152, Year 4 = $72,256, Year 5 = $74,423). The total salary also includes adjunct faculty pay (Year 1 = $19,800, Year 2 = $19,800, Year 3 = $25,200, Year 4 = $32,400, Year 5 = $39,600), which is based on a projected cost of 22 adjunct credits in each of the first two years, with increasing numbers of credits in year 3 and after, at approximately $900 per credit.

The benefits for full-time faculty are based on 7.65% FICA and 27% benefits (Year 1 = $22,913, Year 2 = $23,599, Year 3 = $24,307, Year 4 = $25,036, Year 5 = $25,787). Total benefits also include FICA for adjuncts at 7.65% (Year 1 = $1,515, Year 2 = $1,515, Year 3 = $1,928, Year 4 = $2,479, Year 5 = $3,029) but no benefits for adjuncts.

**Administrative Staff**

The full-time faculty member is also the program manager. The AOM for this area is accounted for under Support Staff. Effective July 1, 2025, a new Assistant Dean position will also provide administrative support to the computer science program.

**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 |

| Data for Review | Frequency | Timeframes | Data Source | Data Collector* | Reporting |
|---|---|---|---|---|---|
| Retention Rate | Annually | June | PS/OPAIR | OPAIR staff | Faculty Meetings, PAC Meetings |
| 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 | |

***Effective July 1, 2025, Program Manager roles will be shifted to Assistant Deans and/or Faculty Leads.**

**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.*

The new program strongly supports these goals. Minority students often have fewer experiences/opportunities coming out of high school. 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. 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 experiences, which is to the benefit of both.

**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 fully delivered through distance education, 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 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 programs 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, and faculty training. As part of the Center for Teaching and Learning, Online Learning and Instructional Innovation supports the curriculum, governance, and administrative processes of the College. FCC faculty teaching online courses receive individual training and course development guidelines from OLII.

**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 have an opportunity to evaluate each course at the end of each semester. Program managers, department chairs, the Associate Vice Presidents and Deans and the Provost for Teaching, Learning and Student Success have access to the student course evaluations in their respective areas. Student feedback is used for course and program improvement, and faculty are expected to reflect on student evaluations in their annual self-evaluation. 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 44 key quality standards for online course design. The standards are used to peer-review existing online courses at FCC, guide the design of new courses, and shape the training of online faculty.

The College has made every effort to comply with relevant federal and state regulations for its online courses and programs. 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. FCC has contractual arrangements with Maryland Online (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.