



January 28, 2021

James D. Fielder, Jr., PhD
Secretary of Higher Education
Maryland Higher Education Commission
6 N. Liberty St.
Baltimore, MD 21201

Dear Dr. Fielder:

On behalf of the University of Maryland Global Campus (UMGC), this letter serves as official request for a new bachelor's degree program in Cloud Computing Systems. (HEGIS: 07.0211. CIP: 11.0902). In accordance with COMAR 13B.02.03, the following proposal is submitted for your review.

As noted in this proposal, UMGC plans to offer an undergraduate certificate in Cloud Computing and Networking that is embedded within this bachelor's degree program. A proposal for that certificate has also been submitted for your review.

Payment for review of this new academic program has been made to MHEC via R*STARS interagency fund transfer, transaction number JAIA0862, in the amount of \$850 in accordance with the MHEC fee schedule.

Sincerely,

A handwritten signature in black ink, appearing to read "Blakely R. Pomietto", with a stylized flourish at the end.

Blakely R. Pomietto, MPH
Senior Vice President and Chief Academic Officer

CC: Antoinette Coleman, Associate Vice Chancellor for Academic Affairs, University System of Maryland



Cover Sheet for In-State Institutions

New Program or Substantial Modification to Existing Program

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

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

Payment Submitted:	Yes No	Payment Type:	R*STARS Check	Payment Amount:	Date Submitted:
Department Proposing Program					
Degree Level and Degree Type					
Title of Proposed Program					
Total Number of Credits					
Suggested Codes			HEGIS:	CIP:	
Program Modality			On-campus		Distance Education (<i>fully online</i>)
Program Resources			Using Existing Resources		Requiring New Resources
Projected Implementation Date			Fall	Spring	Summer Year:
Provide Link to Most Recent Academic Catalog			URL:		
Preferred Contact for this Proposal			Name:		
			Title:		
			Phone:		
			Email:		
President/Chief Executive			Type Name:		
			Signature:		Date:
			Date of Approval/Endorsement by Governing Board:		

Revised 3/2019

Academic Program Proposals

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.

Consistent with the institutional purpose as stipulated by State statute (Md. Education Code Ann. § 13-101(2013)1), the mission of UMGC is improving the lives of adult learners. UMGC will accomplish this by:

- (1) Operating as Maryland's open university, serving working adults, military servicemen and servicewomen and their families, and veterans who reside in Maryland, across the United States, and around the world;
- (2) Providing our students with affordable, open access to valued, quality higher education; and
- (3) Serving as a recognized leader in career-relevant education, embracing innovation and change aligned with our purpose and sharing our perspectives and expertise.

Each facet of UMGC's mission has direct bearing on the programs the university offers and how those programs are designed and delivered. By mission and state mandate, every aspect of the UMGC student experience is designed from its origins for working-adult and military-affiliated students to access online education and built to leverage our unique and longstanding expertise in designing online learning. The learning resources, the selection, training, and evaluation of faculty, the non-academic supports, the success-coach advising model, the virtual classroom, the academic resources, the term and session structure, and course length are all deliberately derived from adult-learning science in distributed, online modalities, and the learning ecosystem is designed for a learner experience taking place anywhere in the world. These students' demographic profile drives the design and delivery of our learning model: The average age of UMGC's undergraduate student is 33 years old, 75% of them work full-time, and 46% have dependent children. For these students, their often-complicated life circumstances while pursuing higher education means they need and benefit most from the authentic online education that UMGC has delivered for more than two decades.

Authentic online education is fundamentally different from courses and programs originating at traditional institutions and taught remotely in the same way as face-to-face classes. Instead, authentic online education is a distinctive educational architecture intentionally designed for virtual teaching, learning and assessment, with technology tools strategically deployed for engagement and outcomes, as well as wraparound services that provide support throughout the online student life cycle. These features set UMGC apart in the higher education landscape of Maryland.

Our history and expertise have allowed us to build strong relationships with the military community, which is nothing less than part of UMGC's institutional identity. As of Fall 2020, 65% of UMGC's undergraduate students are military affiliated, including active duty servicemembers, their families, and Veterans. This dimension of UMGC's identity is a particular point of pride, beginning with the university first sending faculty overseas in 1949 to teach America's soldiers on military installations in Europe. The relationship between UMGC and the military has grown ever stronger in the decades since as a

result of our intentional program design and delivery model that meets adult learners *where they are*, whether through asynchronous online courses or on military bases in Germany, Italy, Japan, Korea, Guam, Colorado, Virginia, and many other military facilities around the world.

Today UMGC holds competitively awarded contracts from the U.S. Department of Defense (DOD), under which we serve military servicemembers in Europe, Asia, and the Middle East, delivering specifically solicited programs of study identified by the DOD as responsive to the training, education, and upskilling needs of the military. UMGC is recognized as one of the top military- and veteran-friendly schools in the country, with an unmatched expertise and established reputation as a preeminent provider of quality, affordable, career-relevant postsecondary education. Recognition as one of the Best Military Friendly Online Colleges (GuideToOnlineSchools.com) and as the Military Times No. 4 Best Cybersecurity Program for 2018, among other accolades, are evidence of UMGC's successful commitment to serving our nation's troops. Most recently, in 2019 UMGC was competitively selected as one of five partner institutions to the emergent U.S. Naval Community College to serve the Navy and Marines.

All of these considerations are reflected in UMGC's proposal herein to offer a new Bachelor of Science in Cloud Computing Systems. The proposed B.S. program in Cloud Computing Systems is designed to meet the growing need for highly skilled professionals who can keep pace with the growth in cloud computing, especially the growing demand for cloud administrators and systems managers. Organizations are increasingly employing cloud computing in order to capture opportunities for innovation, productivity, and efficiency; to be flexible in the use of resources; and to scale adaptively and quickly to business needs. As a result, organizations need individuals with the requisite skills to create, maintain, and manage the virtual environments and technologies associated with cloud-based systems. Additionally, the need to secure these cloud-based systems through policies, control measures, and other engineering and operating procedures has become critical as so much of our economic and social activity rely on cloud-based systems and infrastructure.¹

An important outcome of this program is to provide students with hands-on experience with a variety of cloud tools and the ability to plan, assess and develop appropriate solutions for the cloud environment. At the same time, students will acquire fundamental knowledge and skills in cloud computing that will equip them to obtain highly desired certifications in cloud technology and adapt to future changes in tools, technology, and the marketplace. The program is designed to prepare graduates who possess an immediately implementable skillset to succeed in a global environment of workforce diversity, increasing competition, and technological innovation – all driven by the accelerated growth in digital data and information at the core of the economy and much of society.

A 2020 (ISC)² report identifies a substantial lack of qualified staff in this field.² The gap is intensifying: by 2022, organizations will have 75% of their workload on the cloud.³ This workforce shortage is a significant challenge for organizations, and the size of the gap

¹ Source: <https://www.red-gate.com/simple-talk/cloud/security-and-compliance/how-organizations-can-optimize-cloud-security/>

² Source: <https://www.isc2.org/resource-center/reports/2020-cloud-security-report>

³ Source: <https://reprints.forrester.com/#!/assets/2/346/RES122882/reports>

between supply and demand in the labor market requires a rapid scale-up of cloud computing education via a network of complementary programs across an array of institutions of higher education. The proposed B.S. in Cloud Computing Systems will prepare students for careers in direct response to these critical shortages in qualified cloud professionals.

The proposal aligns with UMGC's mission by providing a learner-focused program based on leading-edge adult learning theory and curriculum design that accommodates the needs of students and the community. In addition, this B.S. in Cloud Computing Systems aligns with UMGC's mission to offer high quality, workplace-relevant academic programs that expand the range of credentials and career opportunities for working adult, federally employed, and military affiliated students. In the School of Cybersecurity and Information Technology specifically, where the B.S. in Cloud Computing Systems will be located, approximately 66% of undergraduate students are military affiliated, of whom approximately 38% are active duty. The average age of the school's student population is 31, 74% of students are working full-time, and 75% are enrolled part-time. On average, UMGC students transfer 38 credits to the university; 43% of students transfer between 30-59 credits and approximately 36% transfer between 60-89 credits. Moreover, UMGC's global reach means nearly 60% of students in the School of Cybersecurity and Information Technology are either non-Maryland residents or enrolled overseas.

The B.S. in Cloud Computing Systems will support these students' professional development with opportunities to learn from employers and peers. Students are given time to practice skills as they progress through formative instruction. The fully online, asynchronous program model offers flexibility, continuing education, and social opportunities to adults interested in refreshing and reshaping their career opportunities. The curriculum can be completed in a stackable manner: each course leading up to the final capstone experience can lead to an industry certification, and the first five courses in the program also lead to a stacked credential (the UMGC certificate in Cloud Computing and Networking, submitted concurrently with this proposal) that can be earned before graduation.

This program consists of 11 courses (33 credits) in the major plus related elective courses, and general education requirements. A detailed description of the program and courses within the major are described in section G.

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

As the public state and national leader in distance and distributed education, UMGC awards associate, bachelor's, master's and doctoral degrees, as well as undergraduate and post- baccalaureate certificates. The university's academic inventory offers programs that are core to any public university, but UMGC's mission to serve adult students results in a sustained academic emphasis on career-relevant and workforce-aligned programs. Consequently, the university awards degrees and certificates in the arts and humanities, behavioral and social sciences, business and management, health-related fields, computing, education, and technology. As part of its emphasis on career-relevant education, UMGC offers non-credit professional development programs and hosts professional conferences and meetings supporting economic and societal needs of the State.

The B.S. in Cloud Computing Systems will be part of the Department of Cybersecurity in the School of Cybersecurity and Information Technology, one of three new schools established at UMGC in January 2020 as part of a comprehensive reorganization of academic units to position the university for long-term growth and maximum student success. The formation of the School of Cyber and Information Technology powerfully indicates the centrality and criticality of these fields and programs in the institution's identity and role. Moreover, a school dedicated to these disciplines – unique in the state of Maryland – has given UMGC the capacity to optimize and align curricula to the needs of students and employers as mandated by our mission.

The proposed program in Cloud Computing is tightly aligned with UMGC's institutional learning goals that help students master academic and professional content and include a strong emphasis on technology and information literacy. Cloud Computing Systems is, at its core, an interdisciplinary field, requiring synthesis of knowledge across a variety of adjacent fields and technologies. The program builds upon UMGC's general education requirements and a solid understanding of scientific and quantitative reasoning. While cloud computing professionals must function at a high level in terms of technical expertise, the ability to translate this expertise to non-technical managers and other stakeholders is critical to positively impact decision-making processes. Thus, critical thinking and problem solving, communication, teamwork and the ability to work in and support diverse environments are all as important as technical knowledge and skills.

Initial coursework in the B.S. in Cloud Computing Systems includes fundamentals of networking, network virtualization, cloud technologies, fundamentals of Microsoft Azure, and cloud engineering. Taken together, these courses lead to the embedded undergraduate certificate in Cloud Computing and Networking, a certificate that is accessible to both majors and non-majors alike. Later courses in the major address more advanced knowledge and skill development in areas such as cloud-based applications, AWS cloud, cloud security, cloud administration and operations. The capstone course addresses current trends and projects in cloud computing. From the initial courses through to the capstone, the institutional learning goals of developing job-seeking skills and the capacity for lifelong learning are essential for the continuously evolving field of cloud computing. This B.S. program is an institutional priority because it directly addresses UMGC's mission to provide career-relevant and workforce-aligned programs for adult and life-long learners.

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.)

No new general funds are required for implementation of this program. The financial table in section L is based only on students entering the new program.

New courses will be developed and funded through existing budget allocation of funds in this Fiscal Year and through a departmental budget allocation as part of the FY 2022 budget process. The program will include an existing base of courses currently offered for the Computer Networks and Cybersecurity program. The financial data in section L reflects an existing base of FTE faculty, administrative staff, adjunct faculty, and support staff, which will be sufficient to support the launch of the B.S. in Cloud Computing Systems. Salaries are shown with benefits at current rates of 37% for full-time staff and 9% for adjunct faculty.

4. Provide a description of the institution's commitment to:
a) ongoing administrative, financial, and technical support of the proposed program

UMGC's support services are designed to accommodate students who may not be physically in Maryland or who would simply prefer to access support remotely. These services are, therefore, intentionally and thoughtfully built for complete online delivery rather than in the primarily face-to-face format that exists on traditional campuses. Support services include the following:

- Help@UMGC provides support services for the learning management system (D2L). A specialized technical support team for D2L questions and problems is available 24 hours a day, seven days a week, 365 days a year. In addition, UMGc trains faculty to handle some D2L troubleshooting, publishes D2L FAQs, provides chat, phone, and e-mail access to a Help Center with a comprehensive knowledge base and includes a peer-to-peer feature in the online classroom to encourage students to help each other with D2L issues.
- The Digital Teaching and Learning unit within Academic Affairs provides instructional-design support and consultation to Help Desk staff and program leadership to optimize the learning environment across delivery modes and resolve challenges or obstacles students and faculty encounter.
- Students also receive 24/7 support in the use of educational technology from UMGc's Virtual Lab Assistance team, which resolves students' technical questions and issues in lab environments. Complementarily, program leadership and faculty support students in the proficiency of use with educational technology tools.
- MyUMGC is a self-service portal that provides access to administrative functions and student records. UMGc has designed this portal to ensure that students around the world can complete administrative tasks and view records at their convenience.
- UMGc's library is directly accessible through a link within each online classroom. The library helps to educate students in the use of information resources and services and develops and manages UMGc's extensive online library collection.
- The Effective Writing Center (EWC) offers an array of writing-related services to students, including review of draft papers, guest lecturers on writing skills for the classroom, a plagiarism tutorial, resources on citing and referencing, and resources to support research activities. The EWC is also directly accessible through a link within each online classroom.
- Turnitin has been integrated within courses as a developmental tool for students to assist with achieving authenticity in their writing.
- Subject matter tutoring is available in select courses. Subject matter tutors can help define and explain concepts, clarify examples from course content, and guide students toward understanding a particular topic. Students can connect with a subject matter tutor by accessing a link in their online classroom.
- The Office of Accessibility Services arranges accommodations for students with disabilities. Students can register with this office via an online form and then work with a staff member to receive appropriate accommodations for either online or hybrid courses. UMGc students move locations frequently and often need to adjust their course schedules because of work or family obligations so the Office of Accessibility Services is prepared to help students with transitioning their accommodations even when these changes occur.
- The Office of Career Services and its CareerQuest portal provides quality resources and services to assist students and alumni with their career planning and job search

needs including Mentoring and Internship Plus programs. This office supports students who are transitioning from one career to another or are looking to climb up the corporate ladder, in addition to those who are entering the workforce for the first time. The CareerQuest portal is available 24 hours a day, seven days a week and includes an online database that allows students to connect with local and national hiring managers.

- The Alumni Association is a way for graduates to network and connect. Its online community features a career center, information on available chapters, discussion boards, photo sharing, and a resource center.
- The Financial Aid Office helps students understand and navigate the process of filing for financial aid. Extended office hours ensure that students can receive support quickly and staff members have expertise with a variety of financial aid options as UMGC students may be using employer assistance, veterans' benefits, or other aid that is more common among adult student populations.
- Success Coaches assist students with mapping out degree plans, selecting and scheduling courses, and generally navigating the administrative and academic virtual landscape of earning a degree or certificate online.

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

This is not applicable as this program is new.

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

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

- a) The need for the advancement and evolution of knowledge**
- b) Societal needs, including expanding educational opportunities and choices for minority and educationally disadvantaged students at institutions of higher education**
- c) The need to strengthen and expand the capacity of historically black institutions to provide high quality and unique educational programs**

As an open access institution, UMGC makes educational opportunities and choices available for all students within the state of Maryland, including new college majority populations – especially military affiliated and working adults most often left behind by higher education. In the School of Cybersecurity and Information Technology, where the B.S. Cloud Computing will be located, approximately 66% of undergraduate students are military affiliated, of whom approximately 38% are active duty. The average age of the school's student population is 31, 74% of students are working full-time, and 75% are enrolled part-time. On average, UMGC students transfer 38 credits to the university; 43% of students transfer between 30-59 credits and approximately 36% transfer between 60-89 credits. And UMGC's global reach means nearly 60% of students in the School of Cyber and Information Technology live outside Maryland, including those enrolled overseas.

In addition, the need for the advancement and evolution of knowledge is a central concept in the curriculum of the proposed Cloud Computing Systems degree. Critical thinking, problem-solving, and communication skills are required skills for a career in

the fields associated with cloud computing and are central to the program objective to prepare students to enter the workforce and advance in their careers. The program prepares students with hands-on experience and job-seeking skills in fully virtualized environments accessible worldwide, while developing the capacity for lifelong learning, all essential skills for the continuously evolving field of cloud computing.

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

The program proposal is designed to meet present and future needs of the state, as identified in 2017-2021 State Plan for Post-Secondary Education: Student Success with Less Debt (State Plan).⁴ This program supports the three primary goals in the State Plan in the following ways:

- The program serves Goal 1 (Access) in the State Plan in that it is designed to support UMGC's overall mission to set a global standard for excellence and to be respected as a leader in affordable and accessible adult education programs. In addition, UMGC administers its programs to meet the University System of Maryland goals of effectiveness and efficiency by employing data-driven decision-making that ensures that academic programs are broadly accessible and offer high quality education at an affordable cost. At UMGC this commitment to affordability and access is synonymous with a commitment to diversity and inclusion. The university's open admission approach is central to this commitment. The process to apply for admission is streamlined and does not require the submission of standardized test scores. The admission requirements for the B.S. in Cloud Computing Systems are aligned with this mission.
- The program serves Goal 2 (Success) and Goal 3 (Innovation) in the State Plan, as it is based on principles of competency- and performance-based learning that are at the forefront of developments in adult learning in higher education. Competency-based learning is an outcomes-based approach to education that emphasizes what students should know and be able to do to be successful in their disciplines, fields, and careers. The approach is learner-focused, and authentic assessment (the measurement of what students have learned and the competencies students master) is embedded in every step of the learning process to assist students in building real-world, job-relevant competencies in real time. The B.S. in Cloud Computing Systems will employ authentic, project-based assessments that are relevant to tasks that graduates will actually perform on the job; such projects serve as both the means of instruction and assessment of learning in the program. Retention and success focus on students' learning experiences and are improved through enhanced learning resources (e.g. labs, readings, handouts, slides, etc.). These resources are provided online within the learning management system. The methodology and fully asynchronous, on-demand nature of this type of student support is innovative in higher education and online learning, thus reflective of best practices in adult teaching and learning. In this, UMGC fulfills its commitment to be a leader in educational innovation.

⁴ Source: 2017-2021 Maryland State Plan for Postsecondary Education:
<http://www.mhec.state.md.us/About/Pages/2017StatePlanforPostsecondaryEducation.aspx>

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

Evidence of strong demand for a B.S. in Cloud Computing Systems is derived to important extent from data models generated by Emsi.⁵ A keyword search on skills or topics that cloud computing systems emphasizes identifies 66,172 unique job postings nationwide between January 2019 and December 2019 (see Table 1). Of those, 30,041 job postings (45%) required a bachelor's degree (see Table 2). In Maryland, there were 2,204 total job postings between January 2019 and December 2019 with 1,113 (50%) requiring a bachelor's degree (see Table 3). In the same year, there were 6,730 total job postings in the Washington, DC, area, with 3,832 (57%) requiring a bachelor's degree (see Table 4).

Table 1: Job Postings for DMV vs Nationwide, Jan. 2019-Dec. 2019

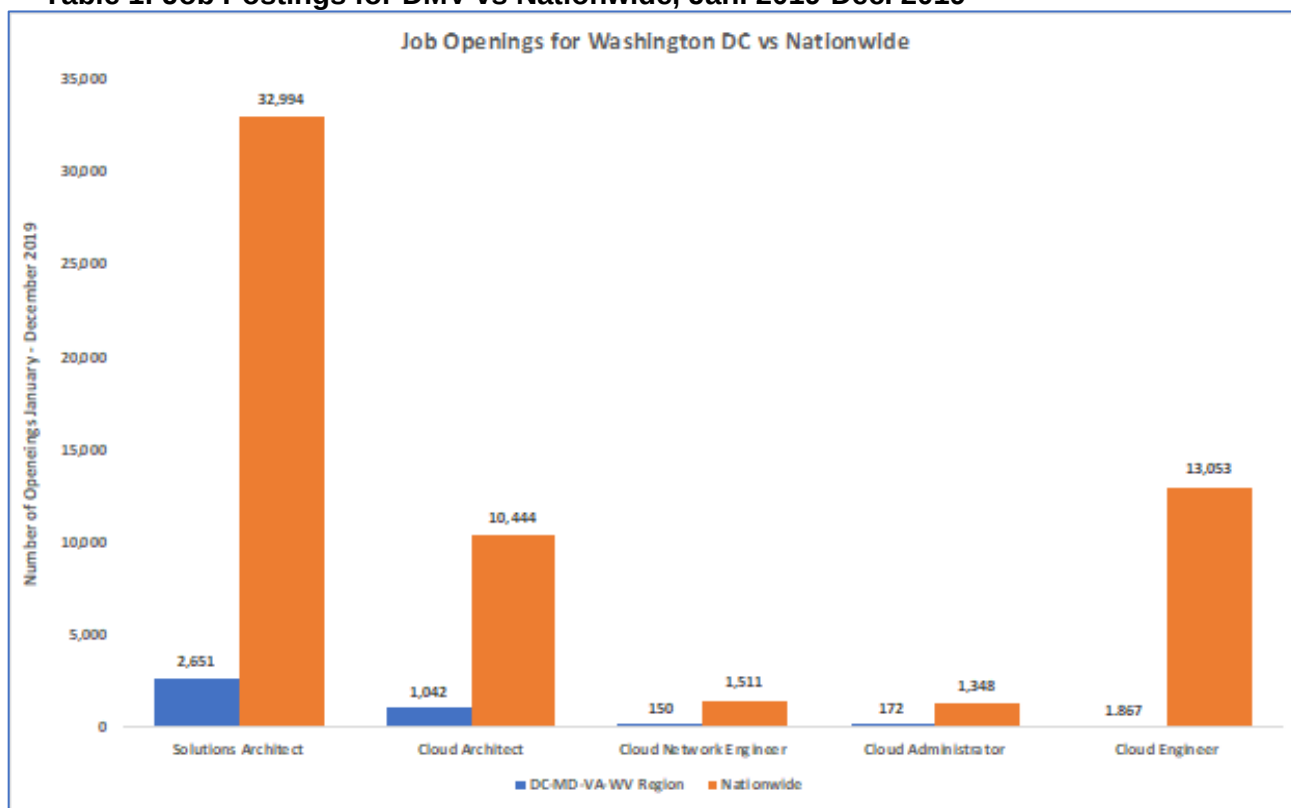


Table 2: Education Level for Job Postings in Jan. 2019-Dec. 2019 (Nationwide)

⁵ Source: <https://www.economicmodeling.com/>

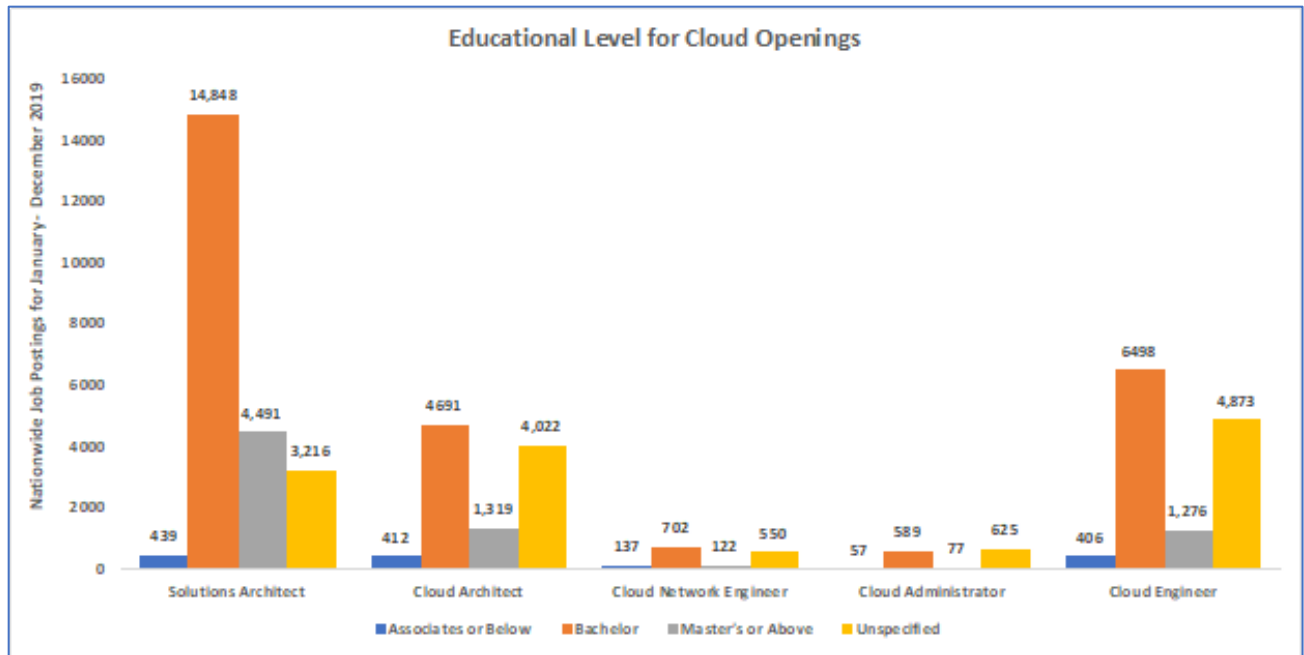


Table 3: Education Level for Job Postings in Jan. 2019-Dec. 2019 (Maryland)

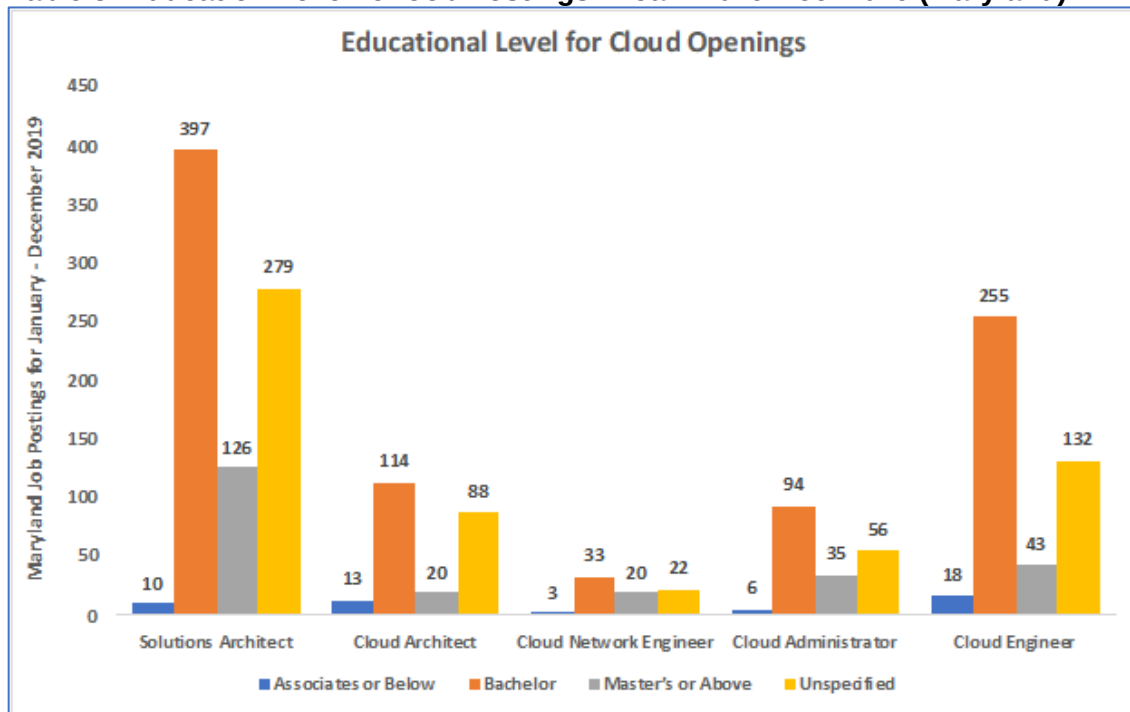
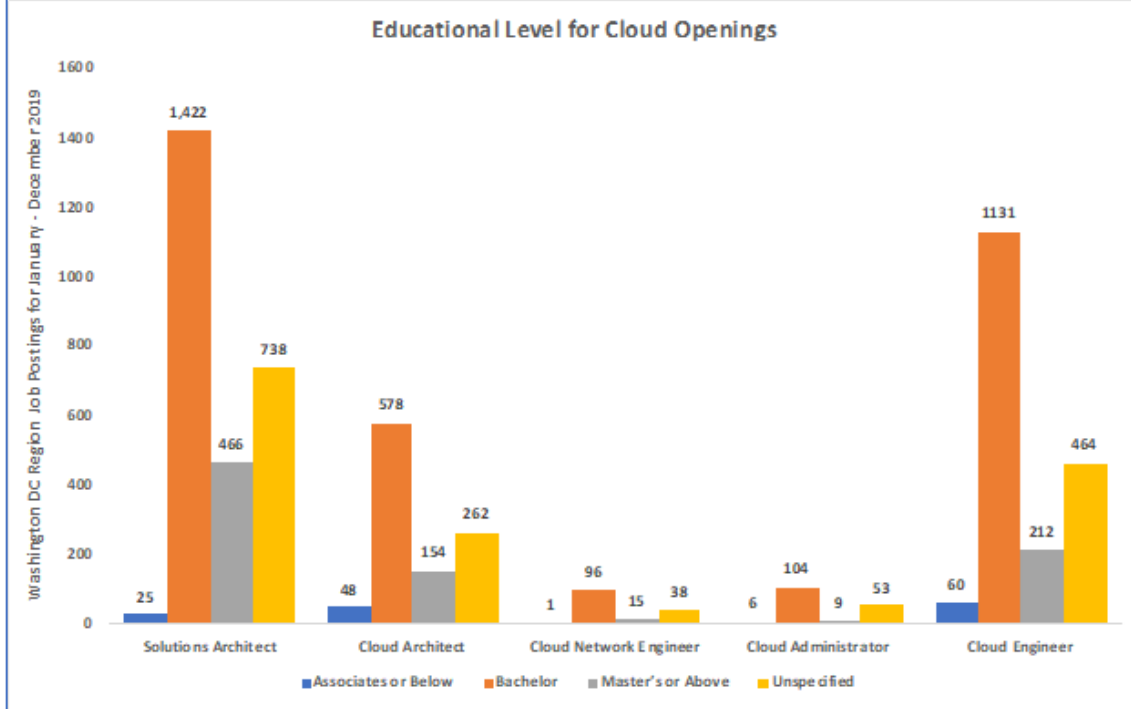


Table 4: Education Levels for Job Postings in Jan. 2019-Dec. 2019 (DC-VA-MD-WV)⁶



Forbes reports similar trends:⁷ there were 50,248 cloud computing positions in the U.S. in November 2018, with a median salary of \$146,350. The report indicates that the demand for cloud computing expertise continues to increase exponentially. The report also indicates that the Washington, DC, region leads the top twenty metro areas that have the most open positions for cloud professionals.

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

Cloud computing is a relatively new program area, and enrollment data from the few institutions⁸ that offer the program is limited. UMGC introduced the closely related Master of Science in Cloud Computing Architecture in 2017, which has proved a popular offering for students, with 526 enrollments in 2019 and 672 in 2020 YTD (an increase of 28%). These figures indicate durable prospective student demand.

As an additional data point, CMIT 326 (Cloud Technologies) was offered for the first time in Fall 2020 as an elective in the Cybersecurity undergraduate offerings and enrolled 1,039 students. These numbers show existing demand and promising opportunity for growth in a full cloud degree program and demonstrate need for a Bachelor of Science in Cloud Computing that can provide global, at-scale access to working adults and military-affiliated students in a fully asynchronous online environment.

⁶ Source: National Center for O*NET Development. Used under the [CC BY 4.0](https://creativecommons.org/licenses/by/4.0/) license. Bureau of Labor Statistics

⁷ Source: <https://www.forbes.com/sites/louiscolumbus/2018/11/27/where-cloud-computing-jobs-will-be-in-2019/?sh=7894e0696add>

⁸ At this time, only five institutions in the U.S. – and only one in Maryland – advertise a B.S. degree program in cloud. Those institutions are: Western Governor's, Purdue Global, Morgan State, Full Sail, and Colorado State Global (as a specialization).

Based on these trends and indicators, we can safely project 5-year projected enrollment and graduation trends with approximately 25% growth rate as indicated in Table 5, which shows the total projected enrollments broken out between residents and non-residents of Maryland. UMGC's enrollment and degree-production models indicate that nearly 60% of projected enrollments will consistently come from non-residents of Maryland.

Table 5: Enrollment Projections

	Year 1	Year 2	Year 3	Year 4	Year 5
Total Projected Enrollment	50	75	100	125	125
Maryland Residents	21	31	41	51	51
Maryland Non-Residents	29	44	59	74	74

It is anticipated that approximately 50 degrees will be awarded each year, starting in year 6.

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.**

A search for MHEC approved proposals on a bachelor's degree in cloud computing produced a single result. MHEC approved a proposal submitted by Morgan State University in November 2019 to offer a bachelor's degree in Cloud Computing. The UMGC degree will be just the second bachelor's program in the state of Maryland to meet the growing demand for cloud computing degrees in the Washington, D.C., region. Table 6, which compares the programs offered by the two institutions, as well as Section E below, elaborate the complementary but distinct design features of each program that clearly reflect the distinctive missions and mission-driven service to intentionally different student populations.

What the data and discussion in these sections collectively convey is threefold. First, the program design of UMGC's proposed B.S. in Cloud Computing is structurally, temporally, and conceptually distinct from Morgan State's; Morgan's provision of online courses is indeed a means of extending access to their programs, but their institutional approach is not equivalent to architecture of an end-to-end virtual and sustained engagement between the learner and the university that is central to UMGC's delivery of authentic online learning. Second, UMGC's missional imperative to reach students nationally and globally – a Maryland institution with a state-mandated reach around the world – materially distinguishes this proposed program from Morgan State's historic and critical commitment to lead the state of Maryland in serving underrepresented minority students in STEM disciplines. Third, the vast and growing market demand for the cloud-computing workforce compellingly indicates a need for multiple programmatic options in the state, the nation, and around the world so that students within and beyond the state have quality, Maryland-based choices available to them and do not have to look elsewhere for the right type of cloud-computing program for their career goals and needs. No single institution is going to adequately respond to the scale of this unmet demand. In sum, the increasing gap between job demand and workforce supply constitutes the necessary and justified co-existence of complementary but distinct cloud computing programs offered by Maryland institutions of higher education.

Table 6: Maryland Institutions with Cloud Credential

	UMGC B.S. Cloud Computing Systems	Morgan State University B.S. Cloud Computing
Degree Requirements and Structure (# of credits, a single required sequence vs. electives)	The major consists of 11 courses (33 credits) plus related elective courses and general education requirements. The program includes 1 math course, which is used towards the general education requirements. Students can obtain credit for courses in multiple ways: by taking the course, by taking a challenge exam, by portfolio evaluation, or in the case of courses tied to certifications, by holding the unexpired certification addressed by the course.	The Core area of the program consists of 15 courses (51 credits), which are comprised of 15 credits (Math), 24 credits (Computer Science), 3 credits (Business) and 9 credits (Cloud Computing). To complete the major in Cloud Computing, students are also required to take 19 credits from courses drawn from Cloud Computing, Electrical Engineering, Information Science & Systems, Math, and Computer Science
Delivery (onsite vs. online)	Online (asynchronous)	Online (asynchronous) and face-to-face.
Enrollment (full-time vs. part-time)	Over the past five years, approximately 75% of UMGC students registering for classes within the School of Cybersecurity and Information Technology did so on a part-time basis (6 credits per term). We expect this trend to continue.	The MHEC proposal submitted by Morgan State University indicates no part-time students will be enrolled in the program.
Admission Requirements/Target Audience	UMGC is an open enrollment institution. For the in B.S. in Cloud Computing Systems there are no pre-requisite requirements for entry into the program.	Standard Morgan State University application requirements apply: High school students must have a cumulative GPA of 2.0 or higher. GED applicants must earn at least a score of 410 on each section of the HS equivalency exam, and at least a total score of 2250.
Primary Points of Differentiation in Requirements and Target Audience: Morgan's program requires 70 credits of required coursework overall (51 credits in the core, and 19 in required electives), whereas UMGC's requires 33. UMGC offers multiple ways of obtaining credits for courses, including transfer credit from work at previous institutions (most students transfer 30-60 credits when they enroll at UMGC) and credit for unexpired industry certification exams aligned to the program (12 in all). This, coupled with the focused course requirements for the major, may lead to accelerated graduation for career-ready professionals. UMGC's program is also open to full- and part-time students.		
CIP Code	CIP Code: 11.0902 A program that prepares individuals to design and implement enterprise software systems that rely on distributed computing and service-oriented architecture, including databases, web services, cloud computing, and mobile apps. Includes instruction in data management, distributed and cloud computing, enterprise software architecture, enterprise and cloud security, mobile systems and applications, server administration, and web development.	CIP Code: 11.0103 A program that focuses on the design of technological information systems, including computing systems, as solutions to business and research data and communications support needs. Includes instruction in the principles of computer hardware and software components, algorithms, databases, telecommunications, user tactics, application testing, and human interface design.

Primary Points Differentiation in CIP: UMGC's program is focused on cloud computing systems, aligned to the proposal's focus on career-readiness for cloud professionals. The UMGC program focuses on operations (including security), administration, and management of cloud technology, distinct from software development. Morgan State University's CIP Code indicates a broader focus on technological systems inclusive of but well beyond cloud. Compared to UMGC's, Morgan State's program takes a broader perspective, arising from computer science, where the program is housed and as indicated by required courses in Data Structures, Computer organization, Operating systems, Databases, Software Engineering, and Artificial Intelligence. Each of these is a course with a "COSC" (that is, Computer Science) prefix. The program core (51 credits) is constituted as follows: Computer Science courses (24 credits), Math (15), Cloud (9), Business (3). The elective choices are also dominated by computer science courses (24 courses). These significant structural and conceptual differences in the two programs, combined with the differences in scale and reach of the two institutions' operational orientation, substantially minimize the overlap between the two programs' design and potential student population.		
Pedagogy and Learning Model	The curriculum is based on principles of competency- and performance-based learning. Authentic assessments are embedded throughout; students "learn by doing" through scenario-based projects grounded in real-world situations and problems and using interactive tools and case studies which incorporate applied learning.	
Program Content	The B.S. in Cloud Computing Systems focuses on the needs of an organization including planning, design, security, creation, and maintenance of cloud computing infrastructure. Courses within the program align with leading cloud certifications. These microcredentials (certifications) can be stacked to obtain a certificate (15 credits), which can itself be stacked within the major.	Morgan State's core requirements for the program are dispersed broadly across a range of topics: substantial programming (4 courses, including a course on data structures) and math (4 courses). Primary content on cloud in the core comes from two courses CLCO 261 (Introduction to Cloud Computing), and CLCO 401 (Cloud Application). CLCO 490 is cross listed with COSC 490 as a Senior Project. The electives include two other cloud courses, along with numerous Computer Science (COSC) and math electives. Program information indicates no direct alignment to industry certifications.
Primary Points of Differentiation in Pedagogy/Learning Model and Content: Of the 11 courses in UMGC's major, 8 address cloud directly; the other three directly address cloud-related technology (Networking, Virtualization, and Linux). Content in the UMGC cloud classes is focused on cloud operations, administration, and management. Cloud content in Morgan's program is more broadly dispersed, with the core containing two courses, and two others in the electives. Ten of the 11 UMGC courses in the major directly address cloud-related certifications. Morgan's cloud classes do not indicate a direct alignment to industry credentials in cloud computing. UMGC and Morgan State University take materially different approaches to math and computer science requirements: Morgan's requirements in both areas are extensive and aligned to computer science and information technology curriculum. In UMGC's program, College Algebra is the only required math. Morgan's program includes electives; UMGC's program is structured as a straight-line pathway designed to accelerate time to degree.		

The remaining cloud-computing related credentials in Maryland are offered at the associate degree level or as lower-division or post-baccalaureate certificate programs. Montgomery College offers an associate degree. Capitol Technology University offers a post-baccalaureate certificate. Frederick Community College and Montgomery College also offer lower-division certificates.

2. Provide justification for the proposed program.

A globally scalable bachelor's degree in cloud computing directly responds to the large and growing unmet demand for cloud professionals, especially at the bachelor's degree level. Maryland's current undergraduate cloud offerings are not sufficient to close the gap, and UMGC's program is significantly different in structure, intent and scope from that offered by Morgan State. Notably, nearly 60% of students in the school in which the proposed program will be located are either non-Maryland residents or enrolled overseas, which buttresses UMGC's ability to respond to workforce development needs for students both within and beyond Maryland.

In addition, UMGC serves a diverse student demographic – primarily adult learners, active-duty military service members, veterans and other military affiliated students – who rely on UMGC's fully asynchronous, online delivery modality in order to access higher education. UMGC will leverage our global reach to serve students in other geographical locations. In this regard, UMGC is leveraging its global reach in accordance with the statutory mandate and mission that the university be "Maryland's open university, serving working adults, military servicemen and servicewomen and their families, and veterans who reside in Maryland, across the United States, and around the world."⁹

Finally, UMGC's teaching and learning model relies on scholar-practitioner instructors who typically work full-time within their field, and who bring intimate knowledge of workplace needs and practices to the classroom. This approach enhances the workplace relevant, project-based aspects of the curriculum, while connecting students to working professionals in the field.

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

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

There is one B.S. program in Cloud Computing offered by Morgan State University. As discussed above, UMGC's program design reflects the institution's focus on working-adult, military-affiliated student populations. In the School of Cybersecurity and Information Technology, where the B.S. in Cloud Computing will be located, approximately 66% of undergraduate students are military affiliated, of whom approximately 38% are active duty. The average age of the school's student population is 31, and 75% are enrolled part-time. On average, UMGC students transfer 38 credits to the university; 43% of students transfer between 30-59 credits and approximately 36% transfer between 60-89 credits. Moreover, UMGC's global reach means nearly 60% of students in the School of Cyber and Information Technology are either non-Maryland residents or enrolled overseas. Because of this unique student demographic profile, the B.S. in Cloud Computing is designed to respond to the reality that most students enroll at UMGC with the majority of their general education requirements completed and focus primarily on completing program requirements. 74% of UMGC students are working full-time while completing the courses in their major, so information and skills that are often immediately and directly applicable to their current positions are built purposefully into UMGC's Cloud program.

⁹ Source: Md. Education Code Ann. § 13-101(2013)1

In these contexts, the UMGC program requires 33 credits and is strategically focused on instruction in the management and administration of cloud systems and technologies on all major platforms – including AWS, Microsoft Azure, and Google - and addresses certifications offered by vendor-neutral agencies such as CompTIA and (ISC)². The program requires only college algebra and requires no computer-coding coursework, reflecting our focus on rapid reskilling and upskilling for working adults seeking to advance in or enter the cloud systems management and administration workforce.

UMGC's program design stands in distinct contrast to Morgan State's program. Morgan's program requires 70 credits (51 credits in the core and 19 credits in required electives), which aligns to the structure of programs primarily designed for a four- to six-year bachelor's degree completion life cycle that is more reflective of primarily full-time students. Morgan's program requires 5 times more credits in math coursework than UMGC's program, and students in Morgan's cloud program are required to take 24 credits in computer science, which aligns with Morgan's research orientation and provides students an appreciable foundation in the broader information technology disciplines (as reflected in the program's CIP code designation, 11.0103). Finally, Morgan's program includes extensive internship experiences designed for more traditional, full-time students who have summers and other extended periods of time to engage in this type of training.

The structural, temporal, and curricular differences in the design of UMGC's and Morgan's programs illustrate distinctive orientations toward remarkably different student populations and will result in a significant variety of program and career choices for students in and outside of Maryland. Given the current market demand and rapid future growth projected in this field, the State will be best served by a diverse array of program offerings in cloud computing to prepare students for the workforce, whether they be entry-level professionals, mid-career professionals, or career changers. Consequently, UMGC's proposed Cloud program will not negatively impact Morgan's Cloud program.

Before submitting this proposal, UMGC academic leadership engaged Morgan State leadership directly with the expressed purpose of understanding the differences between the programs' curriculum design, specifically the intentional curriculum-design and content differences related to the distinct populations of students each institution is optimally designed to serve. UMGC is confident that the high demand for cloud computing professionals in and around the state of Maryland will drive interest in both institutions' mission-driven offerings, and our proposal responds directly to this well-documented market demand that no single institution in Maryland or elsewhere can meet. While it is unfortunate that the two institutions could not agree on this point, UMGC submits this proposal with full confidence in these evidence-based distinctions, and that a complementary space exists in the state for these two Cloud programs.

UMGC's proposal does not present undue harm or unreasonable duplication with Morgan State University. UMGC firmly believes 1) our proposal responds directly to a well-documented market demand that no single institution in Maryland or elsewhere can reasonably supply and, 2) the evidence presented throughout our proposal documents the specific student-type that seeks a UMGC education.

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.

A search of the MHEC inventory of approved academic programs in Maryland indicates that one of the four Historically Black Institutions in Maryland has a potentially related program: Morgan State's B.S. in Cloud Computing. However, as discussed above, Morgan State's program appears to be capaciously constructed in a way that aligns to their unique institutional identity as a "preeminent, public, urban, research institution,"¹⁰ with a curricular focus on computer science and math required for work in technologies and roles within but also well beyond cloud computing. In contrast, UMGC's program reflects the multipronged commitment to serve not only students in Maryland, but also across the U.S., and around the world with rapid upskilling and reskilling education focused on increasing workforce capacity specifically in the management and administration of cloud computing systems and infrastructure. UMGC's program teaches students fundamental aspects of cloud computing (such as networking and virtualization), and then focuses on familiarizing students with cloud technologies provided by leading vendors (AWS, Microsoft, Google, etc.). Students are taught how to leverage these technologies and manage the tools provided by these cloud-computing platforms in order to meet business needs. This knowledge is complemented with security concepts and other competencies drawn from highly regarded vendor-neutral agencies such as CompTIA and (ISC)². The focus in UMGC's proposed program is not on writing code to develop cloud-based applications, an important and appropriate contrast to Morgan State's code-intensive program.

Additionally, Morgan State's program was designed in close and formal collaboration with AWS;¹¹ UMGC's program includes instruction in AWS (a dominant player in the cloud space) but also purposefully includes instruction in Azure and Google environments as well as vendor-neutral certifying organizations such as CompTIA and (ISC)² to ensure the widest applicability of a graduate's education to workforce opportunities in cloud computing.

Access is also part of the design of the curriculum: UMGC has strategically disaggregated the B.S. in Cloud Computing Systems degree so that students can make progress toward professionally leverageable microcredentials – both industry recognized exam-based certifications and a UMGC transcribed certificate – as they work toward baccalaureate graduation. As an additional indicator of and response to the need for access to upskilling and reskilling in these critical fields, UMGC is also developing complementary non-credit trainings aligned to industry certifications in partnership with multiple leading employers in the U.S. economy. These non-credit trainings are fully stackable within an A.A. or B.S. program and diversify the curriculum pathways by which learners access critical workforce development education.

Finally, this proposed program derives from UMGC's institutional identity, role, and mission and reflects the explicit design, delivery, and support services across the student journey lifecycle, all of which statutorily and missionally distinguish our mission, model, and students from Morgan State's. This mission-driven orientation to UMGC's portfolio also plays out in the stakeholders we serve, most notably the U.S. military.

¹⁰ Source: [Morgan State University MHEC proposal](#).

¹¹ Source: [Morgan State University MHEC proposal](#), page 5.

Between now and 2023, the contracts that UMGC holds with the Department of Defense to be a premier provider of educational services to military servicemembers will be up for renewal, and the university's cybersecurity and information technology curricula are critical to this partnership. Similarly, UMGC and the newly launched U.S. Naval Community College (USNCC) recently announced a partnership through which UMGC is a partner institution in providing cybersecurity coursework for USNCC students. Our ability to offer a cloud computing program is imperative to our ability to be responsive to future needs of these students.

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.

Like many universities, UMGC began its cloud computing offerings at the master's level with a Master of Science in Cloud Computing Architecture that launched in 2017. Cloud computing was initially viewed as primarily a graduate-level discipline, given the complexity of the content early on in the field's emergence and the variety of techniques and tools utilized in the field. More recently, the adoption of cloud computing and associated concepts, tools, and techniques in all levels of government and the non-profit sector has experienced exponential growth and continues to expand rapidly. This accelerated adoption rate has, in just a few years, created a high-demand market for entry-level jobs in cloud accessible at the bachelor's-degree level, far beyond what any single institution can supply. According to the market research presented in section C, 45% of cloud-computing related positions at the national level will be available to bachelor's degree holders, with 57% requiring a bachelor's degree regionally, and 50% in Maryland requiring a bachelor's degree.

Accordingly, the curriculum for the B.S. in Cloud Computing Systems incorporates teaching, learning, and assessment strategies that focus on students' development of concrete, job-related knowledge and skills, while reinforcing their understanding of underlying concepts, principles and theories. At the conclusion of each course in the program (except the capstone), students are prepared to take specific and in-demand cloud-related industry certification exams (see Table 7 below). These highly marketable micro-credentials are aligned to job demand and essential to success in the job market. Further, the entire curriculum can be completed in a stackable manner: each course before the capstone can lead to an industry certification, and the first five courses in the program also lead to a stacked credential (the UMGC certificate in Cloud Computing and Networking, submitted in parallel with this proposal) that can be earned before graduation. Finally, because courses are aligned to cloud-related industry certifications, students who come to the program already having earned certifications aligned to the curriculum receive transfer credit for those courses, accelerating time to degree.

Table 7: Alignment of Courses in the program with certifications

Course	Credits	Certification
CMIT 265 (*)	3	CompTIA Network+
CCS 267 (*)	3	VMware Certified Professional
CMIT 291	3	Linux Professional Institute Certification 1 [LPIC-1] and CompTIA Linux+
CMIT 326 (*)	3	CompTIA Cloud+ and AWS Certified Cloud Practitioner
CMIT 336 (*)	3	Microsoft Azure Fundamentals

CCS 346 (*)	3	Google Cloud Engineer - Associate
CCS 356	3	AWS Certified Developer - Associate
CMIT 426	3	AWS Certified Solutions Architect - Associate
CMIT 436	3	(ISC) ² Certified Cloud Security Professional
CMIT 446	3	AWS Certified SysOps Administrator - Associate
CCS 495	3	N/A
Total	33	

NOTE: The five (*)-ed courses comprise the embedded and stackable certificate in Cloud Computing and Networking.

The proposed program will be overseen within the Department of Cybersecurity and will be managed concurrently with the Master of Science in Cloud Computing Architecture program by the Program Director, Dr. Patrick Appiah-Kubi. Dr. Appiah-Kubi is an AWS Faculty Cloud Ambassador, who is pursuing the AWS Academy Cloud faculty accreditation. He has done extensive research and published several conference and journal papers on cloud computing and has developed and taught several graduate cloud computing courses. He is also a senior member of IEEE and part of the computer society subgroup of the IEEE.

UMGC also has a cohort of faculty who have substantial experience and expertise in the cloud field. Most of them possess certifications such as AWS Certified Cloud Practitioner, AWS Solutions Architect (both Associate and Professional), AWS Certified DevOps Engineer, AWS Certified SysOps Administrator, AWS Certified Developer (Associate), AWS Certified Advanced Networking (Specialty), AWS Certified Security (Specialty), Azure Fundamental, Azure Administrator Associate, Azure Solutions Architect (expert), Azure Security Engineer, CompTIA Cloud+ and CompTIA Certified Cloud Security Professional. UMGU requires that any faculty who teaches a class associated with an IT certification should currently hold that certification.

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

The program consists of 11 courses (33 credits, see Section G.4.) in the major, 14 general education courses (41 credits) and 16 elective courses (46 credits). Some courses will be sequenced, requiring students to take them in a prescribed order.

Program Learning Goals (Objectives) are as follows:

1. Communicate effectively in a variety of contexts utilizing appropriate techniques to convey results.
2. Evaluate and solve complex issues or problems which require technical and management skills that pertain to cloud computing.
3. Apply quantitative reasoning to analyze data related to business cloud needs, support conclusions, and solve problems that utilizes cloud frameworks.
4. Collaborate with team members to plan, assess and develop appropriate solutions for cloud adoption.
5. Evaluate the cloud infrastructural needs of an organization, analyze cost estimates and value proposition of the cloud utilizing appropriate techniques to provide reasonable solution recommendations to an organization.
6. Propose a network virtualization plan that utilizes cloud services and technologies required to deploy a cloud solution.

7. Design a secure, reliable, scalable and cost-effective cloud-based application utilizing industry-standard methods, models and techniques for a specific cloud project.
8. Design a cloud deployment solution based on architectural design principles, processes and frameworks and customer requirements.
9. Devise a comprehensive compliance, policy and risk assessment plan based on best practices, procedures and processes for the cloud solution to mitigate cloud adoption risk.
10. Create a security strategy for mitigating cloud security risk and threats associated with cloud adoption.

Appendix C shows the mapping of the program learning goals to the core courses in the major.

Five of the first six courses in the B.S. program provide a foundation in the principles, concepts and applications underlying cloud computing systems and comprise a certificate in Cloud Computing and Networking. The Cloud Computing and Networking certificate will be a highly marketable option for students of many majors from all three UMGC schools, and also for new students seeking a quick introduction to the field of cloud computing.

The heart of the program is the set of five courses that follow the courses comprising the certificate. This second set of courses are focused on using selected leading cloud technologies to build and securely manage cloud computing platforms to meet business needs. The culminating course is a capstone which focuses on the integrative application of skills and knowledge acquired throughout the program to solve a complex real-world problem. The skills addressed by the program are threaded throughout the curriculum and were identified through interactions with industry professionals and analysis of market trends and job needs. Courses will use a project-based approach, where learning happens in the context of a project (problem) which integrates institutional learning goals such as critical thinking and writing, and specific program goals.

3. Explain how the institution will:

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

UMGC approaches learning design from an “Understanding by Design” perspective, utilizing a backward design model. This approach begins with identifying the program learning goals that a student will achieve through the program of study. The program learning goals are mapped first to the Degree Qualification Program (DQP) to ensure that the set of learning goals are comprehensive and appropriate for the degree level. In addition, the program learning goals are mapped against UMGC institutional learning goals to validate that the program aligns with the university mission and institutional goals.

Once the program learning goals have been validated through mapping to the DQP and institutional learning goals, the program learning goals are mapped to the courses in the program. This step ensures that all program learning goals are addressed in the curriculum and provide guidance in the development of the courses to ensure that each

course contributes to the program learning goals without unnecessary duplication of outcomes across courses.

Using the mapping of institutional learning goals to courses, key assignments are identified in courses for use in assessing student achievement of program learning goals. Periodically, a random sample of student artifacts for these identified key assignments are collected and reviewed by faculty to assess how effectively students are meeting the program learning goals.

Using student learning assessment results along with non-direct measures of student learning including student retention and market and labor data, program directors produce an annual review of program quality. For new programs, these annual reviews are integrated into an Academic Program Review including external review after 5 years. After this initial review, programs continue the annual review every year with an Academic Program Review every 7 years.

In November 2020, UMGC licensed AEFIS as its assessment management system. AEFIS will be the central repository for program learning goals, assessment maps, and student artifacts. AEFIS integrates with the D2L LMS to allow student work to be duplicated from the LMS into AEFIS for assessment purposes. This process ensures that assessment review is independent of grades and evaluation within the class and allows for independent review of student work apart from the classroom faculty. AEFIS also holds annual program review reports.

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

The B.S. in Cloud Computing Systems program will consist of 14 general education courses (41 credits), 11 required major courses (33 credits) and 16 elective courses (46 credits).

Below is the list of the 11 required courses. As noted above, students holding any of the industry certifications aligned to the program will receive transfer credit for those courses, accelerating their progress toward the degree.

CMIT 265: Fundamentals of Networking (3)- Designed to help prepare for the CompTIA Network+ certification exam. An introduction to networking technologies for local area networks, wide area networks, and wireless networks. The aim is to recognize the type of network design appropriate for a given scenario. Topics include the OSI (open system interconnection) model, security, and networking protocols. Prerequisite: IFSM 201.

CCS 267: Network Virtualization (3)– Designed to help learners prepare for the VMware Certified Professional exam. Learners will select storage, networking, and hardware options necessary to implement a private cloud solution. They will then install and configure a virtualization tool (such as vSphere) to establish a private cloud solution and manage it. Prerequisite: CMIT 265.

CMIT 291: Introduction Linux (3)- Designed to help prepare for the Linux Professional Institute Certification 1 [LPIC-1] and Linux+ exams. A study of the Linux operating system. The goal is to configure and manage processes, user interfaces, device files, print facilities, file systems, task automation, the boot-up/shutdown sequence, disk

storage, network connectivity, system security, users, and groups. Prerequisite: CMIT 202 or CMIT 265.

CMIT 326: Cloud Technologies (3)- Designed to help prepare for the CompTIA Cloud+ and AWS Certified Cloud Practitioner certification exams. A hands-on study of basic cloud technologies. The aim is to apply the techniques and tools used in cloud environments, especially the AWS (Amazon Web Services) cloud. Topics include the global infrastructure of the cloud, deployment and operation in various cloud environments, high availability, scalability, elasticity, security, and troubleshooting. AWS, Microsoft Azure, and Google Cloud are compared. Prerequisite: IFSM 201.

CMIT 336: Fundamentals of Microsoft Azure (3)- Designed to help prepare for Exam AZ-900: Microsoft Azure Fundamentals. A hands-on study of Microsoft Azure services. The aim is to demonstrate mastery of cloud concepts, the core services used in Azure; pricing and support models used for Azure; and fundamentals of cloud security, privacy, compliance, and trust for Microsoft Azure. Topics include high availability, scalability, agility, fault tolerance, and disaster recovery in the Microsoft Azure environment. Prerequisite: CMIT 326.

CCS 346: Cloud Engineering (3)– Designed to help learners prepare for the Google Cloud Engineer Associate exam. Learners will set up the cloud environment as well as plan, configure, deploy, implement, and operate the deployed solution and security access management on Google Cloud. Prerequisite: CMIT 326.

CCS 356: Application Development and Scripting in the Cloud (3)– Designed to help learners prepare for the AWS Certified Developer Associate exam. Learners will design, develop, and deploy secure server/serverless applications to interact with AWS services using API, SDK and CLI, as well as optimize applications and perform root cause analysis on faults. Prerequisite: CMIT 291.

CMIT 426: Mastering the AWS Cloud (3)- Designed to help prepare for the AWS Certified Solutions Architect - Associate exam. A hands-on study of Amazon Web Services (AWS). The goal is to understand the computing, networking, storage, and database services in AWS; apply best practices in building secure and reliable applications in the AWS cloud environment; and identify the appropriate AWS service to meet an organization's technical requirements. Prerequisite: CMIT 326.

CMIT 436: Security in the Cloud (3)- Designed to help prepare for the (ISC)² Certified Cloud Security Professional exam. A hands-on study of cybersecurity and measures for securing critical assets in cloud environments. The goal is to apply the principles of confidentiality, integrity, and availability (CIA) of digital resources in cloud environments. Prerequisite: CMIT 426.

CCS 446: Cloud Administration and Operations (3)– Designed to help learners prepare for the AWS Certified SysOps Administrator Associate exam. Learners will create and maintain metrics and alarms to monitor and report on cloud system performance. Learners will evaluate the availability and resilience of AWS environments and mitigate cloud deployment and operational issues. Prerequisite: CMIT 436.

CCS 495: Capstone: Current Trends and Projects in Cloud Computing (3)– The course is the final course for the major. Learners will complete a compressive, project driven study of cloud design, implementation, operation and monitoring. Learners will

integrate knowledge from all previous study in the program and apply to solve a complex real-world cloud problem that meets the needs of an organization. Prerequisite: CCS 446.

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

All UMGC undergraduate students are required to complete 41 credit hours in general education requirements. The general education courses required for the program will consist of:

- Research and Computing Literacy - 7 Credits
- Communication – 12 Credits
- Mathematics – 3 Credits
- Arts and Humanities – 6 Credits
- Behavioral and Social Sciences – 6 Credits
- Biological and Physical Sciences – 7 Credits

See Appendix B for the Bachelor of Science in Cloud Computing Systems Degree Planning Course Sequence Sheet, which includes required major and related courses, and required and recommended General Education courses.

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

N/A

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 systems, availability of academic support services and financial aid resources, and costs and payment policies.

UMGC maintains a comprehensive website that houses all updated information about its programs. Students will have access to degree requirements, course catalogs, course schedules, and other pertinent information about the program.

The website also provides specific and clear information about technology requirements for UMGC students, information and training on learning management system, and other additional resources to maximize students' learning experience.

A variety of support services are available to students for academic assistance (Tutoring, Writing Center), as well as technical support and financial aid.

UMGC students are guided by the Student Handbook that is available online and serves as a general guide for all current and prospective students.

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.

All Bachelor of Science in Cloud Computing Systems program related communications (advertising, recruiting and admission materials) are done in conjunction with UMGC-wide institutional communication strategy which adheres to the principle of truth in advertising. All written and electronic materials prepared for prospective students for purpose of recruitment will accurately and clearly represent the courses, the program, and services available.

H. Adequacy of Articulation

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

UMGC already has a significant portfolio of articulations with community colleges, both within the state of Maryland and nation-wide in computing and information technology. Some of these community colleges already have programs in cloud computing (for example, the lower-level certificates offered by Montgomery College and Frederick Community College that map into UMGC's upper-level offerings). UMGC has a flexible and convenient transfer policy – accepting up to 70 credits from local community colleges. The university also offers an additional incentive for community college students in the form of a “completion scholarship,” whereby students who complete their 2-year degree at a local community college are guaranteed admission to UMGC, and a tuition rate that allows recipients of the scholarship to complete the four-year degree for \$12,000 or less. New articulations can easily be created between the proposed B.S. program and the cloud offerings of community colleges, providing community-college students a seamless and accelerated, affordable pathway to a four-year degree in cloud computing. These pathways to a four-year degree can also be accelerated because some cloud-related community college courses can be articulated to courses comprising the B.S. program.

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 faculty member will teach in the proposed program.

UMGC's model employs full-time faculty (known as collegiate faculty) in faculty leadership roles, such as Department Chairs and Program Directors, with responsibility for the overall intellectual coherence and integrity of the program. Other collegiate faculty teach and serve in complementary roles that maintain and support the academic programs, providing input into the design and content of the program and their courses. This core group of full-time collegiate faculty will support the Adjunct faculty in teaching the program courses. Notably, UMGC's School of Cyber and IT, where the proposed Cloud program will be located, recently optimized its organizational structure in

order to repurpose an administrative position as an additional collegiate faculty line to support the anticipated growth in the cloud computing area.

In keeping with UMGC's emphasis on workplace relevance, the Bachelor of Science in Cloud Computing Systems teaching faculty will be practicing professionals who teach part-time for UMGC. These adjunct faculty provide instruction for the majority of courses (which is true for all programs at all levels at UMGC). This model is responsible for one of UMGC's greatest strengths: scholar-practitioner faculty who have solid academic credentials and continue to work outside the university, providing a continuous infusion of current workplace knowledge, career relevant perspectives, and maximum flexibility for adapting to changing student demand. In this way, UMGC supports students in a learning experience that is practical and relevant to today's competitive and evolving global marketplace. Many adjuncts have considerable experience with UMGC. Collegiate and adjunct faculty both hold academic rank and title, based on their academic qualifications and professional experience, including teaching experience at UMGC. Since 1996 UMGC has held a MHEC-approved waiver of the Code of Maryland (COMAR) requirements for total credit hours taught by full-time faculty (Appendix A).

The centrality and appropriateness of UMGC's faculty model relative to its educational mandate and mission were reaffirmed by MHEC in a 2016 review of mission statements, as evidenced in the following excerpt from the Commission's report:

UMUC intentionally seeks highly qualified full-time and adjunct faculty who have hands-on experience in the disciplines they teach and who can leverage that experience to provide a richer learning experience for students. The university's mission to serve adult students is supported by adjunct faculty who are scholar-practitioners engaged daily in their profession. The ability to employ adjunct faculty is critical to UMUC's capacity to quickly deploy academic and continuing education programs in response to workforce-related needs. This entrepreneurship and flexibility in establishing new programs is particularly important to the university: given its history of very limited state support, the university's financial model is based on tuition revenues, and all programs must be self-supporting.¹²

Consistent with this model, UMGC has a substantial roster of faculty with expertise in areas related to Bachelor of Science in Cloud Computing Systems. Teaching effectiveness is monitored by class observation, student course evaluations, and program-specific, student-level competency assessment. The School of Cybersecurity and Information Technology already has an active unit of faculty qualified and prepared to teach courses in the proposed program and we constantly recruit additional faculty.

The following is a partial list of faculty and their graduate degree title(s), academic title/rank, and the courses they will teach:

Table 8: Faculty who will teach courses in the B.S. in Cloud Computing Systems

Name	Appointment Type and Rank	Terminal Degree and Field	Status	Course(s) to be Taught
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¹² Source: Maryland Higher Education Commission (December 2015), Mission Statement Review: http://mhec.maryland.gov/institutions_training/Documents/acadaff/2016MissionStatementReview.pdf

Patrick Appiah-Kubi	Program Director of Cloud Computing and Networking, Collegiate Associate Professor	PhD, Information Technology	Full-time	CMIT 265 CMIT 326 CCS 495
John Galliano	Program Director of Cybersecurity Technology, Collegiate Associate Professor	DIA, Computer and Information Systems Security	Full-time	CMIT 265 CMIT 326
Manish Patel	Collegiate Associate Professor	MBA, Management Information Systems	Full-time	CMIT 291
TBD	Collegiate Faculty		Full-time, beginning ~July 2021	
Marcus Winkfield	Adjunct Assistant Professor	PhD, Information Systems	Part-time	CMIT 326 CMIT 336 CMIT 426
Samuel Bunmi	Adjunct Assistant Professor	PhD, Information Assurance and Cybersecurity	Part-time	CMIT 326 CMIT 426 CMIT 436
Nancy Landreville	Adjunct Professor	PhD, Information Technology	Part-time	CCS 267
Stephen Orr	Adjunct Associate Professor	PhD, Computer Science	Part-time	CMIT 265 CMIT 326
Cliff Davis	Adjunct Assistant Professor	MS, IT Management	Part-time	CCS 446 CCS 346
Leo Aguilera	Adjunct Assistant Professor	MS, Computer Science	Part-time	CCS 356

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

UMGC is committed to providing pedagogy training in support of student learning throughout the faculty life cycle with the institution. FACDEV 411, our required New Faculty Academic Orientation, is a two-week, facilitated online class that covers the history of UMG, pedagogy of adult learning, facilitating online learning, and providing additional support for students through UMG's Library, Effective Writing Center, and Office of Accessibility Services. Parallel required training courses exist for faculty teaching hybrid courses and faculty teaching in our competency-based curriculum model.

In addition, faculty members have access to just-in-time professional development opportunities such as our bi-monthly webinars; self-paced workshops on pedagogical

and LMS-related matters; quick guides on online classroom support and technology; and a variety of Skillsoft courses.

b) The learning management system

UMGC provides multiple touchpoints to ensure thorough orientation to and continued education about our LMS, Desire2Learn. Building on the materials provided in FACDEV 411, UMGC offers workshops on grading strategies; the integration of audio and video feedback to students; gradebook setup and rubrics; crafting powerful introductions; open educational resources (OERs) used in the classroom; and netiquette.

In addition, many webinars directly amplify the skills needed by faculty members to be successful in the online classroom, e.g., recursive feedback; scaffolding student learning; digital literacy; classroom assessment techniques; creating a more engaging classroom; etc.

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

Besides the strategies outlined above, UMGC has recognized the need to equip faculty more comprehensively with skills and abilities to enhance engagement and coaching, in order to enhance student learning and retention.

To that end, UMGC has developed a coaching training which will be made available to all UMGC faculty (including faculty teaching this program) in February 2021. This course, FACDEV 111—Coaching and Providing Feedback that Matters—will provide coaching skills to create an active and motivating presence in the classroom in order to establish helpful and supportive relationships with each student leading to persistence and academic success.

This addition our training catalog will diminish the distance between faculty and students inherent in online courses by facilitating regular interaction and outreach and personalized and actionable coaching and feedback.

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

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

No new library resources are needed to serve the Bachelor of Science in Cloud Computing Systems program. The UMGC Library provides access to a vast array of library resources and services to UMGC students, faculty, and staff worldwide to meet their academic needs and includes a wide and varied collection of journal articles, reports, case studies, and, in some instances, complete books available electronically via a comprehensive selection of online library databases. Library services include instruction, reference, electronic reserves, and document delivery for materials not otherwise available in the library databases. The UMGC Library relies on distributed technology as its primary mechanism to provide online access to resources and services to UMGC's widely dispersed, working-adult student population.

The curated collection of online academic research databases available to UMGC faculty and students provides access to hundreds of thousands of full-text articles as

well as reports, statistics, case studies, book chapters, and complete books in a wide range of subject areas. In addition, students have access to the full text of dissertations and theses via the *ProQuest Dissertations and Theses* database. The Library assists faculty and learning designers in providing links to Library materials directly in online classes.

The UMGC Library also offers other resources and services. UMGC students, faculty, and staff within the continental United States have access to more than ten million volumes in print from the 16-member University System of Maryland and Affiliated Institutions (USMAI) library consortium. The UMGC Library offers document delivery services to all UMGC students, faculty, and staff worldwide for a variety of materials, including journal articles and book chapters. UMGC's expanding collection of 75,000 electronic books (e-books) has significantly increased the ability to meet the needs of UMGC's global population.

The UMGC Library provides faculty and students with research assistance in creating search strategies, selecting relevant databases, and evaluating and citing sources in a variety of formats via its [Ask a Librarian](#), which includes 24/7 chat and email. A guide to locating scholarly articles and using UMGC's [library databases](#). The UMGC Library *OneSearch* tool allows users to simultaneously search for scholarly articles, books, and/or other research resources via a single search engine in most of the databases to which the UMGC Library subscribes, either directly or as additional resources.¹³ In addition, UMGC faculty can request customized library instruction sessions for both on-site and online classes, and can also add UMGC Library tutorials and materials to their learning management system classrooms and refer students to them through the Web gateway.

A librarian liaison assigned to each academic department assists faculty with resource identification and other program needs. The Subject Guides area of the [library's web site](#) provides a listing of resource guides for each subject area, with each guide containing relevant databases, Web sites, books, and other resources along with technical and citation assistance.

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.**

Existing resources related to facilities, infrastructure, and equipment are adequate to meet the Bachelor of Science in Cloud Computing Systems program needs. The proposed Bachelor of Science in Cloud Computing Systems will primarily be offered online asynchronously through a distance-education platform.

- 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**

¹³ Source: UMGC Library, 2020: <http://sites.umgc.edu/library/index.cfm>

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

UMGC has an internal email network that provides all incoming students and all faculty with consistent email domains @student.umgc.edu and @faculty.umgc.edu respectively. Students are encouraged but not limited to using this email address in all their communication with the university. Faculty are required to use their UMGc addresses for all their official UMGc communications.

UMGC's standard learning management system is Desire2Learn (D2L). All UMGc classes are taught using this system and all the students with appropriate technology and online access (referenced in section G8) have access to this system through their learning portal.

Support is available for students and faculty through a 24/7 help desk and a large variety of online help resources on UMGc's [website](#).

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.

Narrative Rationale

No new general funds are required for implementation of this program. The financial table that follows is based only on students entering the new program.

As shown in Tables 1 and 2 below, the program is expected to be self-supporting from Year 2 onward. If necessary, resources will be reallocated from the course development fund to support the new program in year one. Regarding expenditures, UMGc's existing base of FTE faculty and administrative and support staff will be redirected to support and serve the Bachelor of Science in Cloud Computing Systems.

TABLE 1:RESOURCES					
Resource Categories	Year1	Year2	Year 3	Year4	Year 5
1. Reallocated Funds	0	0	0	0	0
2. Tuition/Fee Revenue (c + g below)	\$450,000	\$675,000	\$900,000	\$1,125,000	\$1,125,000
a. Number of F/T Students	0	0	0	0	0

b. Annual Tuition/Fee Rate	N/A	N/A	N/A	N/A	N/A
c. Total F/T Revenue (a x b)	N/A	N/A	N/A	N/A	N/A
d. Number of P/T Students	50	75	100	125	125
e. Credit Hour Rate*	\$300	\$300	\$300	\$300	\$300
f. Annual Credit Hour Rate	30	30	30	30	30
g. Total PIT Revenue (d x e x f)					
3. Grants, Contracts & Other External Sources	0	0	0	0	0
4. Other Sources	0	0	0	0	0
TOTAL (Add 1 - 4)	\$450,000	\$675,000	\$900,000	\$1,125,000	\$1,125,000

* only instate tuition is considered

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.

Narrative Rationale

The data below for faculty, staff, and technical support and equipment is based on UMGC's existing base of FTE faculty and administrative and support staff who will be utilized to support and serve the Bachelor of Science in Cloud Computing Systems, as well as existing technical support and equipment.

In category 1.b, the adjunct faculty salary is the median salary for an adjunct associate faculty member with a terminal degree at longevity step 11. In category 7, the expenditure listed is for course development.

TABLE 2: PROGRAM EXPENDITURES:					
Expenditure Categories	Year 1	Year 2	Year 3	Year 4	Year 5
1. Faculty (b + c below)	\$80,697.06	\$121,045.60	\$161,394.10	\$201,742.70	\$201,742.70
a. Number of FTE sections	18	27	36	45	45
b. Total Salary (Adjunct salary at \$1371 per credit hours)	\$74,034	\$111,051	\$148,068	\$185,085	\$185,085
c. Total Benefits (9%)	\$6,663.06	\$9994.59	\$13,326.12	\$16,657.65	\$16,657.65
2. Admin. Staff (b + c below)	\$246,600	\$246,600	\$246,600	\$246,600	\$246,600
a. Number of FTE	2	2	2	2	2
b. Total Salary	\$180,000	\$180,000	\$180,000	\$180,000	\$180,000
c. Total Benefits (37%)	\$66,600	\$66,600	\$66,600	\$66,600	\$66,600
3. Support Staff (b + c below)	\$34,250	\$34,250	\$34,250	\$34,250	\$34,250
a. Number of FTE	.5	.5	.5	.5	.5
b. Total Salary	\$25,000	\$25,000	\$25,000	\$25,000	\$25,000
c. Total Benefits (37%)	\$9250	\$9250	\$9250	\$9250	\$9250
4. Technical Support and Equipment	\$80,000	0	0	0	0
5. Library	0	0	0	0	0
6. New or Renovated Space	0	0	0	0	0
7. Other Expenses (course development, marketing)	\$100,000	0	0	0	0
TOTAL (Add 1 – 7)	\$541,547.06	\$401,895.59	\$442,244.12	\$482,592.65	\$482,592.65

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.

UMGC has created an annual program review process that includes assessment of student learning as described earlier along with non-direct measures of student learning including student course evaluations, student retention and graduation rates, and student program surveys administered in capstone courses. As part of this process, external data is collected, including enrollment in related programs at other institutions and trends in labor markets. UMGC's mission for career relevant education requires that program learning goals and curriculum are maintained in the context of changing needs in labor markets and required skills for graduates.

As part of the annual program review, courses within the program portfolio are reviewed for course health. This includes student success rates within courses and course reenrollment rates (how many students in a course re-enroll in the following term). In addition, student course evaluations are administered every term for every course. Data are aggregated in academic dashboards at the course level to allow faculty to evaluate the effectiveness of course curriculum and delivery. When a course is scheduled for revision, faculty teaching the course are surveyed to provide input to the faculty and instructional designers revising the course.

UMGC is in the process of adopting Quality Matters for course evaluation. As that process rolls-out, courses will be reviewed on a regular basis against the Quality Matters rubric to further ensure quality of course materials and design.

Full-time faculty are reviewed at least every two years. Part-time faculty are reviewed on a course/semester basis. The student course evaluation provides an opportunity for faculty to receive both quantitative and qualitative feedback on their teaching.

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.

Faculty, administrators, and the Office of Academic Quality collaborate to implement and monitor assessment activities, review results, and make appropriate resource, curriculum, or other modifications. Annually, student performance across learning demonstrations is evaluated to determine where improvements may be required. Changes are made to curriculum and/or student support models. The process supports a continuous cycle of improvement.

Additional evaluation includes tracking of student retention, grade distributions and cost-effectiveness. Regular academic program reviews consider all factors related to academic quality, curriculum currency and relevance, student support and adequacy of facilities.

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.**

UMGC seeks to reflect the diversity of the global community it serves. Cultural differences are recognized, valued, and considered essential to the educational process. UMGc provides an academic environment in which diversity is not only articulated as one of the institutional core values but is reflected in the university's ethnically and racially diverse student body and its proven record of providing higher education access to minority students. The university's Digital Teaching and Learning unit collaborates with UMGc's Office of Diversity and Equity to ensure a robustly inclusive curriculum that is built around UMGc's focus on project-, scenario-, and problem-based learning, which learning science has shown to more adequately respond to the learning approaches most effective for adult students. Additionally, the School of Cybersecurity and Information Technology is undertaking a focused initiative, in collaboration with the Office of the Chief Digital Officer, to specifically enhance inclusion in the School's offerings, starting with the diversity of perspectives and identities reflected in the projects that anchor the School's curriculum.

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.**

N/A

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

University of Maryland Global Campus has been approved to offer distance education by the Middle States Commission on Higher Education (MSCHE) and maintains compliance with COMAR 13B.02.03.22. UMGc is approved to offer distance education as an alternative delivery method included within its scope of accreditation, as evidenced in the university's MSCHE Statement of Accreditation Status. Furthermore, among its many recognitions, as of 2016 UMGc had received five Sloan Consortium (now Online Learning Consortium) Excellence Awards for online program quality and three IMS Global Learning Consortium awards for technology integration in the classroom environment.

Historically, UMGc was an early provider of off-campus educational opportunities for students and one of the first universities in Maryland to develop online education. UMGc has been a leader among public institutions in providing quality and affordable online education and has been providing distance education to residents of the state of Maryland, to the nation's service members, and to those who live outside of Maryland for more than seventy years. Additionally, UMGc's Europe and Asia divisions offer hybrid and onsite classes to fulfill contract requirements and meet the needs of military

students overseas. Stateside, all onsite classes, with the exception of an occasional accelerated offering, are in hybrid format, blending onsite and online delivery.

UMGC's distance education offerings, including the DMCCPA, are in compliance with C-RAC's 2011 Guidelines.

Appendix A



90.2.1.001

cc: LEL
Bob S.

Robert L. Ehrlich, Jr.
Governor

Michael S. Steele
Lt. Governor

John J. Oliver, Jr.
Chairman

Calvin W. Burnett
Secretary of Higher Education

MEMORANDUM

DATE: January 6, 2005
TO: Dr. Nicholas H. Allen
Provost and Chief Academic Officer, UMUC
FROM: Michael J. Kiphart, Ph.D. *MAK*
Assistant Secretary for Planning and Academic Affairs
SUBJECT: UMUC Waiver of Full-Time Faculty and Library/Learning Resources Center

Office of the Provost
UMUC

JAN 10 2005

According to our records, UMUC's request for a waiver of full-time faculty and library/learning resource center went before the Education Policy Committee on January 16, 1996. The Education Policy Committee approved for the University a waiver of the definition of full-time faculty and library/learning resource center as provided for in the Commission's Minimum Requirements for Degree-Granting Institutions, and further, that the Commission instruct the Secretary of Higher Education to review the University at regular intervals to assure that the University was in compliance with the applicable provisions of the waiver to the minimum requirements.

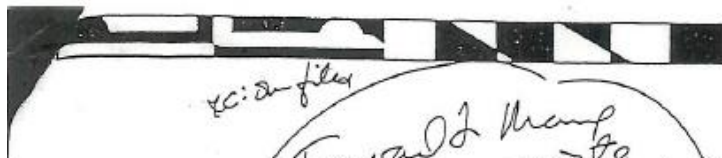
On February 15, 1996, the matter went before the Commission and an amended recommendation was approved. The Commission approved for the University a waiver of the requirements for total credit hours taught by full-time faculty and for a waiver of the requirements for a minimum library collection for the Library/Learning Resource Center as provided for in the Commission's Minimum Requirements for Degree-Granting Institutions. Further, the Commission instructed the Secretary of Higher Education to review the University at regular intervals to assure that the University was in compliance with the applicable provisions of the waiver to the minimum requirements. The Commission also approved a recommendation that the Faculty Advisory Council and Student Advisory Council recommendations be referred to the University of Maryland System Board of Regents.

Enclosed are documents supporting the approval of the waiver. Should you require additional assistance, please contact David Sumler, Director of Academic Affairs – Planning and Policy, at 410-260-4533 or dsumler@mhec.state.md.us.

MJK:aaw
Enclosures

MARYLAND HIGHER EDUCATION COMMISSION

839 Bestgate Rd. • Suite 400 • Annapolis, MD 21401-3013
T 410.260.4500 • 800.974.0203 • F 410.260.3200 • TTY for the Deaf 800.735.2258 • www.mhec.state.md.us

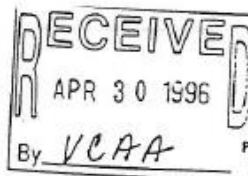


cc: a file

Forwarded Memo
for appropriate
action
vra
Conn. n 68
Polin

Mr. Lance W. Billingsley, Esq.
Chairman, Board of Regents
University of Maryland System
3300 Metzger Road
Adelphi, MD 20783

April 23, 1996



Parris N. Glendening
Governor

Edward O. Clarke, Jr.
Chairman

Patricia S. Florestano
Secretary of
Higher Education

RECEIVED

APR 29 1996

OFFICE OF THE CHANCELLOR
THE UNIVERSITY OF MARYLAND
SYSTEM

Dear Mr. Billingsley:

At its February 15, 1996 meeting, the Maryland Higher Education Commission considered a request by University of Maryland University College for a waiver of the Commission's minimum requirements in the area of full-time faculty and library resources. The Commission has granted the waiver.

In the discussion of the waiver and related issues, both the Faculty Advisory Council and the Student Advisory Council to the Commission raised issues which the Commission felt were more appropriately addressed by the University of Maryland's governing board. Therefore, I am forwarding to you the resolutions submitted to the Commission by these two advisory councils, in addition to the relevant materials considered by the Commission in granting the waivers.

Consistent with the final recommendations of the Commission on this matter, I would appreciate a review of these issues by the Board of Regents. I would also appreciate receiving the results of that review when it is completed. Since the academic year is coming to a close, I realize that any reaction on the part of the Board of Regents may be delayed until next fall. In light of that schedule, could you please supply the Commission with the Board of Regents' position by November 1, 1996.

Sincerely,

Edward O. Clarke, Jr.
(cr)

Edward O. Clarke, Jr.
Chairman

EOC:PSF:JAS:ds

Enclosures

cc: Dr. Patricia S. Florestano
✓ Dr. Donald N. Langenberg

16 Francis St., Annapolis, MD 21401-1781 | (410) 974-2971 | FAX (410) 974-3513
TTY for the Deaf: (800) 735-2258



Appendix B
UMGC Cloud Computing Systems Degree Planning Course Sequence Sheet
Bachelor of Science in Cloud Computing Systems

This sheet is designed to give an overview of the bachelor's degree requirements at UMG. Every student's plan is unique to them based on their previous education. For full course descriptions and an overview of all requirements, please refer to the current UMG catalog. A minimum of 30 credits must be earned at UMG including at least half of the major/minor; 36 credits must be upper level including half of the credit in the major/minor. Please contact UMG with all questions in regard to your official degree plan. Degree requirements may change based on the date of initial enrollment at UMG.

Program	Course Sequence	Recommended Course	Level	Course Note	Alternative Course(s)
Cloud Computing Systems	1	LIBS150 (1)	GE	Recommended Research Gen Ed	CAPL 398A
	2	PACE111 (3)T	GE	Required Research Gen Ed	Any PACE 111
	3	WRTG111 (3)	GE	Recommended Communication Gen Ed	Any other WRTG
	4	IFSM201 (3)	GE	Required Computing Gen Ed; Pre-req to Major	N/A
	5	NUTR100 (3)	GE	Recommended Bio/Phys Sci Gen Ed	Any other ASTR, BIOL, CHEM, GEOL, NSCI, NUTR, or PHYS
	6	CMIT265 (3)	Major	Required Major Course	N/A
	7	SPCH100 (3)	GE	Recommended Communication Gen Ed	Any other WRTG/SPCH/COMM
	8	MATH 107 (3)	GE	Required Math Gen Ed	N/A
	9	WRTG112 (3)	GE	Required Communication Gen Ed	N/A
	10	CCS 267 (3)	Major	Required Major Course	N/A
	11	HIST125 (3)	GE	Recommended HU/Arts Gen Ed	Any other ARTH, ARTT, ASTD, ENGL (except ENGL 281 and ENGL 384), GRCO, HIST, HUMN, MUSC, PHIL, THET, dance, literature, or foreign language
	12	BIOL103 (4)	GE	Recommended Bio/Phys Sci Gen Ed with required LAB	Any other ASTR, BIOL, CHEM, GEOL, NSCI, NUTR, or PHYS with LAB

	13	BEHS103 (3)	GE	Recommended Beh/Soc Sci Gen Ed	Any other AASP (201 only), ANTH, ASTD, BEHS, CCJS (100, 105, 350, 360, 461 only), ECON, GEOG, GERO (except 342 and 351), GVPT, PSYC, SOCY, or WMST (200 only)
	14	ARTH334 (3)	GE	Recommended HU/Arts Gen Ed	Any other ARTH, ARTT, ASTD, ENGL (except ENGL 281 and ENGL 384), GRCO, HIST, HUMN, MUSC, PHIL, THET, dance, literature, or foreign language
	15	Elective (3)	Elective	Elective	
	16	ECON103 (3)	GE	Recommended Beh/Soc Sci Gen Ed	Any other AASP (201 only), ANTH, ASTD, BEHS, CCJS (100, 105, 350, 360, 461 only), ECON, GEOG, GERO (except 342 and 351), GVPT, PSYC, SOCY, or WMST (200 only)
	17	CMIT 291 (3)	Major	Required Major Course	N/A
	18	Elective (3)	Elective	Elective	
	19	CMIT 326 (3)	Major	Required Major Course	N/A
	20	Elective (3)	Elective	Elective	
	21	CMIT 336 (3)	Major	Required Major Course	N/A
	22	CCS 346 (3)	Major	Required Major Course	N/A
	23	CCS 356 (3)	Major	Required Major Course	N/A
	24	WRTG393 (3)	GE	Recommended Communication Gen Ed	Any other Upper-level WRTG
	25	Elective (3)	Elective	Elective	
	26	CMIT426 (3)	Major	Required Major Course	N/A
	27	Elective (3)	Elective	Elective	
	28	Elective (3)	Elective	Elective	
	29	CMIT436 (3)	Major	Required Major Course	
	30	Elective (3)	Elective	Elective	
	31	Elective (3)	Elective	Elective	
	32	CCS 446 (3)	Major	Required Major Course	
	33	IFSM 461 (3)	Elective	Recommended Elective	

	34	Elective (3)	Elective	Elective	
	35	Elective (3)	Elective	Elective	
	36	Elective (3)	Elective	Elective	
	37	Elective (3)	Elective	Elective	
	38	Elective (3)	Elective	Elective	
	39	Elective (3)	Elective	Elective	
	40	CCS495 (3)	Major	Required Major Course	N/A
	41	Elective (1)	Elective	Elective	

Appendix C

Mapping of Program learning Goals for the B.S. program to core courses in the major

Program Learning Goals	CMI T 265	CCS 267	CMIT 291	CMIT 326	CMI T 336	CCS 346	CCS 356	CMIT 426	CMI T 436	CCS 446	CCS 495
Communicate effectively in a variety of contexts utilizing appropriate techniques to convey results	x	x	x	x	x	x	x	x	x	x	x
Evaluate and solve complex issues or problems which require technical and management skills that pertain to cloud computing	x	x	x	x	x	x	x	x	x	x	x
Apply quantitative reasoning to analyze data related to business cloud needs, support conclusions, and solve problems that utilizes cloud frameworks	x	x	x	x	x	x	x	x	x	x	x
Collaborate with team members to plan, assess and develop appropriate solutions for cloud adoption	x	x	x	x	x	x	x	x	x	x	x
Evaluate the cloud infrastructural needs of an organization, analyze cost estimates and value proposition of the cloud utilizing appropriate techniques to provide reasonable solution recommendations to an organization				x	x	x					x
Propose a network virtualization plan that utilizes cloud services and technologies required to deploy a cloud solution	x	x	x								x
Design a secure, reliable, scalable and cost-effective cloud-based application utilizing industry-standard methods, models and techniques for a specific cloud project							x			x	x
Design a cloud deployment solution based on architectural design principles, processes and frameworks and customer requirements							x	x		x	x
Devise a comprehensive compliance, policy and risk assessment plan based on best practices, procedures						x		x	x	x	x

and processes for the cloud solution to mitigate cloud adoption risk											
Create a security strategy for mitigating cloud security risk and threats associated with cloud adoption									x	x	x
Develop an administrative, monitoring, maintenance, auto-scaling and configuration plan for the cloud solution				x	x	x					x