CAPITOL
TECHNOLOGY
UNIVERSITY

1927

Bradford L. Sims, PhD
President

February 12, 2018

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

Dear Dr. Fielder,

Capitol Technology University is requesting approval to offer a **B.S. in Construction Management and Critical Infrastructure**. The degree curriculum requires the development of new courses as well as utilizes existing courses in our computer, systems, and electrical engineering degree areas, cyber security, and telecommunications.

The mission of Capitol Technology University is to provide practical education in engineering, computer science, information technology, and management that prepares individuals for professional careers and affords the opportunity to thrive in a dynamic world. A central focus of the university's mission is to advance practical working knowledge in areas of interest to students and prospective employers within the context of Capitol's degree programs. The university believes that a B.S. in Construction Management and Critical Infrastructure is consistent with this mission.

There is now an intersection between construction management and the protection of critical infrastructure given the current global environment. This new degree recognizes the reality and provides a curriculum to train construction managers and professional with the critical infrastructure necessary now and in the future. This approach builds upon already successful areas of study such as the B.S. in Management of Cyber and Information Technology, which integrates business and cybersecurity. Capitol Technology University's programs are structured to teach students the leadership and technical skills necessary to meet the needs of a modern technology-dependent society. These programs have been preparing professionals for rapid advances in technology, intense global competition, and more complex business environments for decades.

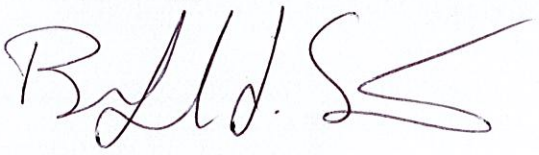
The Department of Homeland Security has identified sixteen critical infrastructure sectors. Those sectors span every sector of the construction industry. The Department of Homeland Security considers the assets, systems, and networks of each sector so vital to the United States that their incapacitation or destruction would have a debilitating effect on security, national economic security, and national public health and safety. As a result, there is a pressing need to educate and train construction management and Critical Infrastructure professionals so the protection of those

assets, systems, and networks are considered at inception, not afterwards. Graduates with the B.S. in Construction Management and Critical Infrastructure degree will fill this need, making the degree extremely relevant now and in the future.

Graduates of Construction Management and Critical Infrastructure are desirable across many fields, across a variety of job categories and levels of employment. A critical gap between the supply and demand of skilled leaders with this knowledge is increasing in demand, which translates into a growing need for universities and other academic institutions to support programs that educate construction management and critical infrastructure professionals at all levels and for all industries.

**To respond to industry need, we respectfully submit for approval a B.S. in Construction Management and Critical Infrastructure. The required proposal is attached as is the letter from me as university president confirming the adequacy of the university's library to serve the needs of the students in this degree.**

Respectfully,



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

Dear Dr. Fielder,

This letter is in response to the need for confirmation of the adequacy of the library of Capitol Technology University to support the proposed B.S. in Construction Management and Critical Infrastructure. As president of the university, I confirm that the library resources, including support staff, are more than adequate to support the B.S. in Construction Management and Critical Infrastructure. In addition, the university is dedicated to and has budgeted for continuous improvement of library resources.

Respectfully,

Bradford L. Sims, PhD

# PROPOSAL FOR:

__X__NEW INSTRUCTIONAL PROGRAM

_____ SUBSTANTIAL EXPANSION/MAJOR MODIFICATION

_____ COOPERATIVE DEGREE PROGRAM

__X__WITHIN EXISTING RESOURCES or____REQUIRING NEW RESOURCES

CAPITOL TECHNOLOGY UNIVERSITY

1927

Institution Submitting Proposal

**Fall 2018**

Projected Implementation Date

**Bachelor of Science**
Award to be Offered

**Construction Management and Critical Infrastructure**
Title of Proposed Program

**0908**
Suggested HEGIS Code

**14.0801**
Suggested CIP Code

**Business and Information Sciences**
Department of Proposed Program

**Claude Rankin**
Name of Department Head

**Dr. Helen Barker**
VP Academic Affairs, CAO

**hgbarker@captechu.edu**
Contact E-Mail Address

**240-965-2510**
Contact Phone Number

2-12-18
Signature and Date

President/Chief Executive Approval

2-12-2018
Date

Date Endorsed/Approved by Governing Board

**Proposed Bachelor of Science in Construction Management and Critical Infrastructure**
**Department of Business and Information Sciences**
**Capitol Technology University**
**Laurel, Maryland**

## A. Centrality to institutional mission statement and planning priorities:

1. **Program description and relationship to university mission and how it relates to the institution's approved mission.**

   *Bachelor of Science in Construction Management and Critical Infrastructure Program Description*:

   The Bachelor of Science (B.S.) Construction Management and Critical Infrastructure curriculum is designed to meet the needs of industry and government. The program combines education and experience in both technical and managerial skills to prepare students for leadership roles in the Construction Management and Critical Infrastructure protection professions. Laboratory work supplements classroom lectures to provide practical and useful skills. Students gain additional real-world experience through participation in a required internship. With its comprehensive, management-oriented focus and critical infrastructure training, the program helps students understand the impact of construction on the environment and society and prepares students to be leaders in this exciting field.

   *Relationship to Institutional Approved Mission:*

   The B.S. in Construction Management and Critical Infrastructure is consistent with the University mission to educate individuals for professional opportunities in engineering, business, computer science, and information technology. We provide relevant learning experiences that lead to success in the evolving global community. Fundamental to the degree programs in the Department of Business and Information Sciences are opportunities to produce skilled systems-oriented professionals. The B.S. in Construction Management and Critical Infrastructure is consistent with that philosophy. This same philosophy is supported by existing degree programs and learning opportunities. The degree is an integral part of the strategic plan for FY 2019-2020 and forward. Funding to support the new degree has been included in institutional and departmental budgets for FY 2018-2019 and forecasted budgets going forward.

   The degree will be offered in hybrid format with courses on ground and online. This results in the convenience required by the 21st century learner, and provides live interaction with faculty and fellow students critical to the high-level learning experience. The curriculum provides students real-world opportunities through labs, case studies, and an internship, thereby providing the student the necessary practical experience the University believes critical to success in the modern aviation environments. The degree is consistent with the interdisciplinary nature of the University as well as the field of Business and Information Sciences. This opportunity will be available to all University students.

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

   Capitol Technology University operates on five strategic goals:

1. **Elevating Education and Academic Quality:** *The University is an institution that offers career relevant curriculum with quality learning outcomes.*

2. **Expand Enrollment and Reputation:** *The University will become more globally renowned and locally active through student, faculty, and staff activities.*

3. **Diversify and Increase Financial Resources**: *The University will enhance its financial resources by expanding the range and amount of funding available to the institution, aligning costs with strategic initiatives, and expanding corporate relationships.*

4. **Maintain Institutional Viability**: *The University is committed to providing relevant learning in a quality learning environment.*

5. **Extend Our Family of Organizational Partners**: *The mission of Capitol Technology University is to provide relevant learning experiences that lead to success in the evolving global community.*

This new instructional program supports all those goals. It does so, in part, because of the cross disciplinary nature of the program. There is now an intersection between construction management and the protection of Critical Infrastructure given the current global environment. This new degree recognizes the reality and provides a curriculum to train construction managers and professional with the Critical Infrastructure necessary now and in the future. This approach builds upon already successful areas of study such as the B.S. in Management of Cyber and Information Technology, which integrates business and cybersecurity. Capitol Technology University's programs are structured to teach students the leadership and technical skills necessary to meet the needs of a modern technology-dependent society. These programs have been preparing professionals for rapid advances in technology, intense global competition, and more complex business environments for decades. The B.S. in Construction Management and Critical Infrastructure degree allows these students to move their skills and careers to the next level within the evolving global community.

The new B.S. in Construction Management and Critical Infrastructure is fully supported by the university's Vision 2025 and Strategic Plan 2018-2021. Funding to support the degree has been included in forecasted budgets going forward.

If approved, the new B.S. in Construction Management and Critical Infrastructure will use the Capitol Technology University's Information Literacy Path in the same manner as all of the other degrees at the institution. Information Literacy is infused in to the university's curriculum and the undergraduate experience. Capitol Technology University's Information Literacy Path begins during Orientation and Freshman Seminar. The experience continues every semester through the university's Writing Across the Curriculum program where there are writing assignments in all courses -- some of which require significant research. During the Freshman year, students are required to take English Communications I (EN-101) and English Communications II (EN-102). Both courses have a series of writing assignments that begin during Week 1 and continue to Week 16 of the semester. In addition to examining literature, EN-102 requires a team project in global research. There are two other courses that are required by every degree at the university: Ethics (SS-351) and Arts and Ideas (HU-331). Both courses are focused on research and experiential learning. All students also have access to information videos on the university's portal that support Information Literacy through the university library. All students at the university will experience all the markers in the Information Literacy Path regardless of learning modality (i.e., online, on ground, and hybrid).

The University has active partnerships (e.g., Leidos, Patton Electronics, Lockheed Martin, Northrup Grumman, and Cyber Security Forum Initiative, IRS, SAS) at the private and public level. The B.S. in Construction Management and Critical Infrastructure degree will provide new opportunities for partnerships as well as research. Potential partnerships for internships were identified at the most recent job fair held at the University. The increase in partnerships and placement of our interns and graduates in our partner institutions will serve to expand the university's enrollment and reputation. While additional enrollment will increase financial resources, additional partnerships and grants in the construction and Critical Infrastructure arenas will help diversify and increase financial resources.

The Department of Homeland Security has identified sixteen critical infrastructure sectors. Those sectors span every sector of the construction industry. The Department of Homeland Security considers the assets, systems, and networks of each sector so vital to the United States that their incapacitation or destruction would have a debilitating effect on security, national economic security, and national public health and safety. As a result, there is a pressing need to educate and train construction management and Critical Infrastructure professionals so the protection of those assets, systems, and networks are considered at inception, not afterwards. Graduates with the B.S. in Construction Management and Critical Infrastructure degree will fill this need, making the degree extremely relevant now and in the future.

**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 advancement and evolution of knowledge.**

   Our nation, state, and society are faced with an urgent need build newer, more secure critical infrastructure and to protect better the existing critical infrastructure. Capitol Technology University believes it is imperative to position the state to take advantage of this urgent need, rather than standing on the sidelines while there is a nationwide demand for properly educated and trained talent in the interdisciplinary intersection of construction management and Critical Infrastructure.

   In 2013, Presidential Policy Directive 21 (PPD-21) called for a national unity of effort in this arena.

   > The Nation's critical infrastructure provides the essential services that underpin American society. Proactive and coordinated efforts are necessary to strengthen and maintain secure, functioning, and resilient critical infrastructure – including assets, networks, and systems – that are vital to public confidence and the Nation's safety, prosperity, and well-being.
   >
   > The Nation's critical infrastructure is diverse and complex. It includes distributed networks, varied organizational structures and operating models (including multinational ownership), interdependent functions and systems in both the physical space and cyberspace, and governance constructs that involve multi-level authorities, responsibilities, and regulations. Critical infrastructure owners and operators are uniquely positioned to manage risks to their individual operations and assets, and to determine effective strategies to make them more secure and resilient.

Critical infrastructure must be secure and able to withstand and rapidly recover from all hazards. Achieving this will require integration with the national preparedness system across prevention, protection, mitigation, response, and recovery.

(Source: https://obamawhitehouse.archives.gov/the-press-office/2013/02/12/presidential-policy-directive-critical-infrastructure-security-and-resil)

The prevention, protection, mitigation, response, and recovery of Critical Infrastructure is highly dependent on the Construction industry and its leaders. Construction Management professionals must be educated in the knowledge gained since the 9/11 Terrorist Attacks and lessons learned so the Construction industry can take a proactive approach in a national unity of effort to protect our Critical Infrastructure.

**b. Societal needs, including expanding educational opportunities and choices for minorities and educationally disadvantaged students at institutions of higher education.**

Capitol Technology University has a long history of serving the minority population. The university has a 51% minority student population with 7% undisclosed. The university's minority population is 34% African American.

**c. Provide evidence that the perceived need is consistent with the Maryland State Plan for Postsecondary Education.**

The 2013-2017 Maryland State Plan for Postsecondary Education articulates six goals for postsecondary education:

1. Quality and Effectiveness
2. Access, Affordability, and Completion
3. Diversity
4. Innovation
5. Economic Growth and Vitality
6. Data Use and Distribution

**Goal 1**

The B.S. in Construction Management and Critical Infrastructure program, with its rigor, will produce highly qualified professionals in the interdisciplinary field of construction management and Critical Infrastructure. The university has a proven record of quality education. In addition to regional accreditation from the Middle States Commission on Higher Education (MSCHE), the International Accreditation Council for Business Education (IACBE) accredits the university's management degrees. The B.S. in Construction Management and Critical Infrastructure program is consistent with the criteria for the delivery of high quality higher education and the IACBE accreditation requirements. Faculty and staff are engaged in faculty development to remain current in their field of teaching as well as to expand knowledge across disciplines. The university has in place services and learning tools to guide students to successful degree completion. Programs such as Early Alert provide staff and faculty opportunities for early student intervention in the pathway to graduation. This applies to all students regardless of mode of course delivery. Capitol is a transfer friendly institution and participates in multiple programs for government and military credit transfer. Capitol participates in the Articulation System for Maryland Colleges and

Universities (ARTSYS) and has multiple transfer agreements with local institutions at all degree levels.

## Goal 2

The courses for the B.S. in Construction Management and Critical Infrastructure will be offered in the hybrid format with courses offered both on ground and online. This provides learning opportunities for students unable or unwilling to attend an on-campus institution of higher education. The University provides a tuition structure that is competitive with its competitors. The University tuition structure does not differentiate between in-state and out-of-state students. Student services are designed to provide advising, tutoring, virtual job fair attendance, and other activities supporting student completion and employment for both on-ground and online students.

Students receive information through admissions regarding the cost to attend the university. The information is also publicly available on the university website. Admissions and financial aid identify for the student potential grants, scholarships, and state plans to reduce potential student debt. The net cost vs gross costs are identified clearly for the student. Students receive advising from financial aid prior to enrolling in classes for the first time. Admissions, student services and departmental chairs advise students as to academic readiness and degree requirements. The specific success pathway is developed for each student.

The university tuition increases have not exceeded 3%.

The university has in place services, tutoring, and other tools to help ensure student graduation and successful job placement. The university hosts a career (job) fair twice a year. The university has an online career center available to all students covering such topics as career exploration, resume writing, job search techniques, social media management, mock interviews, and assistance interpreting job descriptions, offers, and employment packages.

The university works with its advisory boards, alumni, partners, and faculty to help ensure that the degrees offered at the university are compatible with long term career opportunities in support of the state's knowledge based economy.

## Goal 3

The Capitol Technology University community is committed to creating and maintaining a mutually respectful environment that recognizes and celebrates diversity among all students, faculty, and staff. The university values human differences as an asset and works to sustain a culture that reflects the interests, contributions, and perspectives of members of diverse groups. The university delivers educational programming to meet the needs of diverse audiences. We also seek to instill those values, understanding, and skills to encourage leadership and service in a global multicultural society.

The university supports various clubs that identify with diverse groups including race, gender, military/veterans, and sexual orientation. The university has a 51% minority student population with 7% undisclosed. The Black/African American population is 34%. For our size, the university has military/veteran population of 22%. We have a 17% female population, which is significant given that institution is a technology university.

Achievement gaps: The university provides leveling courses in support of individuals attempting a career change to a field of study not necessarily consistent with their current skills. There are situations where additional undergraduate courses best serve student needs in subject areas. The university makes these courses available.

The university engages in diversity training for its institutional population, including students. Diversity and inclusiveness are built in to the curriculum allowing graduates to operate effectively in a global environment. The university supports such things a team projects and grants across degrees. This has proven effective at supporting multiple aspects of diversity.

## Goal 4

Capitol Technology University's past, present, and future is inextricably intertwined with innovation. The university has a long tradition of serving as a platform for the use of new and transformative approaches to delivering higher education. New technology and cutting-edge techniques are blended with proven strategies with the goal of enabling student success in the classroom as well as in a successful career after graduation. As a small institution, Capitol Technology University can quickly integrate new technologies into the curriculum to better prepare students for the work environment. The university designs curriculum in alliance with accreditation and regulating organizations/agencies.

The university employs online virtual simulations in a game-like environment to teach practical hands-on application of knowledge. The university is engaged with a partner creating high level virtual reality environments for some courses in the degree. This all occurs in parallel with traditional proven learning strategies. These elements of the university learning environment are purposeful and intended to improve the learning environment for both the student and faculty member. In addition, these elements are purposely designed to increase engagement, improve outcomes, and improve retention and graduation rates. The university believes that innovation is the key to successful student and faculty engagement.

Example: The university engages its students in 'fusion' projects, which allows students to contribute skills in interdisciplinary projects such as those in our Astronautical Engineering and Cyber labs where business students become project managers (e.g., to send a CubeSAT on a NASA rocket) and data analysts (e.g., to analyze rainforest data for NASA). If the request for a B.S. in Construction Management and Critical Infrastructure is approved, the university will recruit partners to create real-world integrative learning opportunities for students in the degree.

## Goal 5

One of the overarching principles of Capitol Technology University's approach to education is to instill a zeal for life-long learning in our students, which promotes economic growth and vitality of the student. Construction Management and Critical Infrastructure are fields where the knowledge base keeps improving with technological advances. University partnerships (both current and future) will provide learning and economic growth opportunities for its students, faculty and staff, and partners. Currently, the university's multiple degree levels provide opportunities for undergraduate and graduate students to engage in high level research partnerships. The university is also committed to partnering with Maryland institutions to employ our graduates to keep the talent in the state. The university instills in students of all majors an entrepreneurial attitude preparing them to bring skills to existing businesses or start a business of their own; the university strongly believes the best location for both career choices is in the state of Maryland.

## Goal 6

Capitol Technology University is committed to data collection and disclosure beyond the requirements of regulations and accreditation. Data is publicly available on the university website. Assessment for the university is the responsibility of the VP of Academic Affairs. Highly skilled personnel are required in a timely manner to accumulate the data, analyze the data, distribute the results, and recommend potential decisions to achieve the desired outcomes. In addition, data is evaluated by the University Academic Dean, department chairs, faculty, advisory boards, trustees, university executives, etc. to make the best decision possible.

**C. Quantifiable & reliable evidence and documentation of market supply and demand in the region and State:**

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

The construction industry is thriving as the economy continues to grow and the effect of recent reduction in the corporate tax rate to 21% is beginning to be felt across the sector.

"All signs and numbers point to a huge year for the construction industry. Even in December, with much of the nation frozen, the construction industry added 30,000 jobs, according to the Bureau of Labor Statistics.

For all of 2017, construction added 210,000 jobs, a 35 percent increase over 2016.

Construction spending is also soaring, rising more than expected in November to a record $1.257 trillion, according to the Commerce Department. That was up 2.4 percent annually. Spending increased across all sectors of real estate, commercial and residential, with particular strength in private construction projects. The only weakness was in government construction spending.

Construction firms are clearly looking to hire more workers. Three-quarters of them said they plan to increase payrolls in 2018, according to a new survey from the Associated General Contractors of America. Industry optimism for all types of construction, measured by the ratio of those who expected the market to expand versus those who expected it to contract, hit a record high.

"This optimism is likely based on current economic conditions, an increasingly business-friendly regulatory environment and expectations the Trump administration will boost infrastructure investments," said Stephen Sandherr, the association's CEO.

Contractors are most optimistic about construction in the office market, which has seen little action since the recession. Transportation, retail, warehouse and lodging were also strong in the survey."

(Source: https://www.cnbc.com/2018/01/05/by-all-measures-a-construction-boom-is-shaping-up-for-2018.html)

"ConstructConnect's construction starts forecast for 2018 is a 4.8% increase to $773.1 billion. Commercial construction (offices, parking garages and transportation terminals) is expected to have a 12.4% increase in starts next year..."

(Source: https://www.constructconnect.com/blog/construction-news/2018-construction-industry-economic-outlook/)

However, there is a shortage of highly trained personnel to fill the job openings within the construction industry.

"Looking ahead to the beginning of 2018, it seems that employers in industries across the board are expecting to add jobs, with certain sectors more likely to hire than others... Construction is showing a +18% employment outlook... We're seeing a renaissance in industries like construction and manufacturing in the U.S.," said Becky Frankiewicz, president of ManpowerGroup North America, as part of the release of the data. "These are not the jobs of the past; many are highly skilled roles that will build America's future. Strong hiring intentions tell us employers have positions to fill, yet we know they're struggling to find people with the right skills to fill them. Technological disruption will touch all industries sooner or later."

(Source: https://www.forbes.com/sites/karstenstrauss/2017/12/14/where-the-jobs-will-be-in-2018/#5b9bdb1b60e3)

"Construction labor looks to be a stubborn problem to resolve," noted Kermit Baker. Labor shortages will continue to plague the construction industry in 2018 and the years to come."

(Source: https://www.constructconnect.com/blog/construction-news/2018-construction-industry-economic-outlook/)

"The biggest concern for the industry is the severe shortage of labor... Construction firms are adding jobs, but workers are also leaving the industry, aging out. In 2017, a net 190,000 new workers entered the construction industry, far lower than the prior three-year average of 284,000 annual additions."

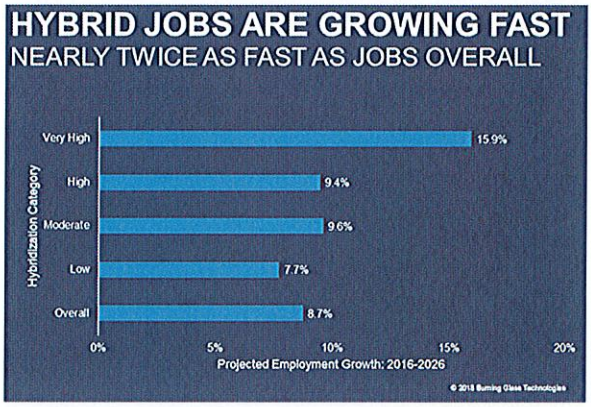
(Source: https://www.cnbc.com/2018/01/05/by-all-measures-a-construction-boom-is-shaping-up-for-2018.html)

2. **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.**

Interdisciplinary degrees that lead to hybrid jobs are growing much faster than single occupational field. In a recent article, "Hybrid Jobs Projected to Grow Twice as Fast as Jobs Overall," Burning Glass Technologies explains how the market is changing.

> "Hybrid jobs" represent a major shift in the makeup of occupations—and hybrid jobs growth is increasing twice as fast as the rest of the job market.
>
> Hybrid jobs are a challenge and an opportunity for educators and jobseekers alike, because they meld skills from different disciplines. For example, mobile application developers have to understand programming, design, data analysis, user experience and core marketing skills. Those who possess the right combination of these skills are highly sought – twice as much in demand as compared to skills requested in the overall job market.

Burning Glass Technologies has developed a hybridization score for jobs, based on the extent to which they draw on skills from different fields. Our projections, based on our analysis of labor market demand via job postings, shows jobs with a "very high" hybridization score will grow nearly 16% by 2026, compared to 8.7% for jobs overall. Jobs with a low hybridization score, where skills are concentrated in one field, are only projected to grow 7.7%.




In a 12-month period, we found that more than a quarter million job postings sought this kind of hybrid talent…

The good news: Those with the needed skills can command salaries comparable to those for positions with more advanced technical requirements. The challenge: these skills aren't traditionally thought of as linked. Thus business, design and programming are skills and disciplines that aren't typically taught together – or sought out as a package by students.

…The takeaway for educators: hybrid jobs growth will require students to mix skill sets, which means there's an opportunity for institutions that make it easier for students to combine courses and disciplines into these hybrid skill sets.

(Source: http://burning-glass.com/hybrid-jobs-growth/)

The protection of Critical Infrastructure is one area that is now permeating all other sectors of the economy. One industry that also spans all of the others of the economy is construction, making it an industry that will be required to address the protection of Critical Infrastructure in all of its projects in the future.

"Security is no longer restricted to just technology companies or financial institutions… organizations in charge of critical infrastructure such as the electric grid grapple with skilled adversaries who take advantage of holes in the network defenses to cause damage."

(Source: http://burning-glass.com/average-cybersecurity-salary-over-93000/)

**3. Data showing the current and projected supply of prospective graduates.**

Although there are over fifty top construction management programs in the United States. The university has been unable to find a hybrid Bachelor of Science degree that focuses directly on both construction management and Critical Infrastructure. This situation presents an opportunity for the

state of Maryland to have the first degree of its kind in the nation. It also presents the opportunity to offer a program that provides future construction managers and professionals with the cutting-edge skills that address the future needs of the construction industry rather than focusing on the past.

If approved, the B.S. in Construction Management and Critical Infrastructure will send its graduates in to the construction industry with management skills, real-world experience through internships, and the ability to address one biggest threats to every industry: attacks on Critical Infrastructure. Students in the proposed degree will receive courses in critical infrastructure protection (as it relates directly to the construction of facilities in the 16 Critical Infrastructure Protection sectors) as well as cybersecurity – an existing strength of the university and a key component of all Critical Infrastructure Protection plans.

If approved, Capitol Technology University's degree position its graduates to earn more money in the construction and fill the requirement for leaders in the industry to possess a bachelor's degree.
In another recent article, Burning Glass Technologies detailed the gap between the industry's needs and the ability of higher education's ability to produce the required number of graduates.
"To earn more money in construction, you would want to be a supervisor. For construction supervisors, 47% of job postings now require a bachelor's degree – but only 12% of current construction supervisors have one."

(Source: http://burning-glass.com/earn-more-money-become-manager/)

**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.**

   In the state of Maryland, Morgan State University offers a traditional Bachelor of Science degree in Construction Management and the University of Maryland Eastern Shore offers a Bachelor of Science degree in Construction Management Technology – a program that focuses on the technology in the construction industry [i.e., Building Information Modeling (BIM)] and Green Technology. However, neither Morgan State University nor the University of Maryland Eastern Shore offers a Bachelor of Science in Construction Management and Critical Infrastructure. Capitol Technology's proposed degree is distinctly different given its hybrid nature and focus on Critical Infrastructure Protection.

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

   The B.S. in Construction Management and Critical Infrastructure program is strongly aligned with the university's strategic priorities and is supported by adequate resources. The new B.S. in Construction Management and Critical Infrastructure degree will strengthen and expand upon management degree programs at the university. In addition, the Construction Management and Critical Infrastructure courses will be an option for all students as the field integrates well with the market needs of the university's other technical programs. The degree will represent study in two expanding disciplines. Research also shows a current and growing shortage of Construction Management professionals with a strong knowledge of Critical Infrastructure protection. This is an interdisciplinary academic field that helps fill this gap. There is a thorough discussion of the need in sections B and C of this document.

**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.**

   The university is not aware of any similar high-demand programs at the Maryland HBIs.

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

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

   The university is not aware of any impact on the uniqueness and institutional identities and missions of Maryland HBIs.

**G. Adequacy of curriculum design and delivery to related learning outcomes consistent with Regulation .10 of this chapter:**

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

   *Program description, as it will appear in the catalog:*

   The Bachelor of Science (B.S.) Construction Management and Critical Infrastructure curriculum is designed to meet the needs of industry and government. The program combines education and experience in both technical and managerial skills to prepare students for leadership roles in the Construction Management and Critical Infrastructure protection professions. Laboratory work supplements classroom lectures to provide practical and useful skills. Students gain additional real-world experience through participation in a required internship. With its comprehensive, management-oriented focus and critical infrastructure training, the program helps students understand the impact of construction on the environment and society and prepares students to be leaders in this exciting field.

   *Description of program requirements:*

   Entrance requirements: Have earned a high school diploma or GED. Students must have achieved a minimum of a 2.2 GPA in high school. Submit official transcripts of all prior academic work completed at community colleges, colleges, or universities you've attended. Submit SAT (minimum 800) or ACT (minimum 15) scores. The applicant must also interview with a Capitol Technology University Admissions Counselor. There are no special criteria for this degree.

   To be eligible to graduate from the university, students must have successfully completed all program course requirements, be in good academic standing (GPA 2.0 or higher), satisfied all financial obligations, and all other outstanding obligations to the university.

   *Degree Requirements:*

   The following is a list of courses for the B.S. in Construction Management and Critical Infrastructure degree. Students expecting to complete this degree must meet all prerequisites for the courses listed below.

**Construction Management and Critical Infrastructure**
**Courses**
**Total Credits: 121**

*CONSTRUCTION MANAGEMENT CORE COURSES – 39 CREDITS*

**CM-120 - Introduction to Construction Management (3 Credits)**
This course will introduce the basic history and management concepts of the construction industry to students with the expectation that upon completion students will have an overview of the industry. Career choices, industry firms, and key players in the Construction Management process will be explored.

**CM-125 - Construction Graphics and Plan Reading (3 Credits)**
This is an introductory course designed to prepare students to identify, read and interpret construction drawings. The course will be delivered from an applied perspective with an emphasis on understanding the processes involved in construction and interpreting them from drawings. Pre-requisite: CM-120

**CM-220 - Construction Methods and Materials (3 Credits)**
Vertical construction emphasizing comprehensive analysis of materials, design and specifications, installation methods, testing and inspection, and appropriate construction methodology for application. Prerequisite: CM-120 and MA-114

**CM-230 - Estimating I (3 Credits)**
Introduction to the classification of work from plans and specifications. Covers discussion of the estimating function and review and applications of material quantity survey techniques used in estimating costs of construction projects. Includes types of approximate and precise methods of estimating and their uses, and computer applications. Pre-requisite: CM-125

**CM-250 – Legal Issues in Construction (3 Credits)**
An overview of standard construction contracts traditionally used between contractors, owners, design professionals and subcontractors from a general contractor's point of view. Prerequisites: CM-220.

**CM-260 – Statics and Strengths of Materials (3 Credits)**
This algebra-based course is the study of forces acting upon structural elements. Analytic and graphic methods are used to illustrate resultants and reactions, equilibrium, centroids and moments of inertia applied to static structures. Analysis includes stress, strain, axial loading, bending, and deflection of beams. Prerequisite: MA-112 and PH-201

**CM-270 – Safety Management (3 Credits)**
Covers OSHA liability, general safety, hazard communication, fire, material handling, tools, welding, electricity, scaffolding, fall protection, cranes, heavy equipment, excavation, concrete, ladders and stairways, confined space entry, personal protective equipment, and health hazards. Prerequisite: CM-120

**CM-301 – Construction Project Management (3 Credits)**
The study of construction procedures and administration process using the latest construction management technologies and methods to explain typical project management functions and documentation. Prerequisites: CM-120, CM-125, CM-220, CM-230, CM-250, CM-260, CM-270.

**CM-330 - Estimating II (3 Credits)**
Covers pricing and bidding of construction work including cost factors, labor and equipment, productivity factors, prices databases, job direct and indirect costs, methods of estimating time, materials, equipment, subcontractors' work, general expenses, and profit, bid preparations and submission, and computer applications. Prerequisite: CM-230

**CM-350 - Construction Planning and Scheduling (3 Credits)**
A course using construction scheduling software with plans and specifications will be used in planning a construction project from start to finish. Prerequisite: CM-330

**CM-375 - Mechanical and Electrical Construction (3 Credits)**
An introduction to the basics of mechanical, electrical, plumbing and fire protection systems (MEP) in construction. This includes installation of systems and the necessary resources. Prerequisite: CM-220

**CM-380 – Environmental Systems (3 Credits)**
Comprehensive overview of environmental impact of common construction processes; and, environmental/occupational hazards and liability associated with those processes. Prerequisites: CH-120, CM-120, CM-250, and PH-201

**CM-450 – Management of Field Operations (3 Credits)**
This course is intended to equip students with knowledge and skills required to successfully manage and support construction field operations. Knowledge areas include contract administration, project engineering, site superintendence, and other topics critical to field operations.

***CRITICAL INFRASTRUCTURE – 9 CREDITS***

**CRI-210 - Critical Infrastructure I (3 Credits)**
This course will introduce participants to the key terms, policy, guidance, and preparedness efforts required to safeguard the Nation's critical infrastructure. Students will learn relevant policy and guidance, discuss the risk management framework, describe Federal critical infrastructure security and resilience and information sharing programs, and relate critical infrastructure programs to individual actions. Primary focus will be on incorporating Critical Infrastructure protection in to construction of facilities in six of the sixteen critical infrastructure sectors: chemical facilities, commercial (e.g., retail, entertainment, lodging), communications facilities, critical manufacturing facilities, dams, and energy facilities. Students will complete hands-on Critical Infrastructure projects related to the construction of those types of facilities. Prerequisite: None.

**CRI-310 - Critical Infrastructure II (3 Credits)**
The national and economic security of the United States depends on the reliable functioning of critical infrastructure. This course examines collaboration efforts among the entities responsible for constructing physical and cybersecurity protection as well as the development of integrated risk management strategies for our Nation's critical infrastructure. Primary focus will be on incorporating Critical Infrastructure protection in to construction and renovation of facilities in five of the sixteen critical infrastructure sectors: Defense industrial facilities, emergency services facilities, financial services facilities, government facilities, and public healthcare facilities. Students will complete hands-on Critical Infrastructure projects related to the construction and renovation of those types of facilities. Prerequisite: CI-210.

**CRI-410 - Critical Infrastructure III (3 Credits)**
This course will explore how threats, vulnerabilities, and consequences determine risk as it relates to the protection of Critical Infrastructure. Primary focus will be on incorporating Critical Infrastructure protection in to construction of facilities in five of the sixteen critical infrastructure sectors: food and agriculture facilities, Information Technology facilities, nuclear facilities, transportation facilities, and water/wastewater facilities. Students will complete hands-on Critical Infrastructure projects related to the construction, hardening, and recovery of those types of facilities. Prerequisite: CI-310.

*GENERAL EDUCATION – 46 CREDITS*
*(MATH/SCIENCE – 19 CREDITS, HUMANITIES/SOCIAL SCIENCE/MANAGEMENT)*

**GEN ED: MATHEMATICS AND SCIENCE COURSES - 19 CREDITS**

**MA-112 Intermediate Algebra (3 Credits)**
Designed for students needing mathematical skills and concepts for MA-114 and MA-261. Students are introduced to equations and inequalities, learn the language of algebra and related functions, including polynomial, rational, exponential and logarithmic functions. Other topics include solving equations, inequalities and systems of linear equations; performing operations with real numbers, complex numbers and functions; constructing and analyzing graphs of functions; and using mathematical modeling to solve application problems. Prerequisite: MA-005 or acceptance based on placement test scores.

**MA-114 Algebra and Trigonometry (4 Credits)**
Designed for students needing mathematical skills and concepts for MA-261. Topics covered in algebra include algebra: basic operations on real and complex numbers, fractions, exponents and radicals, determinates, solution of linear, fractional, quadratic and system equations. Topics covered in trigonometry include: definition and identities, angular measurements, solving triangles, vectors, graphs and logarithms. Prerequisite: MA-112 or acceptance based on placement test score.

**MA-128 Introduction to Statistics (3 Credits)**
Topics covered in probability include: definitions, theorems, permutations and combinations. Binomial, hypergeometric, Poisson and normal distributions. Topics covered in sampling include: distribution and central limit theorem, estimation and hypothesis testing. Prerequisite: MA-114.

**PH-201 General Physics I (3 Credits)**
Non-calculus based physics. The course focuses on Mechanics: units, conversion factors: vector diagrams, translational equilibrium, friction, torque and rotational equilibrium: uniformly accelerated motion, projectiles: Newton's Law, work energy and power: kinetic and potential energy, conservation of energy: impulse and momentum. Heat: temperature scales, thermal properties of matter, heat and temperature change, heat and change of phase, physics of heat transfer; applications. Prerequisite: MA-114.

**CH-120 Chemistry**
Metric system and significant figures; stoichiometry; fundamental concepts of atomic structure and its relationship to the periodic table; electron configuration; bonds and electronegativity; gases; oxidation states and redox; solutions, acids and bases, changes of state, thermodynamics, chemical kinetics and equilibrium. Prerequisties: MA-114

**UAS-101 Introduction to Unmanned and Autonomous Systems (3 credits)**
This course presents an introduction to Unmanned and Autonomous Systems operations. This includes a historical perspective and background information of this system including its: modeling and control fundamentals, ground based systems, visual and electro-optical aspects of navigation, obstacle and terrain avoidance systems, modular on-board processing systems, and current applications. This course also exposes students to the significant regulations impacting unmanned systems operations. Prerequisite: None.

**GEN ED: ENGLISH, HUMANITIES AND SOCIAL SCIENCE COURSES - 27 CREDITS**

**EN-101 English Communications I (3 Credits)**
This introductory college-level course focuses on effective oral and written communication skills and the development of analytical abilities through various reading and writing assignments. Students must demonstrate competence in writing mechanics, including grammar, sentence structure, logical content development, and research documentation through 2 essays and 2 research papers. Rhetorical modes may include description, comparison/contrast, narrative, and process analysis. Students are expected to develop effective oral communication skills through speeches. Group projects will develop effective team skills such as decision-making, time management, and cooperation. Prerequisites: acceptance based on placement test scores.

**EN-102 English Communications II (3 Credits)**
This sequel to EN-101 involves more sophisticated reading, writing, speaking, and research assignments. Students must demonstrate competence in writing mechanics, as well as advanced research skills, the ability to handle complex information, and effective team skills. Students write research papers: an information paper, a cause-and-effect paper, an argument paper, and a final research paper. Course includes group work. Presentations are required. Prerequisite: EN-101

**BUS-200 Business Communications and Negotiation (3 credits)**
This course includes preparation for various kinds of both written and oral business communication. The course will develop and sharpen the critical thinking and writing skills, including report/proposal preparation

and presentation, needed in the workplace. Strategies for effective communication and negotiation will also be explored. Prerequisite: EN-101.

**BUS-279 Introduction to Leadership (3 credits)**
This course overviews the disciplines and competencies associated with leadership in the 21st century. The study and application of skills, theories, and concepts in a multicultural society will be examined. This is a seminar course with emphasis on class discussion and collaborative learning. Prerequisite: BUS-174, Corequisite EN-101.

**BUS-282 Economics for Management (3 credits)**
This course is an introduction to economic concepts and analysis. It deals with the relationship between government, business, and the overall economy. The key areas focused on include gross domestic product, the public sector, unemployment, and aggregate supply and demand. The global economy is covered with discussion of issues such as international trade and protectionism. Prerequisite: EN-101

**HU-331 Arts and Ideas (3 Credits)**
This course enables students to study and appreciate various forms of art, including painting, sculpture, architecture, music, drama, film, and literature through in-class and on-site experiences. The arts are also surveyed from an historical perspective, focusing primarily on eras in Western civilization. This enables students to sense the parallel development of the arts, of philosophy, and of sociopolitical systems and to recognize various ways of viewing reality. Prerequisite: EN-102.

**SS-351 Ethics (3 Credits)**
This course is designed to help students improve their ability to make ethical decisions. This is done by providing a framework that enables the student to identify, analyze, and resolve ethical issues that arise when making decisions. Case analysis is a primary tool of this course. Prerequisite: EN-102.

**Humanities Electives (3 Credits)**

**Social Science Elective (3 Credits)**

*MANAGEMENT AND BUSINESS COURSES – 9 Credits*

**BUS-270 Financial Accounting I (3 credits)**
This is an introductory accounting course that will provide students with a strong basic knowledge of accounting terms, concepts, and procedures. Analyzing business transactions as they relate to the General Ledger and the use of special journals will be addressed as well as the various processes and procedures related to the full accounting cycle. The accounting principles described are those endorsed by the Financial Accounting Standards Board. Corequisite: MA-112.

**BUS-283 Managerial Accounting (3 credits)**
This course focuses on budgeting and planning. Emphasis is on the use of accounting information to plan and redirect allocations to support business decisions. Managerial Accounting is designed to follow Principles of Accounting. Prerequisite: BUS-270.

**BUS-454 International Business (3 credits)**
Drawing upon previous management and business courses, this course studies the nature and scope of international trade and investment, international institutions, the international monetary system and exchange markets, and the cultural factor affecting international business operations and their influence on the principal business functions. The effects of the revolution in electronic technologies on global business are also examined. Case study analysis and a variety of current media are used in this course. Prerequisites: BUS-372, BUS-376 and BUS-386.

***CYBERSECURITY COURSES – 9 Credits***

**IAE-201 Introduction to IA Concepts (3 Credits)**
This course covers topics related to administration of network security. Topics include a survey of encryption and authentication algorithms; threats to security; operating system security; IP security; user authentication schemes; web security; email security protocols; intrusion detections; viruses; firewalls; Virtual Private Networks; network management and security policies and procedures. Laboratory projects are assigned as part of the homework requirements. This course prepares students for the (ISC)2 Systems Security Certified Practitioner (SSCP) Certification. Corequisites: MA-110 or MA-112 or MA-114 or MA-261.

**IAE-301 Comprehensive Computer and Network Security (3 Credits)**
Building on IAE-201, this course provides learners with detailed and hands-on knowledge of computer and network security. The course emphasizes current topics such as network security, compliance and operational security, threats and vulnerabilities, application security, access control, as well as cryptography. Additionally, underlying theory and concepts are presented to extend learners' understanding of computer and network security. Weekly laboratory exercises are utilized to reinforce practical, real-world security techniques. Classes are a mixture of lecture, current event discussions, and laboratory exercise review and will prepare learners for the CompTIA Security+ certification. Prerequisite: IAE-201.

**IAE-440 Secure Access and Identity Management (3 Credits)**
Students will learn fundamental and advanced IdM (Identity Management) topics, concepts and current issues. The course will prepare the students for real-world IdM challenges faced by professionals in industry and government today. Students will leave the course with an awareness and understanding of a variety of topics pertaining to IdM, including broad technical aspects, legal and policy issues, implementation scenarios, case studies and industry and government applications of IdM components. Students will be provided hands on design, implementation and operations of ICAM systems in a lab environment. Prerequisite: IAE-301

*CAPSTONE – 6 Credits*

**CM-457 Internship in Construction Management (3 Credits)**
Successful completion of an approved internship is a graduation requirement. The internship program complements classroom learning by exposing students to various construction management functions on real-life projects.

**CM-458 Senior Design Project (3 Credits)**
Student proposes, designs, builds and tests a working software project. Students write a report according to specifications and delivers an oral presentation for review.

**2. Describe the educational objectives and intended student learning outcomes.**

*Educational Objectives:*

a. Students will possess the technical skills necessary to enter careers in construction management operations.
b. Students will have a thorough understanding critical infrastructure protection and resilience within the physical facilities sectors.
c. Students will be able to thoroughly comprehend, manage and utilize basic construction documents used in construction.
d. Students will be able to specify and optimize utilization of project methods and materials.
e. Students will be able to perform reliable cost estimates and analyses.
f. Students will be able to effectively manage construction projects using state-of-the-art planning scheduling and monitoring tools.
g. Students will possess a working knowledge of the management tools that are widely used for cost and schedule management in the construction industry.
h. Students will be able to create an effective critical infrastructure protection and resilience plans with appropriate processes and tools.
i. Students will be able to communicate well both orally and in writing, and possess the ability to work as a productive member of a construction team.
j. Students will possess a sense of exploration and the ability to maintain lifelong learning in the areas of emerging construction methods and management as well as critical infrastructure protection and resilience.

*Learning Outcomes:*

Upon graduation:

a. Graduates will be prepared for employment in the field of construction management and critical infrastructure in a business sector of choice with a strong understanding of field concepts, project management process and team management skills.
b. Graduates will understand the laws, regulations, and customary expectations as they relate to construction management and critical infrastructure.
c. Graduates will demonstrate familiarity with security operations and administration, demonstrate a working knowledge of critical infrastructure and operational security.

d. Graduates will be able to demonstrate leadership qualities through experiential learning.
e. Graduates will be to apply various techniques and methods to efficiently and effectively plan and control construction projects.
f. Graduates will understand the value of and apply sustainable building practices to optimize use of available resources.

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

General education requirements will be met in an integrated manner along with the degree specific requirements. Beginning in the first semester of the first year, students take both general education requirements as well as degree specific courses. This methodology continues throughout the undergraduate curriculum until all general education requirements have been fulfilled. A student must satisfy all the requirements of the program, both general education and degree specific, to graduate. This process is consistent with other undergraduate degrees at the university.

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

The program will be accredited regionally by Middle States Commission on Higher Education (MSCHE) and the International Accreditation Council for Business Education (IACBE). No special requirements exist.

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

The university will not be contracting with another institution or non-collegiate organization.

**H. Adequacy of articulation:**

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

Currently, this program does not have articulation partners. However, it is expected that articulation will work as it does for the university's current degrees. The university is very active with its transfer partners throughout the state and beyond. The goal of the university is to work with partners to make transfer as seamless as possible and to maximize transfer credits as allowable. There are dedicated transfer student personnel to guide this process.

**I. Adequacy of faculty resources (as outlined in COMAR 13B.02.03.11):**

1. **Provide a brief narrative demonstrating the quality of the program faculty. Include a summary list of the 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.**

All faculty listed below have been engaged with the university for at least several years. Barker, Pittman, Butler, Rankin, Bajwa, Opeka, Antunes, and Ashmall are full-time faculty members. Most faculty hold terminal degrees. Moss, Darraj, and Perry work in cybersecurity fields. The university leadership is confident in the quality of the faculty and their abilities to provide a learning environment supportive of the goals of the university for student success. Additional qualified faculty will be added as needed.

Instructors who will be engaged with the core courses and electives of this concentration are:

| INSTRUCTOR | BACKGROUND | COURSES ALIGNED TO BE TAUGHT |
|---|---|---|
| Dr. Bradford Sims | Ph.D. Curriculum Instruction Design<br>M.S. Building Construction Management<br>B.S. Building Construction Technology | All CM courses<br>CRI-210, CRI-310, CRI-410 |
| Dr. Alex Antunes<br>Full time | Ph.D. Computational Astrophysics | All CS courses |
| Lt. Col. Soren Ashmall, USMC (Ret.)<br>Full time | M.A. Broadcast Journalism<br>B.A. Theatre<br>MOS 3450 Planning, Programming, & Budget Systems Officer<br>MOS 8055 Information Management Officer<br>MOS 0202 Intelligence Officer<br>MOS 2602 Signals Intelligence Officer/Ground Electronic Warfare Officer<br>Licensed Real Estate Agent/REALTOR<br>Facilities Security Officer, National Industrial Security Program (NISP) | All Liberal Arts<br>EN-101<br>EN-102 |
| Dr. Garima Bajwa<br>Full time | Ph.D. Computer Science and Engineering<br>M.S. Electrical and Computer Engineering<br>B.S. Electronics and Communication Engineering | CT-152 |
| Dr. Hasna Banu<br>Adjunct | Ph.D. Theoretical Physics<br>M.S. Mathematics<br>B.S. Mathematics | All Math courses |
| Dr. Richard Baker<br>Adjunct | Ph.D. Information Systems<br>M.S. Computer Science<br>B.S. Mathematics<br>F-4 Pilot | UAS-101 |
| Dr. Helen Barker<br>Full-time | D.M. Organizational Leadership<br>Ph.D. Public Administration and Policy (ABD)<br>M.S. Information Systems Management<br>M.S. Business Administration | BUS-200, BUS-279, BUS-454 |
| Dr. Malcolm Beckett<br>Adjunct | D.B.A. Quality Systems Management in Homeland Security and Defense<br>M.S. Information Systems Management | IAE-201, IAE-301, IAE-321<br>CRI-210, CRI-310, CRI-410 |
| Dr. William Butler<br>Full time | D.Sc. Cyber Security<br>M.S. Strategic Studies<br>B.S. Computer Science<br>NSTISSI No. 4011<br>CNSSI No. 4012<br>NSTISSI No. 4015<br>CNSSI No. 4016 | IAE-201, IAE-301, IAE-321<br>CRI-210, CRI-310, CRI-410 |

| | | |
|---|---|---|
| Dr. Craig Capano<br>Adjunct | Ph.D. Civil Engineering with Concentration in Construction Engineering and Management and a focus on Business<br>M.C.S.M. (Master of Construction Science and Management)<br>B.S. Construction Management<br>A.S. Architectural Engineering | All CM courses<br>CRI-210, CRI-310, CRI-410 |
| Dr. Jami Carroll<br>Adjunct | D.Sc. Cyber Security<br>M.S. Cyber Security<br>M.B.A. | IAE-201, IAE-301, IAE-321<br>All BUS courses |
| Dr. Emily Darraj<br>Adjunct | D.Sc. Cybersecurity<br>M.S. Information Assurance | IAE-201, IAE-301, IAE-321<br>All BUS courses |
| Dr. George Ford | Ed.D. Educational Leadership<br>M.E. Environmental Engineering<br>M.B.A.<br>B.S. Mechanical Engineering<br>Professional Engineer (P.E.) | All CM courses<br>CRI-210, CRI-310, CRI-410 |
| Dr. Raymond Letteer<br>Adjunct | D.Sc. Cyber Security<br>M.S. Information Assurance | IAE-201, IAE-301, IAE-321<br>CRI-210, CRI-310, CRI-410 |
| Dr. Priscilla Lewis<br>Adjunct | D.M. Leadership<br>M.B.A.<br>M.P.S. Managerial Policy<br>B.S. Economics/Mathematics | All BUS courses |
| Dr. Ronald Mau<br>Adjunct | Ph.D. Business<br>M.B.A.<br>M.S. Civil Engineering<br>B.S. Civil Engineering | All CM courses<br>CRI-210, CRI-310, CRI-410 |
| Mr. Sam Morgan III<br>Adjunct | M.S. Aerospace, Aeronautical, & Astronautical Engineering<br>B.G.S. General Studies<br>MQ-1 Predator Pilot<br>MQ-9 Reaper Instructor Pilot<br>A-10 Instructor/Evaluator Pilot<br>F-16 Maintenance Officer<br>Military Pilot (T-37, T-38) | UAS-101 |
| Dr. Mark Moss<br>Adjunct | Ph.D. Computer Science<br>M.S. Computer Science<br>B.S. Mathematics | All CS courses |
| Pamela Opeka<br>Full time | M.Ed. Math<br>B.S. Biology & Chemistry | MA 112, MA 114, MA 128 |

| | | |
|---|---|---|
| Mr. Mark Opeka<br>Adjunct | Ph.D. Materials Engineering<br>M.S. Materials Engineering<br>B.S. Mechanical Engineering | CH-120, CM-220, CM-260 |
| Dr. Alexander Perry<br>Adjunct | D.Sc. Cyber Security<br>M.S. Computational Mathematics | IAE-201, IAE-301, IAE-321<br>CRI-210, CRI-310, CRI-410<br>All Math courses |
| Dr. Jason Pittman<br>Full time | Ph.D. Information Assurance<br>M.S. Network Security<br>B.S. English Literature and Micro-biology | IAE-201, IAE-301, IAE-321<br>CRI-210, CRI-310, CRI-410 |
| Claude Rankin<br>Full time | M.A. Communication Arts<br>B.A. Political Science & Speech<br>(Professionally qualified) | All BUS courses.<br>All Liberal Arts and Humanities<br>MA 112 |
| Dr. Eric Sabbah<br>Full time | Ph.D. Computer Science<br>M.S. Computer Science<br>B.S. Mathematics and Computer Science | ALL CS and CT Courses |
| Nathan Weideman<br>Adjunct | M.S. Astronautical Engineering<br>B.S. Professional Aeronautics | PH 201 |
| Dr. Blake Wentz<br>Adjunct | Ph.D. Technology Management with Construction Management Focus<br>M.E. Construction Management<br>B.S. Business Administration with Finance Major<br>Certified Professional Constructor (CPC)<br>Leadership in Energy and Environmental Design (LEED) Advanced Professional (AP) | All CM courses<br>CRI-210, CRI-310, CRI-410 |
| To Be Hired—5 Adjunct Faculty in construction management | Minimum of MS in Construction Management or associated field | All CM courses<br>CRI-210, CRI-310, CRI-410 |

Additional doctorally-qualified faculty will be added in the near future.

Note: All of the Critical Infrastructure courses (i.e., CRI-210, CRI-310, CRI-410) will be co-taught by one Construction Management (CM) faculty member and one Cybersecurity (IAE) faculty member.

**J. Adequacy of library resources (as outlined in COMAR 13B.02.03.12):**

1. **Describe the library resources available and/or the measures to be taken to ensure resources are adequate to support the proposed program. If the program is to be implemented within institutional resources, include a supportive statement by the President for library resources to meet the program's needs.**

   *Library Services*: The Puente Library offers extensive services and a wide collection for Capitol Technology University students to be academically successful. Library resources are available digitally. The library also provides a mailing service for materials borrowed through the Maryland

system. The library is currently supporting the following degrees at the undergraduate and graduate level: B.S. in Computer Science, B.S. in Cyber and Information Security, B.S. in Electrical Engineering, B.S. in Information Systems Management, B.S. in Internet Engineering, M.B.A., D.Sc. in Cybersecurity, and Ph.D. in Business Analytics and Decision Sciences. Therefore, the library is fully prepared to support a B.S. in Construction Management and Critical Infrastructure.

Services provided to on line students include:

a. "Ask the Librarian"
b. Research Guides
c. Tutorials
d. Videos
e. Online borrowing

Capitol Technology University's online library as well as the on-campus library provides faculty and students with reference documents as well as texts appropriate to their learning experiences. Information about those services may be found at: https://www.captechu.edu/current-students/undergraduate/library.

The John G. and Beverley A. Puente Library provides access to management, decision science, and research methods materials through its 10,000-title book collection, e-books, and its 90 journal subscriptions. The library will continue to purchase new and additional materials in the management, decision science, and research methods area to maintain a strong and current collection in this subject area. Students can also access materials through the library's participation in the Maryland Digital Library Program (MDL). This online electronic service provides access to numerous databases (Access Science, NetLibrary) that will provide access to the materials needed. Available databases include ProQuest, EBSCO, ACM, Lexis Nexis, Taylor Francis, and Sage Publications.

The Puente Library can provide access to historical management and decision science materials through its membership in the Maryland Independent College and University Association (MICUA) and the American Society of Engineering Education (ASEE). Reciprocal loan agreements with fellow members of these organizations provide the library access to numerous research facilities that house and maintain archives of management and data science documents. The proximity of the University of Maryland, College Park and other local area research and academic libraries provides the Puente Library with quick access to these materials as well.

The university is in the process of negotiating with local libraries to provide additional convenient access for students to learning materials.

The library currently supports the needs students at the undergraduate, masters and doctoral level.

**K. Adequacy of physical facilities, infrastructure and instructional equipment (as outlined in COMAR 13B.02.03.13):**

1. **Provide an assurance that the physical facilities, infrastructure and instruction equipment are adequate to initiate the program, particularly as related to spaces for classrooms, staff and faculty offices, and laboratories for studies in the technologies and sciences. If the program is to be implemented within existing institutional resources, include a supportive statement by the President regarding adequate equipment and facilities to meet the program's needs.**

The university has sufficient classrooms to accommodate all hybrid and online courses. The online class platform is web based and requires no additional equipment for the institution. The current Learning Management System meets the needs of the degree program. The Computer Science and Robotics Lab, Business and Technology Lab and the Cyber Lab together also meet the potential research needs of the students providing local and virtual support.

**L. Adequacy of financial resources with documentation (as outlined in COMAR 13B.02.03.14):**

1. **Complete Table 1: Resources. Finance data for the first five years of the program implementation are to be entered. Figures should be presented for five years and then totaled by category for each year.**

**TABLE 1: RESOURCES**

| Resource Categories | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 |
|---|---|---|---|---|---|
| 1. Reallocated Funds | $0 | $0 | $0 | $0 | $0 |
| 2. Tuition/Fee Revenue (c + g below) | $453,523 | $1,085,056 | $2,072,221 | $3,027,650 | $4,555,096 |
| a. Number of F/T Students | 12 | 25 | 50 | 75 | 120 |
| b. Annual Tuition/Fee Rate | $25,619 | $26,003 | $26,393 | $26,789 | $27,191 |
| c. Total F/T Revenue (a x b) | $307,428 | $650,082 | $1,319,667 | $2,009,193 | $3,262,929 |
| d. Number of P/T Students | 15 | 44 | 75 | 100 | 125 |
| e. Credit Hour Rate | $812 | $824 | $836 | $849 | $861 |
| f. Annual Credit Hour Rate | 12 | 12 | 12 | 12 | 12 |
| g. Total P/T Revenue (d x e x f) | $146,095 | $434,974 | $752,555 | $1,018,457 | $1,292,168 |
| 3. Grants, Contracts & Other External Sources | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 |
| 4. Other Sources | -$103,765 | -$219,540 | -$445,906 | -$679,251 | -$1,103,679 |
| TOTAL (Add 1 – 4) | **$349,758** | **$865,516** | **$1,626,316** | **$2,348,399** | **$3,451,417** |

This proposal builds upon an existing degree programs. All courses exist within the other degree programs currently offered by the university.

2. **Provide a narrative rationale for each of the resource categories. If resources have been or will be reallocated to support the proposed program, briefly discuss those funds.**

**a. Reallocated Funds**

Capitol Technology University has reallocated funds during Year 1 for support of program and course development, online support, office materials, travel, professional development, and initial marketing. There is no substantial impact on the institution because of the reallocation of these funds. The reallocated funds will be recovered after the first year. The program is expected to be self-sustaining post Year 1.

**b. Tuition and Fee Revenue**

Tuition is calculated to include an annual 2.5% tuition increase. A 20% attrition rate has been calculated.

**c. Grants**

There are currently no grants etc. at this time.

**d. Other Sources of Funds**

The Funds listed are anticipated scholarships for students from outside sources.

3. **Table 2: Expenditure. Finance data for the first five years of the program implementation are to be entered. Figures should be presented for five years and then totaled by category for each year.**

**TABLE 2: EXPENDITURES**
**Courses are taught by full-time and adjunct professors.**

| Expenditure Categories | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 |
|---|---|---|---|---|---|
| 1. Faculty (b + c below) | $108,750 | $276,059 | $401,541 | $585,581 | $694,331 |
| a. # FTE | 1.3 | 3.3 | 4.8 | 7.0 | 8.3 |
| b. Total Salary | $89,876 | $228,148 | $331,852 | $483,951 | $573,827 |
| c. Total Benefits | $18,874 | $47,911 | $69,689 | $101,630 | $120,504 |
| 2. Admin. Staff (b + c below) | $4,659 | $4,798 | $4,942 | $5,090 | $5,243 |
| a. # FTE | 0.07 | 0.07 | 0.07 | 0.07 | 0.07 |
| b. Total Salary | $3,850 | $3,966 | $4,084 | $4,207 | $4,333 |
| c. Total Benefits | $809 | $833 | $858 | $883 | $910 |
| 3. Support Staff (b + c below) | $57,475 | $114,950 | $172,425 | $229,900 | $287,375 |
| a. # FTE | 1.00 | 2.00 | 3.00 | 4.00 | 5.00 |
| b. Total Salary | $47,500 | $95,000 | $142,500 | $190,000 | $237,500 |
| c. Total Benefits | $9,975 | $19,950 | $29,925 | $39,900 | $49,875 |
| 4. Equipment | $2,543 | $6,503 | $11,678 | $16,380 | $22,793 |
| 5. Library | $10,000 | $10,000 | $10,000 | $10,000 | $10,000 |
| 6. New or Renovated Space | $0 | $0 | $0 | $0 | $0 |
| 7. Other Expenses | $100,000 | $75,000 | $50,000 | $50,000 | $50,000 |
| TOTAL (Add 1 – 7) | **$283,426** | **$487,310** | **$650,586** | **$896,951** | **$1,069,741** |

4. **Provide a narrative rationale for each of the resource categories. If resources have been or will be reallocated to support the proposed program, briefly discuss those funds.**

**a. Faculty**

Table 2 reflects the faculty hours in total, but this does not imply that these are new hire requirements.

**b. Administrative Staff**

Capitol Technology University will continue with current the administrative staff through the proposed time.

**c. Support Staff**

Capitol Technology University with continue with current administrative staff through year two. Additional support staff will be added in Year 3.

**d. Equipment**

Software for courses is available free to students or is freeware. Additional licenses for the LMS will be purchased by the university at the rate of $40 per student. No additional equipment is needed.

**e. Library**

Money has been allocated for additional materials to be added to the on campus and virtual libraries to ensure currency of literature. It has, however, been determined that the current material serves the needs of this degree due to the extensive online database.

**f. New or Renovated Space**

No new or renovated space is required for this degree.

**g. Other Expenses**

Funds have been allocated for office materials, travel, professional development, course development, initial marketing, additional scholarships.

**M. Adequacy of provisions for evaluation of program (as outlined in COMAR 13B.02.03.15):**

The assessment process at the university consists of a series of events throughout the Academic Year. The results of each event are gathered by the University Assessment Team and stored in Canvas for analysis and use in annual reports, assessments, etc. The University Assessment Team analyzes the results, develops any necessary action plans, and monitors implementation of the action plans.

Academic Year Assessment Events:

Fall Semester:

- Faculty submit performance plans consistent with the mission and goals of the university and

department. The document is reviewed and approved with the academic dean.

- Department Chairs and University Academic Dean review the Graduating Student Survey data.
- Department Chairs and University Academic Dean review student internship evaluations.
- Department Chairs and University Academic Dean review grade distribution reports from the spring and summer semesters.
- Department Chairs and University Academic Dean review student course evaluations from the summer semester.
- Departments conduct Industrial Advisory Board meetings to review academic curriculum recommendations. The Advisory Board meets to begin curriculum review or address special issues that may arise related to curriculum. Based on an analysis and evaluation of the results, the University Academic Dean, faculty and the advisory boards will develop the most effective strategy to move the changes forward.

  NOTE: A complete curriculum review for degrees in the Department of business and information sciences occurs every 2 years. In most cases, the changes only require that the University Academic Dean inform the Chief Academic Officer (CAO) and provide a report that includes a justification and the impact of the changes as well as a strategic plan. Significant changes normally require the approval of the CAO and the Executive Council. Changes may require notification/approval of accreditors.

- University Academic Dean and Vice President for Academic Affairs attend the Student Town Hall and review student feedback with department chairs.
- University Academic Dean meets with the faculty to review the student learning progress and discuss needed changes.
- At the August Faculty Retreat, the faculty reviews any outstanding student learning challenges that have not been addressed. The issues are brought to the University Academic Dean for review and development of implementation plans.

Spring Semester:

- Faculty Performance Plans are reviewed with faculty to identify issues of divergence and to adjust the plan as needed.
- Department Chairs and University Academic Dean review grade distribution reports from the fall semester.
- Department Chairs and University Academic Dean review the Graduating Student Survey data.
- Department Chairs and University Academic Dean review student course evaluations from the fall semester and the spring semester (in May before the summer semester begins).
- Department Chairs and University Academic Dean meet to review the content of the graduating student, alumni, and course surveys to ensure the surveys continue to meet the university's assessment needs.
- At Annual Faculty Summit in May, the faculty review and discuss student learning challenges from the past academic year and provide recommendations to the Academic Dean for review and development of implementation plans.
    - Department Chairs conduct interviews with potential employers at our Career Fair (this will move to fall and spring in 2016-2017).
    - Departments conduct Industrial Advisory Board meetings to review academic curriculum recommendations.

Based on the foregoing inputs from faculty, students, industry representatives and Department Chairs, the University Academic Dean prepares the proposed academic budget for the upcoming year. Budget increases are tied to intended student learning improvements and key strategic initiatives.
In addition to these summative assessments, the University Academic Dean meets with the Department Chairs weekly to review current student progress. This formative assessment allows for immediate minor changes, which increase faculty effectiveness and, ultimately, student outcomes.

The Faculty Senate meets monthly during August through April. The Faculty Senate addresses issues that impact student outcomes as those issues emerge. The leadership of the Faculty Senate then provides a report on the matter to the University Academic Dean. The report may include a recommendation or a request to move forward with a committee to further examine the issue. In most cases, the changes only require the University Academic Dean to inform the CAO and provide a report that includes a justification and the impact of changes as well as a strategic plan. Significant changes normally require the approval of the CAO and the Executive Council.

*Student Learning Outcomes*:

Student learning outcomes are measured using the instruments identified above as well as assigned rubrics/measures (e.g., capstone courses, competency exams/projects) dictated by the accreditation requirements of regional accreditor, Middle States Commission on Higher Education (MSCHE). This program is designed to meet the requirements of a Center of Academic Excellence (CAE) under the NSA/DHS.

**N. Consistency with the State Minority Student Achievement goals (as outlined in COMAR 13B.02.03.05 and in the State Plan for Post-Secondary Education):**

Capitol Technology University is a majority/minority school. Our programs attract a diverse set of students. Special attention is provided to recruit females into the STEM and multidisciplinary programs such as the B.S. Business Analytics, B.S. MCIT, B.S. CIT, B.S. ISM, D.Sc., and Ph.D. in Business Analytics and Decision Sciences. The same attention will be given to the B.S. in Construction Management and Critical Infrastructure.

**O. Relationship to low productivity programs identified by the Commission:**

This program is not associated with a low productivity program identified by the commission.

**P. If proposing a distance education program, please provide evidence of the Principles of Good Practice (as outlined in COMAR 13B.02.03.22C):**

1. **Curriculum and Instruction**

   Some courses in this concentration will be offered in an online classroom environment as well as in hybrid (synchronous and traditional classroom).

   a. **A distance education program shall be established and overseen by qualified faculty.**

      The Department of Business and Information Sciences, where this degree will be sponsored, is staffed by qualified teaching chair and other appropriately credentialed faculty.

      Evaluation of courses/programs are done using the same process as all other programs. (Please see Section M of this document.) All Capitol Technology University faculty teach in the

traditional classroom environment and online. (Please see qualifications in Section I of this document.)

**b. A program's curriculum shall be coherent, cohesive, and comparable in academic rigor to programs offered in traditional instructional formats.**

Online programs/courses meet the same accreditation standards, goals, objectives, and outcomes as traditional instruction at the university. The online course development process incorporated the Quality Matters research-based set of standards for quality online course design to ensure academic rigor of the online course is comparable to the traditionally offered course. The dean, chairs, and faculty review curriculum annually. Courses are reviewed at the end of each term of course delivery. This process applies to online and traditional courses. In addition, advisory boards are engaged in the monitoring of course quality to ensure quality standards are met regardless of the delivery platform.

**c. A program shall result in learning outcomes appropriate to the rigor and breadth of the program.**

Online programs/courses meet the same accreditation standards, goal, objectives, and outcomes as traditional classroom delivery. Learning platforms are chosen to ensure high standards of the technical elements of the course. The dean monitors any course conversion from in-class to online to ensure the online course is academically equivalent to traditionally offered course and that the technology is appropriate to support the expected rigor and breadth of the programs courses.

**d. A program shall provide for appropriate real-time or delayed interaction between faculty and students.**

The program courses will be delivered using Adobe Connect and the LMS Canvas. This system supports both synchronous and asynchronous interaction between faculty and students. Some of these class may also be in hybrid (online real-time and traditional classroom) format.

**e. Faculty members in appropriate disciplines in collaboration with other institutional personnel shall participate in the design of courses offered through a distance education program.**

Currently, employed faculty acts as an internal advisory board for program changes including course and program development. All faculty are selected on domain experience and program-related teaching experience.

When new faculty or outside consults are necessary for the design of courses, the university's Human Resources Department initiates a rigorous search and screening process to identify appropriate faculty to design and teach online courses. Again, all faculty are selected on domain experience and program-related teaching experience.

**2. Role and Mission**

**a. A distance education program shall be consistent with the institution's mission.**

Distance education is consistent with the institution's mission. Please refer to Section A of this proposal.

**b. Review and approval processes shall ensure the appropriateness of the technology being used to meet the program's objectives**

The dean and department chairs are an integral part of the curriculum approval process. The dean, chairs and faculty are participants in any new institutional technology changes. The dean approves technologies brought into the classroom by faculty to ensure compatibility with existing technology as well as with course and institutional objectives.

**3. Faculty Support**

**a. An institution shall provide for training for faculty who teach with the use of technology in a distance education format, including training and learning management system and pedagogy of distance education.**

The Department of Distance Learning and the instructional technology division support the online program needs of faculty and students. These departments and the help desk provide constant and on-going support to the faculty. The Canvas portion of the program is the online learning management system. When a new faculty member is assigned to teach an on-line course, the distance learning department provides formal training for that instructor. New faculty are assigned an experienced faculty mentor to ensure a smooth transition to the online environment as well as to ensure compliance with the institution's online teaching pedagogy. The university believes this provides the highest-level learning experience for students and faculty.

**b. Principles of best practice for teaching in a distance education format shall be developed and maintained by the faculty.**

The Distance Learning Department, in conjunction with the dean and an assigned mentor, provide on-going support and instruction on best online practices. Best practices are shared among faculty by the dean and chair as well as through formal events. There are also several texts in the library available to the faculty, which cover distance learning techniques and technology.

**c. An institution shall provide faculty support services specifically related to teaching through a distance education format.**

As mentioned previously, the university online platforms offer several avenues to support instructors engaged in online learning. The Director of our Distance Learning Division is highly skilled and trained in faculty development. Several seminars and online tutorials are available to the faculty every year. Mentors are assigned to new faculty. Best practice sharing is facilitated through the University Academic Dean, department chairs, and formal meetings.

**4. An Institution shall ensure that appropriate learning resources are available to students including appropriate and adequate library services and resources.**

Students can receive assistance in using online learning technology via several avenues. Student aides are available to meet with students and provide tutoring support in both subject matter and

use of the technology. Tutors are available in live real-time sessions using Adobe Connect or other agreed upon tools. Pre-recorded online tutorials are also available.

In addition to faculty support, on ground and online tutoring services are available to students in a one-on-one environment.

Laboratories (on ground and virtual) are available for use by all students and are staffed by faculty and tutoring staff who provide academic support.

Library services and resources are appropriate and adequate. Please refer to Section J of this document and the attached letter from the university president, the library adequately supports the students learning needs.

**5. Students and Student Services**

**a. A distance education program shall provide students with clear, complete and timely information on the curriculum, course, and degree requirements, nature of faculty/ student interaction, assumptions about technology competence and skills, technical equipment requirements, learning management system, availability of academic support services and financial aid resources, and costs and payment policies.**

Students are provided a copy of a degree-tracking sheet at time of inquiry, at registration, and at advising sessions. Students also have access to a portal that contains this information digitally regarding courses in their degree. The system also provides information that identifies what courses been completed and what courses need to be completed. Course requirements are listed in the catalog, on the university website, and in the course syllabus (with more detailed information provided).

The university provides students with an overview of online learning techniques as well as detailed training for those who need it. In addition to online tutorials, a member of the Distance Learning staff is available to respond to questions. The Department of Distance Learning also provides technical support Monday thru Saturday for both Adobe Connect and the LMS (i.e., Canvas). Information regarding student expectations in an online class are outlined in each syllabus and covered by the faculty member in the introductory class for each course. This information is also covered during Orientation and Freshman Seminar.

Information on system requirements is available from the Department of Distance Learning, Department of Information Technology, department chairs, and University Academic Dean. Information on support and system requirements is also found on page 10 of the university catalog.

Faculty members who are new to the online environment are provided experienced mentors as part of their support system. The mentors guide the faculty to ensure a quality learning experience for faculty and students. This ensures consistency in expectations of faculty and the course goals and objectives by the institution as well as students and our accreditors.

The university's Business and Financial Services Department provides cost and payment information and support for both on ground and online students. The information is also available on the university's website and catalog. The university's Financial Aid Department

deals financial needs of both on ground and online students. In addition, there is a staff member dedicated to financial aid as it relates to military and veteran's benefits.

In addition to faculty support to the student who is in the on-line learning environment, support services are offered through Advising and Student Services. The types of support include tutoring, mentoring, advising, and career services.

**b. Enrolled students shall have reasonable and adequate access to the range of student services to support their distance education activities.**

Students have access to the same services as traditional on ground students. Some of these services are facilitated via such tools as Skype. For instance, distance students attend job fairs via Skype facilitated by an assigned campus representative. In addition, training videos are available in Capitol Technology University's student web portal.

**c. Accepted students shall have the background, knowledge and technical skills needed to undertake a distance education program.**

Students are required to have the same skills as traditional on ground students. Training is available for students to familiarize them with the tools of the distance learning system.

**d. Advertising, recruiting and admissions materials shall clearly and accurately represent the program and services available.**

Advertising, recruiting, and admissions materials do clearly and accurately represent the program and the services available.

**6. Commitment and Support**

**a. Policies for faculty evaluation shall include appropriate considerations of teaching and scholarly activities related to distance education programs.**

All faculty, including online faculty, are strongly encouraged to participate in at least one or two professional development opportunities to improve online teaching skills. Faculty are highly encouraged to share their experiences with fellow faculty as well as through publications and presentations. These factors are considered in the annual goals and objectives of faculty and, therefore, are considered in evaluation of performance for promotions, etc. Scholarly activities are recognized in formal university publications. Funding in the annual budget is provided for conferences in support of scholarly activities. Faculty meetings and colloquiums provide opportunities to share best practices among faculty. This includes online faculty. In addition, all faculty are offered the opportunity to attend the annual graduation ceremony and attend the annual faculty residency training event at the expense of the university.

**b. An institution shall demonstrate a commitment to ongoing support, both financial and technical, and to continuation of a program for a period sufficient to enable students to complete a degree or certificate.**

The university has made the financial commitment to the program (please refer to Section L). The university has a proven track record of supporting degree completion.

7. **Evaluation and Assessment**

a. **An institution shall evaluate a distance education program's educational effectiveness, including assessment of student learning outcomes, student retention, student and faculty satisfaction and cost-effectiveness.**

The university applies the same evaluation standards and processes to all degree programs at the institution. (Please see Section M for an in-depth process description.)

In the Department of Business and Information Sciences, where this program will be sponsored, evaluations are done at the course level, student level, curriculum level, and faculty level as well as other stakeholder groups.

Assessment is based on the integration of all the above items as appropriate. Changes are developed and implemented by the faculty responsible for the courses upon approval of the dean. At the end of this cycle, an evaluation is repeated and results analyzed with the appropriate stakeholders regarding the effectiveness of the changes. This is an ongoing process. The university has a vice president and team in charge of outcomes and assessment supporting formal assessment measures.

b. **An institution shall demonstrate an evidence-based approach to best online teaching practices.**

Capitol Technology University has established a course/program matrix, which requires faculty to report student outcomes and suggestions for improving student performance. The university complies with the requirements of its accrediting bodies regarding outcomes/evidenced based accreditation (Middle States Commission on Higher Education, ABET, IACBE, and NSA/DHS). The university is in good standing with all its accrediting bodies.

c. **An institution shall provide for assessment and documentation of student achievement of learning outcomes in a distance education program.**

The assessment for distance learning classes/students is the same as for all programs at the university. Faculty provide required data on student achievement. The Learning Management System provides data on student achievement. Proof of these assessments is available during the class and post class to the Vice President of Academic Affairs, dean, and department chairs. On an annual basis, the information is reported to accreditation authorities such as Middle States Commission on Higher Education (MSCHE), IACBE, ABET, and NSA/DHS.