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

<table>
<thead>
<tr>
<th>Institution Submitting Proposal</th>
<th>Capitol Technology University</th>
</tr>
</thead>
</table>

**Each action below requires a separate proposal and cover sheet.**

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

<table>
<thead>
<tr>
<th>Department Proposing Program</th>
<th>Department of Doctoral Programs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Degree Level and Degree Type</td>
<td>Doctor of Philosophy (Ph.D.)</td>
</tr>
<tr>
<td>Title of Proposed Program</td>
<td>Ph.D. in Product Management</td>
</tr>
<tr>
<td>Total Number of Credits</td>
<td>60</td>
</tr>
<tr>
<td>Suggested Codes</td>
<td>HEGIS: 505, CIP: 53</td>
</tr>
<tr>
<td>Program Modality</td>
<td>On-campus, Distance Education (fully online), Both</td>
</tr>
<tr>
<td>Program Resources</td>
<td>Using Existing Resources, Requiring New Resources</td>
</tr>
<tr>
<td>Projected Implementation Date</td>
<td>Fall, Spring, Summer, Year: 2019</td>
</tr>
<tr>
<td>Provide Link to Most Recent Academic Catalog</td>
<td>URL: <a href="https://www.captechu.edu/current-students/academic-resources">https://www.captechu.edu/current-students/academic-resources</a></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Preferred Contact for this Proposal</th>
<th>Name: Professor Soren Ashmall</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Title: Director, Assessment &amp; Accreditation</td>
</tr>
<tr>
<td></td>
<td>Phone: (571) 332-4344</td>
</tr>
<tr>
<td></td>
<td>Email: <a href="mailto:spashmall@captechu.edu">spashmall@captechu.edu</a></td>
</tr>
</tbody>
</table>

## President/Chief Executive

- Type Name: Dr. Bradford Sims
- Signature: [Signature]
- Date: 3/1/19

## Approval/Endorsement by Governing Board

- Type Name: Dr. Bradford Sims
- Signature: [Signature]
- Date: 3/1/19
March 1, 2019

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 **Doctor of Philosophy (Ph.D.) in Product Management**. The degree curriculum will be taught using a significant number of existing faculty at our university and will be supplemented by new courses supporting the **Ph.D. in Product Management**. The mission of Capitol Technology University is to provide practical education in engineering, computer science, information technology, and business 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 **Ph.D. in Product Management** is consistent with this mission.

A growing requirement within the business industry is the need for highly trained hybrid leaders who possess sophisticated technological skills as well as traditional business knowledge. This program is in response to that need. The **Ph.D. in Product Management** degree is for experienced business leaders who desire to advance in their careers by gaining skills in the Product Management field.

**To respond to needs of the business industry, we respectfully submit for approval a Doctor of Philosophy (Ph.D.) in Product Management.** The required proposal is attached as well as 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,

Bradford L. Sims, PhD
President
March 1, 2019

Dr. James D. Fielder, Jr.
Secretary of Maryland Higher Education
Maryland Higher Education Commission
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 Doctor of Philosophy (Ph.D.) in Product Management. As president of the university, I confirm that the library resources, including support staff, are more than adequate to support the Ph.D. in Product Management. In addition, the university is dedicated to, and has budgeted for, continuous improvement of its library resources.

Respectfully,

Bradford L. Sims, PhD
President
PROPOSAL FOR:
__x__ NEW INSTRUCTIONAL PROGRAM
____ SUBSTANTIAL EXPANSION/MAJOR MODIFICATION
____ COOPERATIVE DEGREE PROGRAM
__x__ WITHIN EXISTING RESOURCES or ____ REQUIRING NEW RESOURCES

CAPITOL
Technology University
Institution Submitting Proposal

Fall 2019
Projected Implementation Date

Doctor of Philosophy
(Ph.D.)
Award to be Offered

0506
Suggested HEGIS Code

Doctor of Philosophy in
Product Management
Title of Proposed Program

52.9999
Suggested CIP Code

Doctoral Programs
Department of Proposed Program

Dr. Ian McAndrew
Dean, Doctoral Programs

Prof. Soren Ashmall
Director, Assessment
and Accreditation
spashmall@captechu.edu
Contact E-Mail Address

571-332-4344
Contact Phone Number

President/Chief Executive Approval

March 1, 2019
Date

Date Endorsed/Approved by Governing Board
A. Centrality to Institutional Mission and Planning Priorities:

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

*Doctor of Philosophy in Product Management Program Description:*

The **Doctor of Philosophy (Ph.D.) in Product Management** provides students with the opportunity to conduct extensive and sustained original research at the highest level in the field of Product Management. Product Management has evolved recently to a hybrid of scientific reasoning and research, business management, cutting-edge technology, operational analysis, marketing, supply, logistics, and sustainability. The **Ph.D. in Product Management** is a unique doctoral program designed to meet the demands of the highest skilled professionals to become the leaders who will be involved in the advancement, expansion, and support of product management on both a large and small scale.

The **Ph.D. in Product Management** is for current professionals in the field who desire to elevate their skills to the highest level and contribute to the body of knowledge in Product Management. The **Ph.D. in Product Management** also provides a path for personnel in the Product Management field to explore new ground as this section of the industry faces revolutionary changes in highly competitive local, national, and global markets.

The University is in a unique position to provide those students with an avenue to pursue a deep proficiency in this area using an interdisciplinary methodology, courses offered, and the skill set of the faculty. Graduates will contribute significantly to the Product Management field through the creation of new knowledge and ideas that are currently lacking as the sector is rapidly evolving by employing new technology, techniques, and materials. The **Ph.D. in Product Management** program is designed as a doctorate by research where students will quickly become able to engage in research and publishing without the need to navigate the limitations inherent in traditional coursework models. This degree is for current professionals in the field who desire to elevate their skills to the highest level and contribute to the body of knowledge in the field.

The **Ph.D. in Product Management** program is designed for experienced professionals in the Product Management field with an appropriate master’s degree and many years of experience. During the program, students will conduct original research in an approved area of Product Management. Successful completion of the program culminates in the award of the **Doctor of Philosophy (Ph.D.) in Product Management** degree.

There are two options for completion of the **Ph.D. in Product Management** program. Under the thesis option, the student will produce, present, and defend a doctoral dissertation after receiving the required approvals from the student's Committee and the Ph.D. Review Board. Under the
publication option, the student will produce, present, and defend their original doctoral research after receiving the required approvals from the student’s Committee and the Ph.D. Review Board. The student must also publish three works of original research in a scholarly peer-reviewed journal(s). One of the three published works may be in a peer reviewed conference proceeding.

Relationship to Institutional Approved Mission:

The Ph.D. in Product Management is consistent with the University mission to educate individuals for professional opportunities in engineering, computer science, information technology, and business. The University provides relevant learning experiences that lead to success in the evolving global community. Fundamental to the degrees in the Department of Doctoral Programs are opportunities to pursue cutting-edge knowledge in technological applications, techniques, and procedures. The Ph.D. in Product Management is consistent with that philosophy. This same philosophy is supported by the University’s existing degree programs and learning opportunities. The University has a Doctor of Science (D.Sc.) in Cybersecurity, Ph.D. in Business Analytics and Decision Science, Ph.D. in Technology, and Ph.D. in Unmanned Systems Applications. The Ph.D. in Product Management degree is an integral part of the Strategic Plan for FY 2017-2021 and succeeding years. Funding to support the new degree has been included in the institutional and departmental budgets for FY 2019-2020 and forecasted budgets going forward.

The Ph.D. in Product Management degree will be offered online using the Canvas Learning Management System and Adobe Connect. The result is the convenience required by the 21st Century learner and provides the interaction with faculty and fellow students that is critical to the high-level learning experience. The curriculum provides the doctoral student the necessary learning tools that the University believes critical to success in the Product Management sector. The degree is also consistent with the interdisciplinary nature of the University.

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 four strategic goals:

1. Expand Educational Offerings, Increase Program Completion: Capitol Technology University is an institution that offers career-relevant curricula with quality learning outcomes. The strategy includes continuing to expand educational offerings, increasing program completion, and raising learner qualifications and outcomes.

2. Increase Enrollment and Institutional Awareness: Capitol will accelerate its goal pursuit to become more globally renowned and locally active through student, faculty and staff activities. Enrollment will grow to 650 undergraduates, 350 masters’ students and 250 doctoral candidates.

3. Improve the Utilization of University Resources and Institutional Effectiveness While Expanding Revenue: Capitol will likely continue to be 80% financially dependent on student tuition and fees. We plan to enhance our resources by expanding the range and amount of funding from other streams and aligning costs with strategic initiatives.
4. **Increase the Number and Scope of Partnerships:** Capitol's service to our constituents and sources of financial viability both depend upon participation with continuing and new partner corporations, agencies, and schools.

The **Ph.D. in Product Management** program builds upon the existing areas of graduate study, including the Master of Business Administration (M.B.A.), Master of Science (M.S.) of Aviation, Master of Science (M.S.) in Critical Infrastructure, Master of Science (M.S.) in Cyber Analytics, Master of Science (M.S.) in Electrical Engineering, Master of Science (M.S.) in Internet Engineering, Master of Science (M.S.) in Cyber and Information Security, Master of Science (M.S.) in Computer Science, Master of Science (M.S.) in Information Systems Management, Technical Master of Business Administration (T.M.B.A.) in Business Analytics and Data Science, and Technical Master of Business Administration (T.M.B.A.) in Cybersecurity, Doctor of Science (D.Sc.) in Cybersecurity, Doctor of Philosophy (Ph.D.) in Aviation, Doctor of Philosophy (Ph.D.) in Business Analytics and Decision Sciences, Doctor of Philosophy (Ph.D.) in Critical Infrastructure, Doctor of Philosophy (Ph.D.) in Manufacturing, Doctor of Philosophy (Ph.D.) in Technology, Doctor of Philosophy (Ph.D.) in Technology/Master of Science (M.S.) Research Methods Combination Program, Doctor of Philosophy (Ph.D.) in Unmanned Systems Applications. The University's graduate degree programs are structured to prepare students to provide critical expert leadership as well as technical expertise to meet the needs of a modern technology and information-dependent organization. The University's programs have been preparing professionals for rapid advances in information and technology, intense global competition, and increasingly complex technological environments for decades. The **Ph.D. in Product Management** will allow students to increase their knowledge to the extreme technological limits of this business sector and contribute to the body of knowledge in the field.

The new **Ph.D. in Product Management** is fully supported by the University's Vision 2025 and Strategic Plan 2017-2021. Funding to support the degree has been included in forecasted budgets going forward.

The University has active partnerships (e.g., Leidos, Patton Electronics, Lockheed Martin, Northrup Grumman, Cyber Security Forum Initiative, IRS, NCS, NSA and DHS) in the private and public arenas. The **Ph.D. in Product Management** degree will provide new opportunities for partnerships as well as expanded research. The increase in partnerships and placement of our 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 Product Management field will help diversify and increase the University's financial resources.

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

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

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

The proposed degree is an integral part of the University’s Strategic Plan for FY 2017-2025 and forward. Funding for the administrative, financial, and technical support of the new degree has been included in the institutional and departmental budgets for FY 2019-2020 as well as the forecasted budgets going forward.

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

Capitol Technology University is fully committed to continuing the Ph.D. in Product Management degree program for a period of time sufficient to allow enrolled students to complete the program.

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.

Leaders in the Product Management sector are facing an ever-increasing need to expand the application of new technology to their industry in order to remain competitive, efficient, and viable now and in the future. Product Managers today depend and thrive on timely, accurate and relevant information to deliver a fully-developed product that meets the current and projected needs of their target market and users. As technology enables the creation and capture of ever-increasing amounts of data, especially user-experience data, the effective leadership, management, and understanding of resource needs and user needs is becoming an enormous challenge.

Product Management has undergone a tremendous transformation from its original application and practice as a particular company’s management of the marketplace appeal of a single, commercial brand. Now, at its highest levels, Product Management has evolved recently to the unification of cutting-edge, scientific reasoning and research, the less-exact realm of marketing, and the rigorous field of business management. Product Management is no longer simply the task of bringing a product to market and managing its consumer appeal. Product Management now has far-reaching implications in the global, environmental, integration, and security aspects of society. The leaders at the highest levels of Product Management constantly develop new solutions, new markets and new techniques to survive and thrive. Effective leadership in this industry can be achieved only with a holistic approach and the advanced skills that will be covered in this proposed degree.

The State of Maryland has a long history of fostering and encouraging business ventures as well as blazing new trails with groundbreaking research. If approved, this new degree will build on that legacy with a groundbreaking new doctoral program in a field that is evolving due to rapidly changing technology and applications. The University’s Ph.D. in Product Management program will produce the next generation of top leaders with the technological
expertise needed now and in the future by the Product Management industry.

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

Capitol Technology University is a diverse multiethnic and multiracial institution with a long history of serving minority populations. The University has a 51% minority student population with 7% undisclosed. The Black/African American population is 34%. The university has military/veteran population of 22%. The University also has a 22% female population – a significant percentage given its status as a technology institution. If approved, the proposed Ph.D. in Product Management will expand the field of opportunities for minorities and disadvantaged students.


(Source: https://www.bls.gov/ooh/management/advertising-promotions-and-marketing-managers.htm)

Employment of 249,600 business leaders and managers is projected to grow 10 percent by 2026, faster than the average for all occupations.

As the ability to track and interact with individual users and consumers becomes more granular and (most importantly) quantifiable, a significant number of the highest-qualified leaders in Product Management will be needed. Over the coming decade, technological change, along with population and business growth will result in both increased globalization and increased individualization. Also, the need to improve portions of the national infrastructure is expected to spur employment growth as roads, bridges, and sewer pipe systems are upgraded or replaced.

To ensure that product-management projects are completed on time and under budget, firms require highly capable Product Management leaders with the latest knowledge and skills. Product Management processes and consumer-marketing technology are rapidly becoming more complex. The next generation of leaders at the highest-levels in Product Management will need a new level of knowledge, combination of multiple management skills, greater oversight abilities, and a much higher level of technological expertise.
c. The need to strengthen and expand the capacity of historically black institutions to provide high quality and unique educational programs.

While Capitol Technology University is not a historically black institution, the university is a diverse multiethnic and multiracial institution with a long history of serving minority populations. The University has a 51% minority student population with 7% undisclosed. The Black/African American population is 34%. The University has military/veteran population of 22%. The university also has a 22% female population – a significant percentage given its status as a technology institution. If approved, the proposed Ph.D. in Product Management will expand the field of opportunities for minorities and disadvantaged students.

The industry watchdog, Diverse: Issues In Higher Education, serves as a source of critical news, information and insightful commentary on the full range of issues concerning diversity in American higher education. The group cites recent U.S. Bureau of Labor Statistics information regarding the inequity of high paying jobs in technology. “Yet, women and minorities are not accessing these jobs at anywhere near a proportionate rate. For instance, a report from the Business-Higher Education Forum notes that African Americans and Hispanics represent just 6 and 7% respectively of STEM employment, even though they represent more than twice that much of the U.S. population.” An examination of the percentages in the Professional and Business Services field show Hispanics fare significantly
better, but African American employment is only at a disappointing 9.9 percent.

<table>
<thead>
<tr>
<th>Industry</th>
<th>2018 Percent of total employed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Women</td>
</tr>
<tr>
<td>Professional and Business Svcs.</td>
<td>41.5</td>
</tr>
</tbody>
</table>

(Source: https://www.bls.gov/cps cpsaat18.htm)

Given the substantial minority population of Capitol Technology University, it is reasonable to assert that the Ph.D. in Product Management program will add to this base of minority participation in the Product Management industry.

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

The 2017-2021 Maryland State Plan for Postsecondary Education articulates three goals for postsecondary education:

1. Access
2. Success
3. Innovation

Goal 1: Access

"Ensure equitable access to affordable and quality postsecondary education for all Maryland residents."

Capitol Technology University is committed to ensuring equitable access to affordable postsecondary education for all Maryland residents. The University meets its commitment in this arena through its diverse campus environment, admissions policies, and academic rigor.

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’s commitment to diversity is reflected in its student body. Capitol Technology University has a 51% minority student population with 7% undisclosed. The Black/African American population is 34%. The University has a military/veteran population of 22%. The University also has a 22% female population – a significant percentage given its status as 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 graduate and/or undergraduate courses best serve student needs in subject areas. The University makes those 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 multiple diversity enhancing actions, including team projects and grants across degrees. This has proven effective at supporting multiple aspects of diversity.

Capitol Technology University does not discriminate on the basis of race, color, national origin, sex, age, sexual orientation, or handicap in admission, employment, programs, or activities.

Through its academic programs, Capitol Technology University seeks to prepare all of its graduates to demonstrate four primary characteristics:

- **Employability**: The ability to enter and advance in technical and managerial careers, appropriate to their level and area of study, immediately upon graduation.
- **Communications**: Mastery of traditional and technological techniques of communicating ideas effectively and persuasively.
- **Preparation of the Mind**: The broad intellectual grounding in technical and general subjects required to embrace future technical and managerial opportunities with success.
- **Professionalism**: Commitment to life-long learning, ethical practice and participation in professions and communities.

The proposed **Ph.D. in Product Management** program and university financial aid will be available to all Maryland residents who qualify academically for admission. The University has successfully managed supporting Financial Aid for doctorate students since its first doctoral courses started.

The **Ph.D. in Product Management** program, with its academic rigor, will produce the highest qualified Product Management professionals for this advancing field of study and employment. The University has a proven record of rigorous high-quality education. The University is fully accredited by three accrediting organizations. In addition to regional accreditation from the Middle States Commission on Higher Education (MSCHE), the University also has specialized accreditation from the International Accreditation Council of Business Education (IACBE) and Accreditation Board for Engineering and Technology (ABET). The **Ph.D. in Product Management** program is consistent with the MSCHE criteria for regional accreditation of the delivery of high quality higher education as well as the specialized IACBE accreditation requirements for the degree’s leadership content.

**Goal 2: Success**

*"Promote and implement practices and policies that will ensure student success."

The courses for the **Ph.D. in Product Management** will be offered online. The online modality 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 potential grants, scholarships, and state plans for each student to reduce potential student debt. The net cost versus 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 the Dean of Doctoral Programs advise students of the need for academic readiness as well as the degree requirements. A specific success pathway is developed for each student.

The University’s tuition increases have not exceeded 3%. The University also has a tuition lock, which means full-time tuition is locked at the rate applied at time of enrollment. The tuition remains at this rate if the student remains enrolled full-time without a break in attendance.

The University has in place services and learning tools to guide students to successful degree completion. Programs such as Early Alert provide the University’s faculty and staff opportunities for early student intervention on the pathway to graduation. This applies to all students regardless of the mode of course delivery or degree program. Capitol Technology University is also a transfer friendly institution and participates in multiple programs for government and military credit transfer. Capitol Technology University participates in the Articulation System for Maryland Colleges and Universities (ARTSYS) and has multiple transfer agreements with local institutions at all degree levels.

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

**Goal 3: Innovation**

"Foster innovation in all aspects of Maryland higher education to improve access and student success."

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 has the agility to rapidly integrate new technologies into the curriculum to better prepare students for the work environment. The University designs curriculum in alliance with its accreditation and regulating organizations/agencies.
The University also employs online virtual simulations in a game-like environment to teach practical hands-on application of knowledge. For the Ph.D. in Product Management this will include simulations and modeling all of the resources involved in the field. The University is engaged with a partner creating high-level virtual reality environments for specific courses in the degree. This use of current technology occurs in parallel with traditional proven learning strategies. These elements of the University online learning environment are purposeful and intended to improve the learning environment for both the student and faculty member. In addition, these elements are intentionally 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 their skills in interdisciplinary projects such as those in our Astronautical Engineering and Cyber Labs. In those labs, students become designers, builders, and project managers (e.g., to send a CubeSat on a NASA rocket) and data analysts (e.g., to analyze rainforest data for NASA). The University’s students recently launched another satellite aboard a NASA rocket from a location in Norway at the beginning of the 2019 Fall Semester. We are also recruiting additional partners for this proposed Ph.D. in Product Management for which real-world product management will provide students with integrative learning opportunities.

The University also supports the transfer of a limited number of graduate level courses appropriate to the degree. The University has some agreements with articulation partners for the transfer of graduate work (e.g., National Defense University).

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

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

Opportunities exist at the highest levels in all areas of Product Management. Product Management is a critical element of the federal, state and national economies. With the introduction of advanced technology, a Ph.D. in Product Management is needed now more than ever before. There are 7,939 jobs listed on indeed.com for New Product Development where a Ph.D. is required or preferred as of February 14, 2019.

(Source: https://www.indeed.com/q-PhD-New-Product-Development-jobs.html)

Graduates with the Ph.D. in Product Management will be expected to fill executive and senior-level management positions in commercial, military, civil and high-technology companies with titles such as:

- Senior Vice President, Product Management
- Product Management Senior Scientist
- Vice President, New Product Management
- Vice President, Channel and Product Management
- Managing General Manager, Products
- Managing Director, Product Line
- Corporate Product Management Officer
- Product Management Senior Strategist
- Business Development Consultant, Product Management
- Business Management Consultant

Graduates from the proposed Ph.D. in Product Management program will possess the highest knowledge in the Product Management field, serve as subject matter experts, and possess the ability to perform as top leaders in their industry.

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

The emerging Product Management sector blends multiple traditional business fields into a single capability. Product Management professionals analyze all available data to improve business operations, supply chains, pricing models, and marketing. A primary driver for this hybrid area is the role of software development in the marketplace. A 2014 article published by the Harvard Business Review states “software is emerging as the proving ground for the future of management practices, the way auto manufacturing used to be the proving ground for new management practices.” (Source: https://hbr.org/2014/06/how-the-software-industry-redefines-product-management.) The new digital proving ground has grown even more important in the last five years as software development is critical for the future of smartphones, the Internet of Things and in-home, digital assistants – the most popular products being purchased.

All of this bodes well for a positive, expanding future for Product Management with the highest technological skills and abilities. The Bureau of Labor Statistics does not break out Product Management as a separate occupation yet, despite petitions to do so. However, current, relevant BLS statistics are available for Advertising, Promotions and Marketing Managers, for Software Developers and for Operations Research Analysts.

In its analysis of the prospects for Advertising, Promotions and Marketing managers, BLS emphasizes that “managers who can navigate the digital world should have the best prospects.” BLS forecasts 10% growth in jobs for this category through 2026.

“Advertising, promotions, and marketing manager positions are highly desirable and are often sought by other managers and experienced professionals. With Internet-based advertising becoming more important, advertising managers who can navigate the digital world should have the best prospects,” according to the Bureau of Labor Statistics. (Source: https://www.bls.gov/ooh/management/advertising-promotions-and-marketing-managers.htm)

For personnel with software development expertise, BLS projects an employment growth rate of 24% through 2026. This type of strong, double-digit growth fits with the need for Product Management expertise at the highest levels. Product Management has shed its old mode and now includes the requirement for expertise in software development in order to maintain an edge on the competition. “The need for new applications on smartphones and tablets will help increase the demand for applications software developers,” writes BLS. Those applications in turn provide highly useful data that can be used to great advantage by the highest-level Product Management professionals who lead groups of products into a successful future.(Source: https://www.bls.gov/ooh/computer-and-information-technology/software-developers.htm#tab-6)
Within the Product Management realm, the analytical skills of a high-level product manager are infused with the skills of operations research analysis. The operational research analysis skills “use advanced mathematical and analytical methods to help organizations investigate complex issues, identify and solve problems, and make better decisions,” according to BLS. The growth projections through 2026 for the single category of Operations Research Analysts is 27%.

The forecasted growth rates for Product Management-related BLS occupational categories are all in the double digits—well above the overall, BLS-projected growth of 7% for all jobs by 2026.

These strong growth projections bode well for the growth in demand for Product Management professionals with the highest-level skills. In fact, the projections highlight the need for individuals who have a focused terminal degree, such as the University’s proposed Ph.D. in Product Management.

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

Product Management is the natural expansion of, and an improvement on, the 20th Century’s version of the brand manager. As such, Product Management is still relatively new in terms of industry classification by the government.

At the same time, there are well-established professional associations and academic institutions that have demonstrated their own active involvement in developing the educational and training needs of the Product Management industry.

One of the leading proponents of increased education and training for product development and management is the Product Development and Management Association (PDMA), which began in 1976. The first issue of PDMA’s journal, the Journal of Product Innovation and Management (JPIM) was published in 1984.

In 2011, the PDMA, with the co-sponsorship of the University of Illinois at Chicago, convened its inaugural Doctoral Consortium. The PDMA’s journal, the Journal of Product Innovation Management, reported in early 2012 on this inaugural event. (Source: https://onlinelibrary.wiley.com/doi/pdf/10.1111/j.1540-5885.2012.00903.x)

In terms of educational and training needs, the PDMA Doctoral Consortium is an event that seeks to “enhance the development of doctoral students who are conducting dissertation research in the domain of innovation and new product development.”

In 2017, the Doctoral Consortium was co-sponsored by the University of New Hampshire’s Paul College and the PDMA. (Source: https://www.unh.edu/unhtoday/2017/10/internationally-renowned)

This year, 2019, the fourth, triennial meeting of the Doctoral Consortium will take place in August in Champaign, Illinois. The event is co-sponsored by the University of Illinois at Urbana Champaign (UIUC) and the Product Development and Marketing Association (PDMA).
The current BLS Employment Projections for Advertising, Promotions and Marketing managers, and for Software Developers are shown below. The largest number of vacancies will be with Software Developers; BLS forecasts 255,400 new jobs will become available through 2026.

**Employment projections data for advertising, promotions, and marketing managers, 2016-26**

<table>
<thead>
<tr>
<th>Occupational Title</th>
<th>SOC Code</th>
<th>Employment, 2016</th>
<th>Projected Employment, 2026</th>
<th>Change, 2016-26</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advertising, promotions, and marketing managers</td>
<td>—</td>
<td>249,600</td>
<td>273,400</td>
<td>10 23,800</td>
</tr>
<tr>
<td>Advertising and promotions managers</td>
<td>11-2011</td>
<td>31,300</td>
<td>33,000</td>
<td>5 1,700</td>
</tr>
<tr>
<td>Marketing managers</td>
<td>11-2021</td>
<td>218,300</td>
<td>240,400</td>
<td>10 22,100</td>
</tr>
</tbody>
</table>

*SOURCE: U.S. Bureau of Labor Statistics, Employment Projections program*

**Employment projections data for software developers, 2016-26**

<table>
<thead>
<tr>
<th>Occupational Title</th>
<th>SOC Code</th>
<th>Employment, 2016</th>
<th>Projected Employment, 2026</th>
<th>Change, 2016-26</th>
</tr>
</thead>
<tbody>
<tr>
<td>Software developers</td>
<td>—</td>
<td>1,256,200</td>
<td>1,558,700</td>
<td>24 302,500</td>
</tr>
<tr>
<td>Software developers, applications</td>
<td>15-1322</td>
<td>831,300</td>
<td>1,085,600</td>
<td>31 255,400</td>
</tr>
<tr>
<td>Software developers, systems software</td>
<td>15-1333</td>
<td>425,600</td>
<td>472,100</td>
<td>11 47,100</td>
</tr>
</tbody>
</table>

*SOURCE: U.S. Bureau of Labor Statistics, Employment Projections program*

A McKinsey & Company article published in 2017, “Product managers for the digital world,” had this description of the near-future, projected need for product managers:

> Over the next three to five years, we see the product-management role continuing to evolve toward a deeper focus on data (without losing empathy for users) and a greater influence on non-product decisions.

> Product managers of the future will be analytics gurus and less reliant on analysts for basic questions. They will be able to quickly spin up a Hadoop cluster on Amazon Web Services, pull usage data, analyze them, and draw insights.”


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

According to GMAC’s annual Corporate Recruiters Survey Report, more than 50% of the recruiters surveyed reported they plan to hire personnel with a graduate management degree and prefer a terminal degree. That statistic has held steady over the last five years, but has almost tripled from 18% ten years ago. The key characteristics that employers are looking for in their prospective leaders are business development, data analytics, and marketing. All three job functions are capabilities embedded in the Ph.D. in Product Management program.

If approved, the Ph.D. in Product Management will send its graduates to the highest leadership positions in industry, academia and government with the ability to chart the course of their organization and its success in the future. The program graduates will be in the position to earn
the maximum amount of income in Product Management and fill the requirement for its senior leaders to possess groundbreaking knowledge in Product Management.

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.

There are no Doctor of Philosophy (Ph.D.) in Product Management programs, or applied doctorates in Product Management, in the State of Maryland. The University of Maryland University College (UMUC) offers a Doctor of Management – a much wider area of focus. The UMUC program also only mentions “product” in a single course offering: Innovation Process and Strategy (DMGT-850, 6 credits). Among the areas covered by the course is “An exploration of theories and applications of innovation in areas such as corporate strategy, new product development, management process improvement, and corporate entrepreneurship.” (Source: https://www.umuc.edu/academic-programs/course-information.cfm?course=DMGT) In a similar fashion, the University of Maryland’s the Robert H. Smith School of Business offers a Ph.D. in Marketing -- a much narrower focus. Capitol Technology University’s proposed Ph.D. in Product Management is different. The degree focuses on a specific sector within the business community – Product Management. The University’s proposed degree will also be offered only online.

If approved, Capitol Technology University’s Ph.D. in Product Management will position its graduates to fill the growing requirement for senior Product Management leaders in businesses throughout Maryland and the surrounding region.

2. Provide justification for the proposed program.

The Ph.D. in Product Management program is strongly aligned with the University’s strategic priorities and is supported by adequate resources. The new Ph.D. in Product Management degree will strengthen and expand upon existing technology and management degree programs at the University. In addition, the Product Management program 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 present the opportunity for the most advanced study in a rapidly changing and highly complex discipline. Research shows there is a significant shortage of Product Management leaders who have the highest level of skills in a field being rapidly transformed by technology. This program helps fill the 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 doctoral level at the Maryland HBIs. There are no known Ph.D. in Product Management degrees at HBIs in the State of Maryland. Capitol Technology University’s proposed Ph.D. in Product Management
focuses on a specific sector within the business community – Product Management. The University's proposed degree will also be offered only online.

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. There are no known Ph.D. in Product Management degrees at HBIs in the State of Maryland. Capitol Technology University’s proposed Ph.D. in Product Management focuses on a specific sector within the business community – Product Management. The University’s proposed degree will also be offered only online.

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

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

The University’s New Programs Group established the proposed program through a rigorous review of unmet needs. The group includes selected representation from the faculty, university administrators, and Executive Council. The program will be overseen by a diverse faculty with backgrounds in Product Management, cybersecurity, science and management, mechanical engineering, environmental scientists, computer science, and business. Please see Section 1 for a detailed list of the faculty’s backgrounds.

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

*Educational Objectives:*

a. Students will integrate and synthesize alternate, divergent, or contradictory perspectives or ideas fully within the field of Product Management.
b. Prepare students to critically analyze existing theories in Product Management to draw data-supported conclusions to move the field forward and support the attainment of desired outcomes.
c. Prepare students to conceptualize, apply and integrate effective qualitative and quantitative research strategies in Product Management and to develop new information effectively.
d. Prepare students to take a leadership role in a field of Product Management while employing the highest levels of ethics, analytics, decision analysis, and data visualization.
e. Students will present scholarly work on Product Management via appropriate communication channels.
f. Students will demonstrate advanced knowledge and competencies in Product Management.
g. Students will execute a plan to complete a significant piece of scholarly in Product Management.
h. Students will evaluate how Product Management affects target populations in local and extended communities.
i. Students will address the need for sustainability and Green products.
Learning Outcomes:

Upon graduation:

a. Graduates will evaluate the legal, social, economic, environmental, and ethical impact of actions within Product Management and demonstrate advanced knowledge and competency to integrate the results in the leadership decision-making process.

b. Graduates will demonstrate a mastery of an area of Product Management research, ethics of research, the stages of the research process, conceptualization and operationalization of research questions, data collection techniques, analytics, qualitative and quantitative methods, measurement, program evaluation research, and research proposal development.

c. Graduates will demonstrate the highest mastery of traditional and technological techniques of communicating ideas effectively and persuasively within Product Management.

d. Graduates will evaluate complex problems, synthesize divergent/alternative/contradictory perspectives and ideas fully, and develop advanced solutions to Product Management challenges.

e. Graduates will contribute to the body of knowledge in the study of Product Management.

f. Graduates will assess the impact of modern Product Management nationally and globally.

g. Graduates will demonstrate a mastery of the concepts of probability, common distributions, statistical methods, data analysis, analysis of contingency tables, generalized linear models, linking logit and log-linear methods with generalized linear model, analysis of discrete data using state-of-the-art programming languages, and data visualization techniques within Product Management.

3. Explain how the institution will:

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

Capitol Technology University will assess student achievement of the learning outcomes per the regulations specified by two of the university’s accreditation organizations: Middle States Commission on Higher Education (MSCHE) and International Accreditation Council for Business Education (IACBE).

Under MSCHE, the University will use Standard V, Educational Effectiveness Assessment, of the Standards for Accreditation and Requirements of Affiliation. Standard V requires:

Assessment of student learning and achievement demonstrates that the institution’s students have accomplished educational goals with their program of study, degree level, the institution’s mission, and appropriate expectations for institutions of higher education.

(Source: https://www.msche.org/?Nav1=About&Nav2=FAQ&Nav3=Question07)

Per the MSCHE’s accreditation requirements, Capitol Technology University will measure Standard V by using the following criteria:

An accredited institution possesses and demonstrates the following attributes or activities:
1. clearly stated educational goals at the institution and degree/program levels, which are interrelated with one another, with relevant educational experiences, and with the institution’s mission;

2. organized and systematic assessments, conducted by faculty and/or appropriate professionals, evaluating the extent of student achievement of institutional and degree/program goals. Institutions should:
   a. define meaningful curricular goals with defensible standards for evaluating whether students are achieving those goals;
   b. articulate how they prepare students in a manner consistent with their mission for successful careers, meaningful lives, and, where appropriate, further education. They should collect and provide data on the extent to which they are meeting these goals;
   c. support and sustain assessment of student achievement and communicate the results of this assessment to stakeholders;

3. consideration and use of assessment results for the improvement of educational effectiveness. Consistent with the institution’s mission, such uses include some combination of the following:
   a. assisting students in improving their learning;
   b. improving pedagogy and curriculum;
   c. reviewing and revising academic programs and support services;
   d. planning, conducting, and supporting a range of professional development activities;
   e. planning and budgeting for the provision of academic programs and services;
   f. informing appropriate constituents about the institution and its programs;
   g. improving key indicators of student success, such as retention, graduation, transfer, and placement rates;
   h. implementing other processes and procedures designed to improve educational programs and services;

4. if applicable, adequate and appropriate institutional review and approval of assessment services designed, delivered, or assessed by third-party providers; and

5. periodic assessment of the effectiveness of assessment processes utilized by the institution for the improvement of educational effectiveness.

(Source: https://www.msche.org/publications/RevisedStandardsFINAL.pdf)

Under IACBE, the University will also use IACBE's Assessment Pyramid to assess student achievement of the learning outcomes in the program:

The Assessment Pyramid below illustrates the general hierarchical relationships among mission, goals, outcomes, and objectives:
The Assessment Pyramid represents the flow from the institutional mission at the apex of the pyramid, which provides purpose and direction for the institution as a whole, followed by the mission of the academic business unit (and other academic units of the institution), and then down to the broad-based goals of the business unit, followed by intended outcomes, and then finally down to performance objectives associated with the intended outcomes at the base of the pyramid.

The widening and downward flow from the institutional mission in this hierarchical structure indicates that:

- The mission of the academic business unit flows from the institutional mission and should be consistent with and contribute to the institutional mission.
- The broad-based goals flow from the mission of the academic business unit with multiple goals associated with the business unit's mission and each goal relating to some aspect of the mission.
- Intended outcomes flow from the broad-based goals with multiple intended outcomes associated with each goal.
- Performance objectives flow from the intended outcomes with multiple objectives associated with each intended outcome.
- Consequently, evidence of accomplishment of desired results at a given level in the pyramid hierarchy would then constitute evidence of accomplishment of the desired results in the level above it.

**Institutional and Academic Business Unit Mission**

The institutional mission statement is a concise statement that defines the general purpose of the institution as a whole, provides direction for all of its activities and operations, and guides decision making for all of its academic and non-academic functional units. Similarly, the academic business unit mission statement provides direction for and guides decision making of the academic business unit. Furthermore, the mission of the business unit should be consistent and consonant with the institutional mission in the sense that each element of the business unit's mission should be associated with and contribute to some aspect of the institutional mission.
**Broad-Based Goals vs. Intended Outcomes**

Goals and intended outcomes are similar in that they describe desired results of the various activities of the business unit and establish the foundation for assessment. The difference between the two lies in the degree of specificity and measurability. Goals are broad, clear, and general statements of what the academic business unit intends to accomplish in terms of student learning and operational effectiveness. They describe the general aims and aspirations of the business unit and provide the general framework for determining the more specific intended outcomes for the unit. In addition, they should be consistent with the academic business unit’s mission in the sense that each broad-based goal should be associated with, contribute to, and mapped to some aspect of the unit’s mission.

The main function of the goals is to provide a link between the academic business unit’s broadly-stated mission and the more specific intended outcomes for the unit (as described in the discussion of the pyramidal structure above). The broad-based goals then become a blueprint for implementing the business unit’s mission and for developing measurable intended outcomes relating to student learning and operational effectiveness. Goals are generally too broadly stated in order to be measurable in and of themselves. Therefore, intended outcomes need to be articulated in order to make the goals specific and to describe what the goals actually mean, i.e., in order to be able to determine the extent to which the goals have been met.

Intended outcomes are clear statements that describe in precise and measurable terms the specific, observable, and desired results pertaining to student learning and the operational effectiveness of the academic business unit. They flow from the academic business unit’s broad-based goals and represent what students must specifically learn and what the academic business unit must achieve operationally in order to accomplish these goals. Consequently, each broad-based goal will usually have multiple intended outcomes associated with it. In addition, a particular intended outcome can support or contribute to the accomplishment of more than one goal.

**Intended Outcomes vs. Performance Objectives**

Once intended outcomes have been developed, the academic business unit must specify the ways in which it will measure the extent to which students and the business unit are achieving the intended outcomes. In other words, the specific instruments, tools, and metrics that will be used to assess the intended outcomes must be determined. Whereas intended outcomes are expressed in terms of the specific knowledge, skills, and abilities that students are expected to acquire and in terms of the desired operational results of the academic business unit, performance objectives on the other hand are the desired quantitative performance results (or performance targets) on the assessment instruments, tools, and metrics that are used to measure the intended outcomes. So, for example, if an academic business unit has defined an intended student learning outcome relating to the global dimensions of business and is measuring this outcome with a locally-developed examination (the assessment instrument), then a performance objective on this instrument for this outcome might be that 80% or more of the students will achieve a sub-score of at least 70% on the set of examination questions dealing with the international and global dimensions of business. Therefore, performance objectives are even more specific than intended outcomes in as much as they identify concrete quantitative targets for the assessment methods used to measure the achievement of
the outcomes. Furthermore, each intended outcome should be capable of being measured by more than one assessment method and would therefore have multiple performance objectives associated with it.

**Summing Up**

...As we move downward along the Assessment Pyramid, we progress from the broad and general to the narrow and specific. Intended outcomes and performance objectives provide the necessary degree of specificity and measurability required to determine the extent of student learning, operational effectiveness, and mission accomplishment.


The following pages provide an example of how the IACBE Assessment Pyramid is implemented by the Capitol Technology University (using Capitol Technology University’s current M.B.A. and M.S. in Information Systems Management programs). If approved, the Ph.D. in Product Management will use the same instruments with revisions tailored to the Ph.D. level.
OUTCOMES ASSESSMENT PLAN
Capitol Technology University
Department of Business and Information Sciences

Section I: Mission and Broad-Based Goals

MISSION STATEMENT

Mission of the Department of Business and Information Sciences:

Mission Statement:
The mission of the School of Business and Information Sciences is to provide students a practical education in an environment supportive of academic excellence and high student achievement, preparing them to thrive in professional careers.

BROAD-BASED GOALS

<table>
<thead>
<tr>
<th>Broad-Based Student Learning Goals:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Employability:</strong> Graduates will have an understanding of the difference between theory and practice and how to extract from theory and extend its application to real-world situations.</td>
</tr>
<tr>
<td><strong>Communications:</strong> Graduates will be able to effectively communicate their ideas in both written and oral form (technical and non-technical) understanding that communication is a cooperative process in both the one-on-one and team environment.</td>
</tr>
<tr>
<td><strong>Preparation of the Mind:</strong> Graduates will have a broad intellectual grounding in business and/or technology. Graduates will be able to analyze situations and successfully determine cause and effect. Graduates will know how to use contemporary research tools as well as more traditional methods to locate and analyze information and develop knowledge.</td>
</tr>
<tr>
<td><strong>Professionalism:</strong> Graduates will have an understanding of their professional and ethical responsibilities. Graduates will have an understanding of the possible social, economic, cultural and environmental impact of their business and/or technical solutions in a global and social context. Graduates will recognize that lifelong learning is essential to the ongoing process of professional and personal development.</td>
</tr>
</tbody>
</table>

BROAD-BASED OPERATIONAL GOALS

<table>
<thead>
<tr>
<th>Broad-Based Operational Goals:</th>
</tr>
</thead>
</table>
1. The School of Business and Information Sciences will be successful in retaining its students based on the University's historical data. (see pg. 13)

2. The School of Business and Information Sciences will recruit, retain and develop qualified faculty committed to academic excellence.

3. The School of Business and Information Sciences will provide students a practical hands-on education.

4. The School of Business and Information Sciences will offer strong, comprehensive, and contemporary degree programs that successfully prepare students for academic and professional careers, graduate school and professional advancement.

5. The School of Business and Information Sciences will provide a supportive learning environment that fosters student success and contributes to excellence in business education.

---

**Section II: Student Learning Assessment**

**STUDENT LEARNING ASSESSMENT: MASTER'S-LEVEL PROGRAMS**

<p>| Student Learning Assessment for Master of Business Administration (MBA) |</p>
<table>
<thead>
<tr>
<th>Program Intended Student Learning Outcomes (Program ISLOs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Graduates will be able to identify organization problems and use information systems, technology, financial and accounting techniques, marketing research, and other decision-making tools to strategically analyze and solve business problems in a global environment.</td>
</tr>
<tr>
<td>Broad-Based Student Learning Goals Associated with this Outcome: 1, 3</td>
</tr>
<tr>
<td>Key Learning Outcomes for Master's-Level Business Programs to which this Outcome is Linked: 1, 2, 3</td>
</tr>
<tr>
<td>2. Graduates will be able to employ quantitative techniques and methods and interpret the results in the analysis of real-world business situations.</td>
</tr>
<tr>
<td>Broad-Based Student Learning Goals Associated with this Outcome: 3</td>
</tr>
<tr>
<td>Key Learning Outcomes for Master's-Level Business Programs to which this Outcome is Linked: 3</td>
</tr>
<tr>
<td>3. Graduates will be able to communicate effectively in multiple forms in a convincing and persuasive manner.</td>
</tr>
<tr>
<td>Broad-Based Student Learning Goals Associated with this Outcome: 2</td>
</tr>
<tr>
<td>Key Learning Outcomes for Master's-Level Business Programs to which this Outcome is Linked: 4</td>
</tr>
</tbody>
</table>
4. Graduates will be able to collaborate effectively with a team of colleagues on diverse projects.

Broad-Based Student Learning Goals Associated with this Outcome: 2, 3

Key Learning Outcomes for Master’s-Level Business Programs to which this Outcome is Linked: 5

5. Graduates will be able to deduce the ethical obligations and responsibilities of business in a leadership role.

Broad-Based Student Learning Goals Associated with this Outcome: 4

Key Learning Outcomes for Master’s-Level Business Programs to which this Outcome is Linked: 6

6. Graduates will be able to differentiate and synthesize discipline-based knowledge as well as hypothesize the interrelationships of the specific areas of study.

Broad-Based Student Learning Goals Associated with this Outcome: 1, 2, 3

Key Learning Outcomes for Master’s-Level Business Programs to which this Outcome is Linked: 2

7. Graduates will develop leadership skills and demonstrate the ability to become a change agent in a complex global economy.

Broad-Based Student Learning Goals Associated with this Outcome: 1, 3

Key Learning Outcomes for Master’s-Level Business Programs to which this Outcome is Linked: 1, 2, 3, 4

<table>
<thead>
<tr>
<th>Assessment Instruments for Intended Student Learning Outcomes—Direct Measures of Student Learning:</th>
<th>Performance Objectives (Targets/Criteria) for Direct Measures:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Capstone Strategic Management (MBA 650) Case Study</td>
<td>At least 75% of the students will score 75% or higher.</td>
</tr>
<tr>
<td>Program ISLOs Assessed by this Measure: 1, 2, 3, 4, 5, 6, 7</td>
<td>Rubric: See Appendix A, C, D</td>
</tr>
<tr>
<td>In addition to the rubric each case study has solution against which all students are graded. This is case specific.</td>
<td></td>
</tr>
<tr>
<td>2. Capstone Senior Project (MBA 700)</td>
<td>At least 75% of graduating seniors will score 75% or higher.</td>
</tr>
<tr>
<td>Program ISLOs Assessed by this Measure: 1, 2, 4, 5, 6</td>
<td>Rubric: See Appendix B, C, D</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Assessment Instruments for Intended Student Learning Outcomes—Indirect Measures of Student Learning:</th>
<th>Performance Objectives (Targets/Criteria) for Indirect Measures:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Graduating Student Survey (Graduate)</td>
<td>On the exit survey instrument, at least 75% of graduating seniors in management will indicate that they were “successful” or “very successful” in achieving the intended learning outcomes for the major in business.</td>
</tr>
<tr>
<td>Program ISLOs Assessed by this Measure: 1, 2, 3, 4, 5, 6, 7</td>
<td></td>
</tr>
</tbody>
</table>

24
Instrument: See Appendix E

2. End-of-course survey (contains overall course and curriculum questions)

Program ISLOs Assessed by this Measure: 1, 2, 3, 4, 5, 6, 7

At least 75% of the students agree or strongly agree that the overall quality of the course has met their expectations of quality and intended learning outcomes of the course.

Instrument: See Appendix F

Section III: Operational Assessment

INTENDED OPERATIONAL OUTCOMES: SCHOOL OF BUSINESS AND INFORMATION SCIENCES

<table>
<thead>
<tr>
<th>Intended Operational Outcomes for the School of Business and Information Sciences:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The School of Business and Information Sciences will be successful in placing its undergraduates in appropriate entry-level positions or in graduate school on an annual basis.</td>
</tr>
<tr>
<td>Broad-Based Operational Goals Associated with this Outcome: 4</td>
</tr>
<tr>
<td>2. Faculty members in the School of Business and Information Sciences will engage in appropriate professional development activities on an annual basis.</td>
</tr>
<tr>
<td>Broad-Based Operational Goals Associated with this Outcome: 2</td>
</tr>
<tr>
<td>3. The School of Business and Information Sciences will be successful in providing high-quality instruction to its students.</td>
</tr>
<tr>
<td>Broad-Based Operational Goals Associated with this Outcome: 4</td>
</tr>
<tr>
<td>4. The School of Business and Information Sciences will be successful in providing high-quality advising to its students.</td>
</tr>
<tr>
<td>Broad-Based Operational Goals Associated with this Outcome: 5</td>
</tr>
<tr>
<td>5. Students in the School of Business and Information Sciences will participate in relevant internships on an annual basis.</td>
</tr>
<tr>
<td>Broad-Based Operational Goals Associated with this Outcome: 3, 4</td>
</tr>
<tr>
<td>6. The School of Business and Information Sciences will provide a practical hands-on experience.</td>
</tr>
<tr>
<td>Broad-Based Operational Goals Associated with this Outcome: 3</td>
</tr>
</tbody>
</table>
7. The School of Business and Information Sciences will be successful in retaining its students on an annual basis.

Broad-Based Operational Goals Associated with this Outcome: 1

8. The School of Business and Information Sciences will be successful in contributing to the professional advancement of its MBA and MSISM graduates.

Broad-Based Operational Goals Associated with this Outcome: 4

<table>
<thead>
<tr>
<th>Assessment Measures/Methods for Intended Operational Outcomes:</th>
<th>Performance Objectives (Targets/Criteria) for Operational Assessment Measures/Methods:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Report of the Office of Career Services and Graduate Student Support</td>
<td>The School of Business and Information Sciences will place 75% or more of its undergraduate students in degree related positions or in graduate school within nine months of graduation.</td>
</tr>
<tr>
<td>Intended Operational Outcomes Assessed by this Measure: 1, 8</td>
<td></td>
</tr>
<tr>
<td>2. Graduating Student Survey</td>
<td>At least 75% of graduating students agreed or strongly agreed that the University provided high quality instruction.</td>
</tr>
<tr>
<td>Intended Operational Outcomes Assessed by this Measure: 3</td>
<td></td>
</tr>
<tr>
<td>3. Performance Review</td>
<td>At least 75% of full-time faculty will participate in professional development activities (webinars, publication, conferences, workshops) on an annual basis.</td>
</tr>
<tr>
<td>Intended Operational Outcomes Assessed by this Measure: 2</td>
<td>At least 50% part-time faculty will participate in professional development activities (webinars, publication, conferences, workshops) on an annual basis.</td>
</tr>
<tr>
<td>4. Continuation Rates Report</td>
<td>At least 50% will graduate.</td>
</tr>
<tr>
<td>Intended Operational Outcomes Assessed by this Measure: 7</td>
<td></td>
</tr>
<tr>
<td>5. Course Survey—to include only those questions related to student satisfaction with course instruction and academic advising</td>
<td>At least 75% of students will agree or strongly agree that they were provided high quality instruction in the course.</td>
</tr>
<tr>
<td>Intended Operational Outcomes Assessed by this Measure: 3, 4, 6</td>
<td>At least 75% of students will agree or strongly agree that they were provided high quality advising.</td>
</tr>
<tr>
<td>6. Internship Report</td>
<td>At least 75% will agree or strongly agree that they were provided hands on experiences.</td>
</tr>
<tr>
<td></td>
<td>At least 40% of the students will participate in internships.</td>
</tr>
</tbody>
</table>
b) document student achievement of learning outcomes in the program

The university will document student achievement of the learning outcomes in the Ph.D. in Product Management program in the same fashion as its current programs. The university will also publicly post the results of the assessment on its website per IACBE accreditation requirements.

The following pages provide an example of the University’s public disclosure of its assessment of the learning outcomes (for programs under IACBE). The public disclosure of learning outcomes assessment will be tailored to the Department of Doctoral Programs and the Ph.D. in Product Management if the degree is approved.
Report of Student Learning and Achievement

Capitol Technology University
Department of Business and Information Sciences

<table>
<thead>
<tr>
<th>Mission of the Department of Business and Information Sciences</th>
</tr>
</thead>
<tbody>
<tr>
<td>The mission of the Department of Business and Information Sciences is to provide students a practical education in an environment supportive of academic excellence and high student achievement, preparing them to thrive in professional careers.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Student Learning Assessment for the Master of Business Administration (MBA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Program Intended Student Learning Outcomes (Program ISLOs)</td>
</tr>
<tr>
<td>1. Graduates will be able to identify organization problems and use information systems, technology, financial and accounting techniques, marketing research, and other decision-making tools to strategically analyze, assess, and devise solutions to business problems in a global environment.</td>
</tr>
<tr>
<td>2. Graduates will be able to employ quantitative techniques and methods and interpret the results in the analysis of real-world business situations.</td>
</tr>
<tr>
<td>3. Graduates will be able to communicate effectively in multiple and present arguments in a convincing and persuasive manner.</td>
</tr>
<tr>
<td>4. Graduates will be able to collaborate effectively with a team of colleagues on diverse projects.</td>
</tr>
<tr>
<td>5. Graduates will be able to deduce the ethical obligations and responsibilities of a business in a leadership role.</td>
</tr>
<tr>
<td>6. Graduates will be able to differentiate and synthesize discipline-based knowledge as well as hypothesize the interrelationships of the specific areas of study.</td>
</tr>
<tr>
<td>Performance Objectives (Targets/Criteria) for Direct Measures:</td>
</tr>
<tr>
<td>---------------------------------------------------------------</td>
</tr>
<tr>
<td>At least 80% of the students will score 80% or higher on the Capstone Project evaluation rubric.</td>
</tr>
<tr>
<td>Program ISLOs Assessed by this Measure: 1, 2, 3, 4, 5, 6.</td>
</tr>
<tr>
<td>Performance Objectives (Targets/Criteria) for Indirect Measures:</td>
</tr>
<tr>
<td>1. Graduating Student Survey (Graduate)</td>
</tr>
<tr>
<td>Assessment Instruments for Intended Student Learning Outcomes—</td>
</tr>
<tr>
<td>Indirect Measures of Student Learning—</td>
</tr>
<tr>
<td>Program ISLOs Assessed by this Measure: 1, 2, 3, 4, 5, 6, 7.</td>
</tr>
<tr>
<td>Program ISLOs Assessed by this Measure: 1, 2, 3, 4, 5, 6, 7.</td>
</tr>
</tbody>
</table>
### Capstone Strategic Management Case Study (Program ISLO 1, 2, 3, 4, 5, 6, 7):

100% of Total  (Class average score: 90.8%)

### 2. Capstone Project (MBA 700):

Percentage of Students Achieving a Score of 80% or Higher on the Capstone Project:

Capstone Project (Program ISLO 1, 2, 3, 4, 5, 6, 7): 100% of Total  (Class average score: 96.6%)

### Summary of Results from Implementing Indirect Measures of Student Learning:

1. **Graduating Student Survey (Graduate):**

   Not Assessed: the response rate was not statistically significant.

2. **End-of-course Survey:**

   (contains overall course questions, curriculum questions, and percentage of students who “agree” and “strongly agree”)

   1. The instructor was well prepared to present and discuss course material.  
      96.4%
   2. The instructor presented content in a systematic and organized fashion, relating parts to the whole.  
      97.5%
   3. The instructor used supplemental technology to present material (ex., audio visual aids, Canvas, www, etc.)  
      95.7%
   4. The instructor posed questions to students designed to promote critical thinking and analysis.  
      90.4%
   5. The instructor promoted free-flow of communication: instructor and student, and between students.  
      97.5%
   6. The instructor introduced divergent viewpoints in areas where different points of view exist.  
      92.5%
   7. The instructor clarified abstract and complex ideas, using examples within students  
      91.5%
8. The instructor periodically evaluated students. 90.3%
9. The instructor assigned homework which reinforces the lecture materials. 95%
10. The instructor provided useful feedback on submitted materials. 91.4%
11. The instructor was available outside of scheduled class hours. 92.8%
12. Course objectives were clearly defined. 97.6%
13. Dates for the submission of major materials were specified. 98.8%
14. Guidelines and requirements for presentations and written assignments were clearly stated. 97.5%
15. Clear, well-developed policies and procedures for evaluating student performance and grading were explained. 96.3%
16. Expectations of students including, but not limited to attendance, make-up work, and honor code policies were clearly explained. 97.6%
17. The course objectives were accomplished. 94.2%
18. Exams and quizzes were designed to test the course outcomes (covered appropriate subject matter). 95.3%
19. The required text(s) were valuable in contributing to my overall understanding of the course content. 89.6%
20. The labs demonstrated and reinforced the course objectives. 92.5%

Summary of Achievement of Intended Student Learning Outcomes:

<table>
<thead>
<tr>
<th>Intended Student Learning Outcomes</th>
<th>Learning Assessment Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Program ISLOs</td>
<td>Direct Measure 1</td>
</tr>
<tr>
<td>Performance Target Was...</td>
<td>Performance Target Was...</td>
</tr>
<tr>
<td>1. Graduates will be able to identify organization problems and use information systems, technology, financial</td>
<td>Met</td>
</tr>
<tr>
<td></td>
<td>and accounting techniques, marketing research, and other decision-making tools to strategically analyze, assess, and devise solutions to business problems in a global environment.</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>2.</td>
<td>Graduates will be able to employ quantitative techniques and methods and interpret the results in the analysis of real-world business situations.</td>
</tr>
<tr>
<td></td>
<td>Met</td>
</tr>
<tr>
<td></td>
<td>NA</td>
</tr>
<tr>
<td>3.</td>
<td>Graduates will be able to communicate effectively in multiple and present arguments in a convincing and persuasive manner.</td>
</tr>
<tr>
<td></td>
<td>Met</td>
</tr>
<tr>
<td></td>
<td>NA</td>
</tr>
<tr>
<td>4.</td>
<td>Graduates will be able to collaborate effectively with a team of colleagues on diverse projects.</td>
</tr>
<tr>
<td></td>
<td>Met</td>
</tr>
<tr>
<td></td>
<td>NA</td>
</tr>
<tr>
<td>5.</td>
<td>Graduates will be able to deduce the ethical obligations and responsibilities of a business in a leadership role.</td>
</tr>
<tr>
<td></td>
<td>Met</td>
</tr>
<tr>
<td></td>
<td>NA</td>
</tr>
<tr>
<td>6. Graduates will be able to differentiate and synthesize discipline-based knowledge as well as hypothesize the interrelationships of the specific areas of study.</td>
<td>Met</td>
</tr>
<tr>
<td>7. Graduates will develop leadership skills and demonstrate the ability to become a change agent in a complex global economy</td>
<td>Met</td>
</tr>
</tbody>
</table>

**Proposed Courses of Action for Improvement in Learning Outcomes for which Performance Targets Were Not Met:**

1. Indirect Measure 1: The university will implement an improved administrative procedure prior to 2018 Commencement that requires Master’s degree graduates to answer the Graduating Student Survey.

---

**Student Learning Assessment for the Master of Science in Information Systems Management (MSISM)**

**Program Intended Student Learning Outcomes (Program ISLOs)**

1. Graduates will be able to identify organization problems and use information systems, technology, project management, and other decision-making tools to strategically analyze, assess, and devise solutions to business problems in a global environment.

2. Graduates will develop leadership skills and demonstrate the ability to become a change agent in a complex global economy.

3. Graduates will be able to communicate effectively in multiple forms and demonstrate the ability to devise plans of action for real-world business challenges.

4. Graduates will be able to the ethical obligations and responsibilities of a business in a leadership role.

5. Graduates will be able to employ information systems, technology, and other decision-making tools and interpret the results in
analyzing and providing solutions to business problems in a global business environment.

6. Graduates will be able to define and conceptualize opportunities for enhanced information analysis and exploitation in order to facilitate business planning and execution.

7. Graduates will be able to collaborate effectively with a team of colleagues on diverse projects.

<table>
<thead>
<tr>
<th>Assessment Instruments for Intended Student Learning Outcomes—Direct Measures of Student Learning:</th>
<th>Performance Objectives (Targets/Criteria) for Direct Measures:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Capstone Project (SM 569) Project</td>
<td>At least 80% of the students will score 80% or higher on the Capstone Project evaluation rubric.</td>
</tr>
<tr>
<td>Program ISLOs Assessed by this Measure: 1, 2, 3, 4, 5, 6, 7</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Assessment Instruments for Intended Student Learning Outcomes—Indirect Measures of Student Learning:</th>
<th>Performance Objectives (Targets/Criteria) for Indirect Measures:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Graduating Student Survey (Graduate)</td>
<td>On the exit survey instrument, at least 75% of the MSISM graduates will indicate that they were “successful” or “very successful” in achieving the intended learning outcomes for the major in business.</td>
</tr>
<tr>
<td>Program ISLOs Assessed by this Measure: 1, 2, 3, 4, 5, 6, 7</td>
<td></td>
</tr>
<tr>
<td>2. End-of-course survey (contains overall course and curriculum questions)</td>
<td>At least 70% of the students “agree” or “strongly agree” that the overall quality of the course has met their expectations of quality and intended learning outcomes of the course.</td>
</tr>
<tr>
<td>Program ISLOs Assessed by this Measure: 1, 2, 3, 4, 5, 6, 7</td>
<td></td>
</tr>
</tbody>
</table>

Assessment Results: Master of Science in Information Systems Management (MSiSM)

Summary of Results from Implementing Direct Measures of Student Learning:

1. Capstone Project (SM 569) Project:

   Percentage of Students Achieving a Score of 80% or Higher on the Capstone Project:
Summary of Results from Implementing Indirect Measures of Student Learning:

1. **Graduating Student Survey (Graduate):**
   
   Not Assessed: the response rate was not statistically significant.

2. **End-of-course Survey:**
   (contains overall course questions, curriculum questions, and percentage of students who “agree” and “strongly agree”)

   1. The instructor was well prepared to present and discuss course material. 94.2%
   2. The instructor presented content in a systematic and organized fashion, relating parts to the whole. 93.3%
   3. The instructor used supplemental technology to present material (ex., audio visual aids, Canvas, www, etc.) 94.2%
   4. The instructor posed questions to students designed to promote critical thinking and analysis. 90%
   5. The instructor promoted free-flow of communication: instructor and student, and between students. 90%
   6. The instructor introduced divergent viewpoints in areas where different points of view exist. 87.5%
   7. The instructor clarified abstract and complex ideas, using examples within students. 91.7%
   8. The instructor periodically evaluated students. 90.8%
   9. The instructor assigned homework which reinforces the lecture materials. 94.2%
   10. The instructor provided useful feedback on submitted materials. 81.7%
   11. The instructor was available outside of scheduled class hours. 88.3%
   12. Course objectives were clearly defined. 96.7%
   13. Dates for the submission of major materials were specified. 88.3%
   14. Guidelines and requirements for presentations and written assignments were clearly stated. 96.7%
15. Clear, well-developed policies and procedures for evaluating student performance and grading were explained.  90%
16. Expectations of students including, but not limited to attendance, make-up work, and honor code policies were clearly explained.  96.7%
17. The course objectives were accomplished.  100%
18. Exams and quizzes were designed to test the course outcomes (covered appropriate subject matter).  96.7%
19. The required text(s) were valuable in contributing to my overall understanding of the course content.  97.5%
20. The labs demonstrated and reinforced the course objectives.  93.3%

### Summary of Achievement of Intended Student Learning Outcomes:

<table>
<thead>
<tr>
<th>Intended Student Learning Outcomes</th>
<th>Learning Assessment Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Program ISLOs</td>
<td>Direct Measure 1</td>
</tr>
<tr>
<td>Performance Target Was...</td>
<td>Performance Target Was...</td>
</tr>
<tr>
<td>1. Graduates will be able to identify organization problems and use information systems, technology, project management, and other decision-making tools to strategically analyze, assess, and devise solutions to business problems in a global environment.</td>
<td>Met</td>
</tr>
<tr>
<td>2. Graduates will develop leadership skills and demonstrate the ability to</td>
<td>Met</td>
</tr>
</tbody>
</table>

36
<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>become a change agent in a complex global economy.</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>3. Graduates will be able to communicate effectively in multiple forms and demonstrate the ability to devise plans of action for real-world business challenges.</strong></td>
<td>Met</td>
<td>NA</td>
<td>Met</td>
<td></td>
</tr>
<tr>
<td><strong>4. Graduates will be able to the ethical obligations and responsibilities of a business in a leadership role.</strong></td>
<td>Met</td>
<td>NA</td>
<td>Met</td>
<td></td>
</tr>
<tr>
<td><strong>5. Graduates will be able to employ information systems, technology, and other decision-making tools and interpret the results in analyzing and providing solutions to business problems in a global business environment.</strong></td>
<td>Met</td>
<td>NA</td>
<td>Met</td>
<td></td>
</tr>
<tr>
<td><strong>6. Graduates will be able to define and conceptualize opportunities for enhanced information analysis and exploitation in order to facilitate business planning and execution.</strong></td>
<td>Met</td>
<td>NA</td>
<td>Met</td>
<td></td>
</tr>
</tbody>
</table>
7. Graduates will be able to collaborate effectively with a team of colleagues on diverse projects.

| Met | NA | Met |

Proposed Courses of Action for Improvement in Learning Outcomes for which Performance Targets Were Not Met:

1. Indirect Measure 1: The university will implement an improved administrative procedure prior to 2018 Commencement that requires Master’s degree graduates to answer the Graduating Student Survey.
4. 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 Doctor of Philosophy (Ph.D.) in Product Management provides students with the opportunity to conduct extensive and sustained original research at the highest level in the field of Product Management. Product Management has evolved recently to a hybrid of scientific reasoning and research, business management, cutting-edge technology, operational analysis, marketing, supply, logistics, and sustainability. The Ph.D. in Product Management is a unique doctoral program designed to meet the demands of the highest skilled professionals to become the leaders who will be involved in the advancement, expansion, and support of product management on both a large and small scale.

*Description of program requirements:*

**Entrance Requirements**

To be accepted into the Ph.D. in Product Management program, students must have completed an appropriate master's degree with a cumulative GPA of no less than 3.0 on a 4.0 scale. Students must also possess a high level of experience in the field, or a closely related field, and show the academic promise of their future ability to produce original research of publishable quality (suitable for a scholarly peer-reviewed journal or publication and presentation of high stature).

Students must also provide a prospectus of at least 750 words that details their existing expertise and preparation for success in conducting original research within Capitol Technology University's Ph.D. in Product Management program. International students are required to take the TOEFL and score at least 550 on the paper-based test or 79 on the internet-based test.

**Degree Requirements:**

The Ph.D. in Product Management program is designed for students with an appropriate master's degree and significant years of field experience. During the program, students will conduct original research in an approved area of study. Successful completion of the program culminates in the award of the Doctor of Philosophy (Ph.D.) in Product Management degree.

There are two options for completion of the Ph.D. in Product Management program. Under the thesis option, the student will produce, present, and defend a doctoral dissertation after receiving the required approvals from the student’s Committee and the Ph.D. Review Board. Under the publication option, the student will produce, present, and defend their original doctoral research after receiving the required approvals from the student’s Committee and the Ph.D. Review Board. The student must also publish three works of original research in a scholarly peer-reviewed journal(s). One of the three published works may be in a peer reviewed conference proceeding.
Degree Course Requirements:

The following is a list of courses for the Ph.D. in Product Management degree. Students must meet all prerequisites for the courses listed below.

**Doctor of Philosophy in Product Management**

**Courses**

**Total Credits: 60**

**PRODUCT MANAGEMENT DOCTORAL CORE: 30 CREDITS**

**PRM-800 Product Management Research Background (6 Credits)**
The student will focus on the study of the latest Product Management processes and developments. The student will synthesize the growing effect of technology on current operations, international relationships and effects on the field, and where there are areas of improvements or failings. The focus will be to start identifying areas for research at a later stage and explore the background. Prerequisite: None.

**PRM-810 Product Management Research Methodologies (6 Credits)**
The student will evaluate and develop research methodologies and strategies suitable for Product Management and address the data sources and information to test a hypothesis or research question. It is expected the student will be building upon PRM-800 in refining and developing their research task and plan. Prerequisite: PRM-800.

**PRM-820 Product Management Future Demands (6 Credits)**
The student will research the future demands Product Management and how these influence specific research questions. Data collection and applications will be central to evaluating the needs of Product Management on the short, medium and long term. Prerequisite: PRM-810.

**PRM-830 Strategies for Product Management (6 Credits)**
The student will undertake a robust and comprehensive analysis of the strategies for the growth and evolution of Product Management. Students will analyze the influences of economics, international politics, and sustainability that dictate planning based upon non-technical aspects. For example, how international disputes effect key resources, costs, and schedules. Prerequisite: PRM-810.

**PRM-840 Product Management Research Proposal (6 Credits)**
The student will produce a proposal for research that is comprehensive in detail and planning. The proposal will address the research topic, scope and aims, objectives and a timing plan. The doctoral student will then complete the research milestones according to the proposal and research plan. Prerequisite: PRM-830.

**PRODUCT MANAGEMENT DOCTORAL RESEARCH AND WRITING: 30 CREDITS**

**PRM- 900 Product Management Doctoral Writing I (6 Credits)**
The student will compose and complete Chapters 1 and 2 within the boundaries of the proposal and research plan. Chapters 1-2 will be reviewed by the student’s Chair and Committee and must be approved for the student to advance. Prerequisite: PRM-840.
PRM-910 Product Management Doctoral Writing II (6 Credits)
The student will compose and complete Chapter 3 within the according to the approved proposal. The student will also submit Chapters 1-3 to the Institutional Review Board (IRB) and Academic Review Board (ARB). After receiving the necessary approvals, the student will conduct data collection and analysis activities consistent with the research plan. Prerequisite: PRM-900.

PRM-920 Product Management Doctoral Writing III (6 Credits)
The student will compose and complete Chapter 4. The student will provide a complete and substantive presentation of the research results in Chapter 4. The student’s Chair and Committee must review and approve Chapter 4 for the student to advance. Prerequisite: PRM-910.

PRM-930 Product Management Doctoral Writing IV (6 Credits)
The student will compose and complete Chapter 5 and submit the work to the student’s Chair and Committee. The student will also finalize all required elements of their research. The student’s Chair and Committee must review and approve the complete document. The student’s Chair and Committee will then submit the complete document to the University Reviewers and Ph.D. Review Board for approval. The student must receive approval from the University Reviewers and Ph.D. Review Board to advance forward. Prerequisite: PRM-920.

PRM-940 Product Management Doctoral Defense (6 Credits)
Upon approval from the University Reviewers and Ph.D. Review Board, the student will prepare and deliver an oral presentation summarizing the body of research and defend the same through viva voce (i.e., oral examination). The student’s Chair, Committee and Ph.D. Review Board will confer to determine if the student has provided a sufficient and necessary final oral defense of the research. Prerequisite: PRM-930.

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

N/A. This is a graduate program.

6. 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). The program will also receive specialized accreditation by International Accreditation Council for Business Education (IACBE) for its management and leadership content. Capitol Technology University is currently accredited by MSCHE and IACBE and in good standing with both organizations.

7. 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.

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

The Ph.D. in Product Management program will provide students with clear, complete, and timely information on the curriculum, course and degree requirements, nature of faculty/student interaction, assumptions about technology competence and skills, technical equipment requirements, Learning Management System, availability of academic support services and financial aid resources, and costs and payment policies.

Curriculum, course and degree information will be available on the university website and via e-mail as well as regular mail (by request). The expectations on faculty/student interaction are available to students during virtual open house events, literature, website, etc. In addition, this information is part of the material distributed for each course. Students receive guidance on proper behavior/interaction with their Chair and Ph.D. Committee members as well as the online environment to facilitate a high-level doctoral learning experience. Technology competence, skills, and technical equipment requirements are part of the material distributed for each course. The technical equipment requirements are listed on the University website. The requirements are also provided to students in the University’s Welcome Package.

The University’s academic support services, financial aid resources, costs and payment policies, and learning management system are covered in the university open houses, application process, welcome aboard process, orientation, student town halls, and individual counseling.

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

The Ph.D. in Product Management program’s advertising, recruiting, and admissions materials will clearly and accurately represent the proposed program and the services available. The material for every new program is derived from the new program request sent to the Maryland Higher Education Commission.

**H. Adequacy of Articulation:**

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

This program does not currently have articulation partners. However, the articulation process 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 the student’s transfer credits as allowable. There are transfer admissions personnel to guide the student through the 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. Dr. Abu-Ageel, Dr. Bajracharya, Dr. Bajwa, Dr. Baker, Dr. Butler, Dr. Leonard, Dr. McAndrew, and Dr. Pitman are full-time faculty members. All of the faculty members hold terminal degrees. The University leadership is confident in the quality of the faculty and their abilities to provide a learning environment supportive of the University goals for student success. Additional doctoral faculty will be added as needed.

Instructors for the **Ph.D. in Product Management** are:

<table>
<thead>
<tr>
<th>INSTRUCTOR</th>
<th>BACKGROUND</th>
<th>COURSES ALIGNED TO BE TAUGHT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr. Nayef Abu-Ageel</td>
<td>Ph.D. Electrical and Computer Engineering</td>
<td>All PRM 900 courses</td>
</tr>
<tr>
<td>Full-time</td>
<td>M.S. Electrical Engineering</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B.S. Electrical Engineering</td>
<td></td>
</tr>
<tr>
<td>Dr. Tariq Abughazaleh</td>
<td>Ph.D. Technology</td>
<td>All PRM 800 and 900 courses</td>
</tr>
<tr>
<td>Adjunct</td>
<td>M.Sc. Quality Engineering</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B.S. Mechanical Engineering</td>
<td></td>
</tr>
<tr>
<td>Dr. Chandra Bajracharya</td>
<td>Ph.D. Electrical and Computer Engineering</td>
<td>All PRM 900 courses</td>
</tr>
<tr>
<td>Full time</td>
<td>M.S. Applied Computing</td>
<td></td>
</tr>
<tr>
<td></td>
<td>M.S. Electrical Power Engineering</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B.E. Electrical Engineering</td>
<td></td>
</tr>
<tr>
<td>Dr. Garima Bajwa</td>
<td>Ph.D. Computer Science and Engineering</td>
<td>All PRM 900 courses</td>
</tr>
<tr>
<td>Full time</td>
<td>M.S. Electrical and Computer Engineering</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B.S. Electronics and Communication Engineering</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Engineering</td>
<td></td>
</tr>
<tr>
<td>Dr. Richard Baker</td>
<td>Ph.D. Information Systems</td>
<td>All PRM 900 courses</td>
</tr>
<tr>
<td>Full time</td>
<td>M.S. Mathematics and Computer Science</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B.S. Mathematics</td>
<td></td>
</tr>
<tr>
<td>Dr. Hasna Banu</td>
<td>Ph.D. Theoretical Physics</td>
<td>All PRM 900 courses</td>
</tr>
<tr>
<td>Adjunct</td>
<td>M.S. Mathematics</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B.S. Mathematics</td>
<td></td>
</tr>
<tr>
<td>Dr. Simon Barnes</td>
<td>Ph.D. Engineering</td>
<td>All PRM 800 and 900 courses</td>
</tr>
<tr>
<td>Adjunct</td>
<td>M.S. Engineering Physics</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B.S. Physics and Nuclear Engineering</td>
<td></td>
</tr>
<tr>
<td>Dr. Malcolm Beckett</td>
<td>D.B.A. Quality Systems Management in Homeland Security and Defense</td>
<td>All PRM 900 courses</td>
</tr>
<tr>
<td>Adjunct</td>
<td>M.S. Information Systems Management</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PMP</td>
<td></td>
</tr>
</tbody>
</table>
| Dr. William Butler  
Full time | D.Sc. Cyber Security  
M.S. Strategic Studies  
B.S. Computer Science  
NSTISSI No. 4011  
CNSSSI No. 4012  
NSTISSI No. 4015  
CNSSSI No. 4016 | All PRM 900 courses |
|-------------------|-------------------------------------------------|-------------------|
| Dr. Andrew Carruthers  
Adjunct | Ph.D. Engineering  
M.S. Engineering Management  
B.S. Engineering Technology | All PRM 900 courses |
| Dr. Soheil Sadat Hosseini  
Full time | Ph.D. Engineering, Electrical Engineering &  
Computer Science  
M.Sc. Electrical Engineering  
B.S. Electrical Engineering | All PRM 900 courses |
| Dr. Robert Leonard  
Full time | Ph.D. Applied Management and Decision  
Science  
M.B.A.  
B.A. Communications | All PRM 800 and 900 courses |
| Dr. Priscilla Lewis  
Adjunct | D.M. Leadership  
M.B.A  
M.P.S Managerial Policy  
B.S. Economics and Mathematics | All PRM 800 and 900 courses |
| Dr. Ian McAndrew  
Full time | Ph.D. Mechanical Engineering  
M.Sc. Manufacturing Engineering  
M.A. Education Management  
Post-Graduate Diploma in Education  
B.Sc. (Hons) Mechanical Engineering  
B.A. Production Engineering  
Technical Qualifications (Associate Degrees)  
Higher National Certificate, HNC, in Mechanical Engineering  
Higher National Diploma, HND, in Production Engineering  
System Safety in Occupational Hygiene and Safety – HAS Courses  
City and Guilds 200, 205 II & III (all distinctions – highest grade ever achieved in Ford’s Training Scheme)  
Apprentice Toolmaker 1977 – 1981 (Distinction) | All PRM 800 and 900 courses |
| Dr. John “Jack” Minogue  
Adjunct | D.Min. Doctor of Ministry  
MDiv. Divinity  
Doctoral Studies, Ethics  
M.A. Theology  
B.A. Philosophy/Minor: Mathematics & Physics | All PRM 900 courses. |
Note: Additional qualified faculty with an appropriate doctorate and experience will be added in the near future. As demonstrated in the list of faculty resources above, Capitol Technology will employ a multidisciplinary group of faculty in this hybrid program.

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

   **a) Pedagogy that meets the needs of the students**

   The primary pedagogy for faculty at Capitol Technology University is the Active Learning model. The University believes strongly in a highly-interactive, thinking, and hands-on experience for students in each class to the maximum extent possible.

   It was two Missouri State professors, historian Charles Bonwell and psychologist James Eison, who coined the term “active learning.” In their 1991 book on the subject, Active Learning: Creating Excitement in the Classroom, they offered this definition of the concept: “active learning involves students in doing things and thinking about the things they are doing.”

   The definition, though it seems circuitous, marks a definitive pedagogical shift in college teaching and learning. Rather than think about what they are watching, hearing, or reading, students are first encouraged to be “doing” something in class, and then to apply critical thought and reflection to their own classroom work and activity. Their argument was backed up by research. Even Bligh, 20 years earlier, had pointed out that the immediate rehearsal of new information and knowledge had a significant impact upon learning.

   This approach is as helpful in the sciences as it is in the arts or humanities: whether it’s organic chemistry, creative writing, or behavioral economics, concepts are all best understood through repeated practice and open, social exploration. The central tenet of active learning is that practice matters, and that classroom time is better spent giving students opportunities to work with concepts over and over, in a variety of ways and with opportunities.

   The central tenet of active learning — that practice and interaction matters — can be applied across disciplines for immediate feedback, so that knowledge can take hold in their own minds.
All faculty receive regular periodic and recurring pedagogical training during the academic year. Those training sessions occur in a hybrid format—simultaneously live online and live on-ground in the classroom. The sessions are designed to reach all faculty, both full-time and adjunct, in order to ensure everyone receives the training. Additionally, the sessions are recorded for those faculty who are unable to attend the live training session due to other professional and teaching commitments.

b) The learning management system

The Department of Online Learning (formerly the University’s Department of Distance Learning) and the instructional technology division support the online program needs of faculty and students. Those university organizations and the IT Help Desk provide constant and ongoing 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 online course, the Department of Online Learning provides formal training for the 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 the faculty member and, in turn, students attending online classes.

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

Faculty at Capitol Technology University receive training in Keller’s ARCS Motivational Model and his associated strategies for distance education/online learning.

A model used in online delivery of teaching and learning to increase learner motivation is the Keller’s ARCS motivational model. This model has been considered an important element in online education because of its implications on increased learner motivation and learning outcomes. The Keller’s model consists of motivating students by maintaining and eliciting attention (A), such as virtual clinical simulations; making the content and format relevant (R), by modeling enthusiasm or relating content to future use; facilitating student confidence (C), by providing “just the right challenge”; and promoting learner satisfaction (S), by providing reinforcement and praise when appropriate. Examples of the Keller’s model include increasing motivation including the arousal of curiosity of students, making the connection between learning objectives and future learning goals, autonomous thinking and learning, and fostering student satisfaction. Keller’s ARCS model has been researched by various educational online programs to analyze student motivation and learning outcomes. The Keller’s model serves as an example and guide for instructors to motivate and increase online engagement with their students as well as research purposes.

A qualitative study by Chan Lin investigated online student learning and motivation. Discussion boards, student projects, and reflection data were collected and analyzed from a 12-week web-based course. Respondents indicated the importance of online feedback from the instructor and peer modeling of course tasks to visualize learning progress. The
study revealed using Keller’s ARCS strategies fosters greater student online engagement by fostering self-efficacy and a sense of accomplishment.

In a mixed method study, assessing the use of Keller’s ARCS on instructional design, the use of educational scaffolding fostered positive levels of student motivation. Relevancy, attention, confidence, and satisfaction were all common factors associated with student success in the course and course completion.


All faculty receive regular periodic and recurring training on evidence-based practices for distance education/online learning during the academic year. Those training sessions occur in multiple formats: asynchronous, synchronous (i.e., live online), hybrid (i.e., simultaneously live online and live on-ground), and traditional on-ground in the classroom. The sessions are designed to reach all faculty, both fulltime and adjunct, to ensure all members receive the training. Additionally, the live sessions are recorded for those faculty who are unable to attend the live training session due to other professional commitments or who are teaching classes at the training delivery time.

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

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

Systems Applications. Therefore, the library is fully prepared to support a **Ph.D. in Product Management**.

Services provided to online students include:

- “Ask the Librarian”
- Research Guides
- Tutorials
- Videos
- Online borrowing

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 Maryland’s Digital eLibrary Consortium. This online electronic service provides access to numerous databases (Access Science, NetLibrary) that supply students with the materials they need. 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 decision science documents. The proximity of the University of Maryland, College Park and other local area research and academic libraries provide the Puente Library with quick access to these materials as well.

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

**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.**

No new facilities are required for the program. The online class platform is web based and requires no additional equipment for the institution. The current Learning Management System, Canvas and Adobe Connect, meets the needs of the degree program. The Business and Technology lab, Computer Science Lab, Cyber Lab, Robotics Lab, and Unmanned Systems Lab together meet the potential research needs of the students. The labs provide both local and virtual support.
2. Provide assurance and any appropriate evidence that the institution will ensure students enrolled in and faculty teaching in distance education will have adequate access to:

a) An institutional electronic mailing system

Capitol Technology University provides an institutional electronic mailing system to all students and faculty. The capability is provided to all students and faculty in all the institution’s modalities of course delivery. Capitol Technology University students and faculty are required to use the institution’s email addresses (e.g., xxxxxxxx@captechu.edu) in all university matters and communications. The University uses the email capabilities in Microsoft Office 365 and Microsoft Outlook.

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

Capitol Technology University provides a robust Learning Management Systems (LMS) through the use of the Canvas LMS by Instructure (www.canvaslms.com). The University pairs Canvas with Adobe Connect (www.adobe.com/Products/adobecconnect.html) to provide a platform for every student and faculty member to meet face-to-face in a synchronous “live” mode of communication. The use of Canvas is required for every course offered at the University; as a result, every course has a classroom on Canvas and Adobe Connect. All syllabi, grades, and assignments must be entered into Canvas on a timely basis throughout the semester.

Canvas provides the world’s most robust LMS. It is a 21st Century LMS; Canvas is a native cloud, Amazon Web Service hosted system. The system is adaptable, reliable, and customizable. Canvas is easy to use for students and faculty. The system is fully mobile and has proven to be time-saving when compared to other systems. The following list provides the features of the system:

**Time and Effort Savings**

- **CANVAS DATA**
  Canvas Data parses and aggregates more than 280 million rows of Canvas usage data generated daily.

- **CANVAS COMMONS**
  Canvas Commons makes sharing a whole lot easier.

- **SPEEDGRADER ANNOTATIONS**
  Preview student submissions and provide feedback all in one frame.

- **GRAPHIC ANALYTICS REPORTING ENGINE**
  Canvas Analytics help you turn rich learner data into meaningful insights to improve teaching and learning.

- **INTEGRATED MEDIA RECORDER**
  Record audio and video messages within Canvas.

- **OUTCOMES**
Connect each learning outcome to a specific goal, so results are demonstrated in clearly measurable ways.

- **MOBILE ANNOTATION**
  Open, annotate, and submit assignments directly within the Canvas mobile app.

- **AUTOMATED TASKS**
  Course management is fast and easy with automated tasks.

- **NOTIFICATION PREFERENCES**
  Receive course updates when and where you want - by email, text message, even Twitter or LinkedIn.

- **EASE OF USE**
  A familiar, intuitive interface means most users already have the skills they need to navigate, learn, and use Canvas.

- **IOS AND ANDROID**
  Engage students in learning anytime, anywhere from any computer or mobile device with a Web-standard browser.

- **USER-CUSTOMIZABLE NAVIGATION**
  Canvas intelligently adds course navigation links as teachers create courses.

- **RSS SUPPORT**
  Pull feeds from external sites into courses and push out secure feeds for all course activities.

- **DOWNLOAD AND UPLOAD FILES**
  Work in Canvas or work offline—it’s up to you.

- **SPEEDGRADER**
  Grade assignments in half the time.

  **Student Engagement**

- **ROBUST COURSE NOTIFICATIONS**
  Receive course updates when and where you want—by email, text message, and even Facebook.

- **PROFILE**
  Introduce yourself to classmates with a Canvas profile.

- **AUDIO AND VIDEO MESSAGES**
  Give better feedback and help students feel more connected with audio and video messages.

- **MULTIMEDIA INTEGRATIONS**
  Insert audio, video, text, images, and more at every learning contact point.

- **EMPOWER GROUPS WITH COLLABORATIVE WORKSPACES**
  By using the right technologies in the right ways, Canvas makes working together easier than ever.
- MOBILE
  Engage students in learning anytime, anywhere from iOS or Android, or any mobile device with a Web-standard browser.

- TURN STUDENTS INTO CREATEORS
  Students can create and share audio, video, and more within assignments, discussions, and collaborative workspaces.

- WEB CONFERENCING
  Engage in synchronous online communication.

- OPEN API
  With its open API, Canvas easily integrates with your IT ecosystem.

- BROWSER SUPPORT
  Connect to Canvas from any Web-standard browser.

- LTI INTEGRATIONS
  Use the tools you want with LTI integrations.

- MODERN WEB STANDARDS
  Canvas is built using the same Web technologies that power sites like Google, Facebook, and Twitter.

  Lossless Learning

- CANVAS POLLS
  Gauge comprehension and incorporate formative assessment without the need for "clicker" devices.

- MAGICMARKER
  Track in real-time how students are performing and demonstrating their learning.

- QUIZ STATS
  Analyze and improve individual assessments and quiz questions.

- LEARNING MASTERY FOR STUDENTS
  Empower students to take control of their learning.

(Source: https://www.canvaslms.com/higher-education/features)

Capitol Technology University has been using Canvas for over five years. Canvas has proven to be a completely reliable LMS system that provides the necessary technological support for distance education/online learning.
1. 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>
<thead>
<tr>
<th>Resource Categories</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Year 4</th>
<th>Year 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Reallocated Funds</td>
<td>$27,500</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>2. Tuition/Fee Revenue</td>
<td>$208,962</td>
<td>$461,160</td>
<td>$624,708</td>
<td>$795,708</td>
<td>$904,230</td>
</tr>
<tr>
<td>(c + g below)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Number of F/T Students</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>b. Annual tuition/Fee rate</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>c. Total F/T Revenue</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>(a x b)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. Number of P/T Students</td>
<td>13</td>
<td>28</td>
<td>37</td>
<td>46</td>
<td>51</td>
</tr>
<tr>
<td>c. Credit Hour Rate</td>
<td>$893</td>
<td>$915</td>
<td>$938</td>
<td>$961</td>
<td>$985</td>
</tr>
<tr>
<td>f. Annual Credit Hour</td>
<td>18</td>
<td>18</td>
<td>18</td>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td>g. Total P/T Revenue</td>
<td>$208,962</td>
<td>$461,160</td>
<td>$624,708</td>
<td>$795,708</td>
<td>$904,230</td>
</tr>
<tr>
<td>(d x e x f)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Grants, Contracts and Other External Sources</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>4. Other Sources</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>TOTAL (Add 1 – 4)</td>
<td>$236,462</td>
<td>$461,160</td>
<td>$624,708</td>
<td>$795,708</td>
<td>$904,230</td>
</tr>
</tbody>
</table>

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 after 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 and Contracts

There are currently no grants or contracts.

d. Other Sources of Funds

There are currently no other sources of funds.

e. Total Year

No additional explanation or comments needed.
2. **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 adjunct professors.

<table>
<thead>
<tr>
<th>Expenditure Category</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Year 4</th>
<th>Year 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Faculty (b + c below)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Number of FTE</td>
<td>2</td>
<td>2.5</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>b. Total Salary</td>
<td>$120,000</td>
<td>$153,750</td>
<td>$189,114</td>
<td>$258,456</td>
<td>$331,145</td>
</tr>
<tr>
<td>c. Total Benefits (20% of salaries)</td>
<td>$24,000</td>
<td>$30,750</td>
<td>$37,823</td>
<td>$51,691</td>
<td>$66,229</td>
</tr>
<tr>
<td>2. Admin Staff (b + c below)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Number of FTE</td>
<td>.07</td>
<td>.07</td>
<td>.07</td>
<td>.07</td>
<td>.07</td>
</tr>
<tr>
<td>b. Total Salary</td>
<td>$4,084</td>
<td>$4,207</td>
<td>$4,333</td>
<td>$4,441</td>
<td>$5,508</td>
</tr>
<tr>
<td>c. Total Benefits</td>
<td>$858</td>
<td>$883</td>
<td>$910</td>
<td>$933</td>
<td>$956</td>
</tr>
<tr>
<td>3. Support Staff (b + c below)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Number of FTE</td>
<td>1.00</td>
<td>1.5</td>
<td>2</td>
<td>2.5</td>
<td>3</td>
</tr>
<tr>
<td>b. Total Salary</td>
<td>$47,500</td>
<td>$73,032</td>
<td>$99,810</td>
<td>$127,883</td>
<td>$157,296</td>
</tr>
<tr>
<td>c. Total Benefits</td>
<td>$9,975</td>
<td>$14,606</td>
<td>$19,962</td>
<td>$25,577</td>
<td>$31,459</td>
</tr>
<tr>
<td>4. Technical Support and Equipment</td>
<td>$845</td>
<td>$1,960</td>
<td>$2,775</td>
<td>$3,680</td>
<td>$4,335</td>
</tr>
<tr>
<td>5. Library</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>6. New or Renovated Space</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>7. Other Expenses</td>
<td>$65,500</td>
<td>$53,500</td>
<td>$55,500</td>
<td>$57,500</td>
<td>$59,500</td>
</tr>
<tr>
<td>TOTAL (ADD 1-7)</td>
<td>$272,762</td>
<td>$332,688</td>
<td>$410,227</td>
<td>$530,161</td>
<td>$656,428</td>
</tr>
</tbody>
</table>

1. Provide a narrative rationale for each expenditure category. If expenditures 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 necessarily imply that these are new hire requirements.
b. Administrative Staff

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

c. Support Staff

Capitol Technology University will slowly increase support staff.

d. Technical Support and 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 $65 per student in Year 1; the license fee per student is calculated to increase at $5 per year 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 the literature remains current and relevant. However, it has 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 needed.

g. Other Expenses

Funds have been allocated for office materials, travel, professional development, course development, marketing, additional scholarships. Year 1 is larger than Years 2-5 due to additional travel expenses required to gain initial name recognition in the market.

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

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

The 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:

- At the August Faculty Retreat, the faculty reviews any outstanding student learning challenges that have not been adequately addressed. The issues are brought to the University Academic Deans for review and development of implementation plans.
- Faculty submit performance plans consistent with the mission and goals of the University and
department. The documents are reviewed and approved by the University Academic Deans.

- Department Chairs and University Academic Deans review the Graduating Student Survey data.
- Department Chairs and University Academic Deans review student internship evaluations.
- Department Chairs and University Academic Deans review grade distribution reports from the spring and summer semesters.
- Department Chairs and University Academic Deans 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 Deans, 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 Doctoral Programs occurs every 2 years. In most cases, the changes only require that the University Academic Deans inform the Chief Academic Officer 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 Chief Academic Officer and the Executive Council.

- University Academic Deans and the Vice President for Academic Affairs attend the Student Town Hall and review student feedback with department chairs.
- Department Chairs conduct interviews with potential employers at our Career Fair.
- Post-residency, the University Academic Deans meet with the faculty to review the student learning progress and discuss needed changes.

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 Deans review grade distribution reports from the Fall Semester.
- Department Chairs and University Academic Deans review the Graduating Student Survey data.
- Department Chairs and University Academic Deans review student course evaluations from the Fall Semester and the Spring Semester (in May before the Summer Semester begins).
- Department Chairs and University Academic Deans 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 Deans for review and development of implementation plans.
- Department Chairs conduct interviews with potential employers at our Career Fair.
- Departments conduct Industrial Advisory Board meetings to review academic curriculum recommendations.

In addition to these summative assessments, the University Academic Deans meets with the Department Chairs on a weekly basis 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 Deans. 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 Deans to inform the Chief Academic Officer 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 Chief Academic Officer and the Executive Council.

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

*Student Learning Outcomes:*

Student learning outcomes for the proposed **Ph.D. in Product Management** will be measured using the instruments identified in Section G and Section M (i.e., those instruments tailored for a Ph.D.), the assessment measures indicated in each module of the doctoral program, and the accreditation requirements of the University’s regional accreditor [i.e., Middle States Commission in Higher Education (MSCHE)] and our degree specific accrediting organizations (i.e., IACBE, ABET, NSA, DHS). This program is designed to meet the requirements of MSCHE. The program will be reviewed for accreditation by MSCHE and IACBE. The University is in good standing with all its accrediting bodies.

*Student Retention:*

The University maintains a comprehensive student retention program under the Vice President for Student Engagement. The program assesses student retention at all levels, including the individual course, major, and degree. During the semester and term, the University’s Drop-Out Detective capability, within its Learning Management System (Canvas), provides an early alert at the course level to potential issues related to retention. Within the Office of Student Life, Academic Advisors monitor Drop-Out Detective and contact students who appear to have issues affecting their academic performance. The Academic Advisors work with each student to create a plan to remove any barriers to success. The Academic Advisors also work with the course instructors as needed to gain additional insight that may be helpful in correcting the situation.

Each student also meets with their Academic Advisor each semester to evaluate their progress toward degree completion. An updated plan of action is developed for each student for their next semester’s registration and each succeeding semester through degree completion.

The Vice President for Student Engagement also meets on a regular basis with the Vice President of Academics/Chief Academic Officer to review the student retention within each degree program and address any issues that appear to be impediments to degree completion.

*Student and Faculty Satisfaction:*

Evaluations and assessment of Student and Faculty satisfaction occur every semester. Faculty members are evaluated every semester by students enrolled in their courses. Students are required to complete a course evaluation online within a specified time frame at the end of the semester for
every enrolled course or they are locked out of Canvas (the University’s Learning Management System) until they complete each survey. Every faculty member is also required to review each of their courses for the semester.

The Department Chairs and University Academic Deans review the student evaluations for every course offered at the University. The Department Chairs and University Academic Deans also review faculty satisfaction every semester. If changes are needed at the course level, the changes are developed and implemented by the faculty responsible for the courses upon approval of the University Academic Deans. If changes are needed at the faculty level, the Department Chairs and University Deans will make the changes. At the end of this cycle, an evaluation is repeated, and the results are analyzed with the appropriate stakeholders regarding the effectiveness of the changes. This is an ongoing process. The University has a team in charge of outcomes and assessment supporting the formal assessment measures.

Cost Effectiveness:

Based on the year-long inputs, evaluations, and reviews described in Section M from faculty, students, industry representatives, and Department Chairs, the University Academic Dean prepares the proposed academic budget for each program for the upcoming year. Budget increases are tied to intended student learning improvements and key strategic initiatives.

Each academic program is also monitored by the Vice President for Finance and Administration throughout every semester and term for its cost effectiveness. Additionally, the revenue and costs of every University program are reviewed annually by the Executive Council and Board of Trustees prior to approving the next year’s budget.

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

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

   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 at all degree levels – undergraduate, master’s, and doctoral. The University also recruits minority populations for all of its undergraduate degrees as well as for its graduate level degrees: M.B.A., M.S. in Aviation, M.S. in Computer Science, M.S. in Critical Infrastructure, M.S. in Cyber Analytics, M.S. in Cyber and Information Security, M.S. in Electrical Engineering, M.S. in Information Systems Management, M.S. in Internet Engineering, M.S. in Unmanned and Autonomous Systems Policy and Risk Management, T.M.B.A. in Business Analytics and Data Science, T.M.B.A. in Cybersecurity, D.Sc. in Cybersecurity, Ph.D. in Aviation, Ph.D. in Business Analytics and Decision Sciences, Ph.D. in Critical Infrastructure, Ph.D. in Manufacturing, Ph.D. in Technology, Ph.D. in Technology/M.S. in Research Methods Combination Program, and Ph.D. in Unmanned Systems Applications. The same attention will be given to the Ph.D. in **Product Management.**
O. Relationship to Low Productivity Programs Identified by the Commission:

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

   This program is not associated with a low Productivity program identified by the Commission.

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

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

   Capitol Technology University is fully eligible to provide distance education. The university has a long history of providing high-quality distance education. The university is accredited regionally by the Middle States Commission in Higher Education (MSCHE) and through four specialized accrediting organizations: International Accreditation Council of Business Education (IACBE), Accreditation Board for Engineering and Technology (ABET), NSA, and DHS. All five accrediting organizations have reviewed the University’s distance education program as part of their accreditation process. Capitol Technology University is fully accredited by MSCHE, IACBE, ABET, NSA, and DHS. The University is in good standing with all its accrediting bodies.

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

   Capitol Technology University has a long history of providing high quality distance education/online learning that complies with the Council of Regional Accrediting Commissions (C-RAC) Interregional Guidelines for the Evaluation of Distance Education. The university will also continue to comply with the C-RAC guidelines with the proposed Ph.D. in Product Management program.

   a. Council of Regional Accrediting Commissions (C-RAC) Interregional Guidelines for the Evaluation of Distance Education.

      1. Online learning is appropriate to the institution’s mission and purposes.

         Online learning is consistent with the institution’s mission, purpose and history. Please refer to Section A of this proposal.

      2. The institution’s plans for developing, sustaining, and, if appropriate, expanding online learning offerings are integrated into its regular planning and evaluation processes.

         All programs at the University – online, hybrid, and on-ground – are subject to the same regular planning, assessment, and evaluation processes. Please see Section M of this proposal for the detailed process.
3. Online learning is incorporated into the institution’s systems of governance and academic oversight.

All programs at the University – online, hybrid, and on-ground – are subject to the same systems of governance and academic oversight. Please refer to Section G and Section M of this proposal.

4. Curricula for the institution’s online learning offerings are 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 on-ground 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 University Academic Deans, Department 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.

5. The institution evaluates the effectiveness of its online learning offerings, including the extent to which the online learning goals are achieved, and uses the results of its evaluations to enhance the attainment of the goals.

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 University Academic Deans monitor all course conversions from in-class to online to ensure the online course is academically equivalent to traditionally offered course and the technology is appropriate to support the expected rigor and breadth of the course.

6. Faculty responsible for delivering the online learning curricula and evaluating the students’ success in achieving the online learning goals are appropriately qualified and effectively supported.

The Department of Doctoral Programs, where this degree will be sponsored, is staffed by qualified University Academic Dean, Dr. Ian McAndrew. Other appropriately credentialed faculty with multi-disciplinary level skills will be part of the delivery process.

The evaluation of the courses in the program will be done using the same processes as all other programs at the University. (Please see Section M.) All Capitol Technology University faculty teach in the traditional classroom environment and online. (Please see faculty qualifications in Section I of this document.)

7. The institution provides effective student and academic services to support students enrolled in online learning offerings.
Students can receive assistance in using online learning technology via several avenues. 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.

8. **The institution provides sufficient resources to support and, if appropriate, expand its online learning offerings.**

The University has made the financial commitment to the program. (Please refer to Section I). The University has a proven track-record of supporting degree completion for several years and this is expanding currently to support students synchronous and asynchronous demands.

9. **The institution assures the integrity of its online offerings.**

Faculty currently employed at the University will act as an Internal Advisory Board for program changes, including course and program development. All current faculty were selected based on domain experience and program-related teaching experience.

When new faculty or outside consults are necessary for the design of courses offered, our Human Resource Department initiates a rigorous search and screening process to identify appropriate faculty to design and teach online courses. All new faculty are selected on domain experience and program-related teaching experience.

The University online platform offers several avenues to support instructors engaged in online learning. The Director of our Online 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 Deans, Department Chairs, and formal meetings.

The assessment for distance learning classes and students in this program will be the same as for all doctoral programs at the University. Faculty will 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, University Academic Deans, and Department Chairs. On an annual basis, the information is reported to the University’s accreditation authorities (e.g., MSCHE, IACBE, ABET).
Addendum
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, and 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. Dr. Abu-Ageel, Dr. Bajracharya, Dr. Bajwa, Dr. Baker, Dr. Butler, Dr. Leonard, Dr. McAndrew, and Dr. Pitman are full-time faculty members. All of the faculty members hold terminal degrees. The University leadership is confident in the quality of the faculty and their abilities to provide a learning environment supportive of the University goals for student success. Additional doctoral faculty will be added as needed.

Instructors for the Ph.D. in Product Management are:

<table>
<thead>
<tr>
<th>INSTRUCTOR</th>
<th>BACKGROUND</th>
<th>COURSES ALIGNED TO BE TAUGHT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr. Nayef Abu-Ageel</td>
<td>Ph.D. Electrical and Computer Engineering</td>
<td>All PRM 900 courses</td>
</tr>
<tr>
<td>Full-time</td>
<td>M.S. Electrical Engineering</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B.S. Electrical Engineering</td>
<td></td>
</tr>
<tr>
<td>Dr. Tariq Abughazaleh</td>
<td>Ph.D. Technology</td>
<td>All PRM 800 and 900 courses</td>
</tr>
<tr>
<td>Adjunct</td>
<td>M.Sc. Quality Engineering</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B.S. Mechanical Engineering</td>
<td></td>
</tr>
<tr>
<td>Dr. Chandra Bajracharya</td>
<td>Ph.D. Electrical and Computer Engineering</td>
<td>All PRM 900 courses</td>
</tr>
<tr>
<td>Full time</td>
<td>M.S. Applied Computing</td>
<td></td>
</tr>
<tr>
<td></td>
<td>M.S. Electrical Power Engineering</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B.E. Electrical Engineering</td>
<td></td>
</tr>
<tr>
<td>Dr. Garima Bajwa</td>
<td>Ph.D. Computer Science and Engineering</td>
<td>All PRM 900 courses</td>
</tr>
<tr>
<td>Full time</td>
<td>M.S. Electrical and Computer Engineering</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B.S. Electronics and Communication Engineering</td>
<td></td>
</tr>
<tr>
<td>Dr. Richard Baker</td>
<td>Ph.D. Information Systems</td>
<td>All PRM 900 courses</td>
</tr>
<tr>
<td>Full time</td>
<td>M.S. Mathematics and Computer Science</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B.S. Mathematics</td>
<td></td>
</tr>
<tr>
<td>Dr. Hasna Banu</td>
<td>Ph.D. Theoretical Physics</td>
<td>All PRM 900 courses</td>
</tr>
<tr>
<td>Adjunct</td>
<td>M.S. Mathematics</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B.S. Mathematics</td>
<td></td>
</tr>
<tr>
<td>Dr. Simon Barrens</td>
<td>Ph.D. Engineering</td>
<td>All PRM 800 and 900 courses</td>
</tr>
<tr>
<td>Adjunct</td>
<td>M.S. Engineering Physics</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B.S. Physics and Nuclear Engineering</td>
<td></td>
</tr>
<tr>
<td>Dr. Malcolm Beckett</td>
<td>D.B.A. Quality Systems Management in Homeland Security and Defense</td>
<td>All PRM 900 courses</td>
</tr>
<tr>
<td>Adjunct</td>
<td>M.S. Information Systems Management</td>
<td></td>
</tr>
</tbody>
</table>
| Dr. William Butler       | D.Sc. Cyber Security  
|                        | M.S. Strategic Studies  
|                        | B.S. Computer Science  
|                         | NSTISSI No. 4011     
|                        | CNSSI No. 4012       
|                        | NSTISSI No. 4015     
|                        | CNSSI No. 4016       | All PRM 900 courses |
| Dr. Andrew Carruthers   | Ph.D. Engineering     
| Adjunct               | M.S. Engineering Management  
|                       | B.S. Engineering Technology | All PRM 900 courses |
| Dr. Soheil Sadat Hosseini | Ph.D. Engineering, Electrical Engineering & Computer Science  
| Full time            | M.Sc. Electrical Engineering  
|                       | B.S. Electrical Engineering | All PRM 900 courses |
| Dr. Robert Leonard     | Ph.D. Applied Management and Decision Science  
| Full time            | M.B.A.                
|                       | B.A. Communications   | All PRM 800 and 900 courses |
| Dr. Priscilla Lewis    | D.M. Leadership       
| Adjunct               | M.B.A.               
|                       | M.P.S Managerial Policy  
|                       | B.S. Economics and Mathematics | All PRM 800 and 900 courses |
| Dr. Ian McAndrew       | Ph.D. Mechanical Engineering  
| Full time            | M.Sc. Manufacturing Engineering  
|                       | M.A. Education Management  
|                       | Post-Graduate Diploma in Education  
|                       | B.Sc. (Hons) Mechanical Engineering  
|                       | B.A. Production Engineering  
|                       | Technical Qualifications (Associate Degrees)  
|                       | Higher National Certificate, HNC, in Mechanical Engineering  
|                       | Higher National Diploma, HND, in Production Engineering  
|                       | System Safety in Occupational Hygiene and Safety – HAS Courses  
|                       | City and Guilds 200, 205 II & III (all distinctions – highest grade ever achieved in Ford’s Training Scheme)  
|                       | Apprentice Toolmaker 1977 – 1981 (Distinction) | All PRM 800 and 900 courses |
| Dr. John “Jack” Minogue | D.Min. Doctor of Ministry  
| Adjunct               | MDiv. Divinity       
|                       | Doctoral Studies, Ethics  
|                       | M.A. Theology        
|                       | B.A. Philosophy/Minor: Mathematics & Physics | All PRM 900 courses. |
Dr. Jason Pittman  
Full time  
Ph.D. Information Assurance  
M.S. Network Security  
B.S. English Literature and Micro-Biology  
All PRM 900 courses

Prof. Harold Van Horn  
Adjunct  
Ph.D. Technology Management  
M.S. Network Security  
M.S. Information Architecture  
M.S. Business Administration  
B.S. Special Studies Science  
All PRM 800 and 900 courses

Note: Additional qualified faculty with an appropriate doctorate and experience will be added in the near future. As demonstrated in the list of faculty resources above, Capitol Technology will employ a multidisciplinary group of faculty in this hybrid program.

2. ADDITIONAL KEY QUALIFICATIONS OF SELECT FACULTY:
   A. Dr. Nayef Abu-Ageel. Dr. Abu-Ageel is a highly experienced administrator and academic with significant experience in product management as the founder and Chief Technology Officer of his own company, Luxint, Inc. He led development of the business plan, established technology and product roadmaps, and secured initial funding. Dr. Abu-Ageel also established and managed business relationships with the Sony and Bose corporations. His leadership in product management extended to the company’s design houses and fabrication labs.
   B. Dr. Richard Baker. Dr. Richard Baker is a noted academic in the field of aviation who also has 30 years of experience in product management in information systems and aviation. His work in this arena includes American Airlines, Turner Construction, and Electronic Data Systems.
   C. Dr. Malcolm Beckett. Dr. Beckett has extensive experience in the product management of information systems over the span of 18 years. He has managed products for police emergency service communications, public safety systems, federal systems, and interoperable critical infrastructure systems at multiple levels. Dr. Beckett’s experience in this realm includes work for Fairfax County, Virginia, Motorola Solutions, United States Department of Homeland Security, and Virginia Polytechnic Institute and State University.
   D. Dr. William Butler. Dr. Butler is a highly experienced academic in the field of cybersecurity who also has managed a wide range of civilian and military information systems products for IR Technologies, Sprint, and Booz Allen Hamilton.
   E. Dr. Soheil Sadat Hosseini. Dr. Hosseini is a distinguished academic who also possesses a wealth of experience in product management in the engineer field. Dr. Hosseini managed a specific business channel as an electrical engineer in Tehran, Iran at Nima Engineering. Dr. Hosseini also developed and managed new products at Faranirro Engineering Company in Sari, Iran.
   F. Dr. Robert Leonard. Dr. Leonard possesses extensive product management experience in addition to his academic credentials. Dr. Leonard served as the Business Development and Marketing Director for Adams County Winery, leading channel development for the company. He led product marketing and management as the Director of Marketing and Management at Outfluence, LLC. Dr. Leonard led product marketing and management as the Director of Marketing and Communications for the International Oncology Network. Dr. Leonard also led all product development and management for an entertainment company that he founded.
G. Dr. Ian McAndrew. Dr. McAndrew is an internationally known academic and highly sought keynote speaker for academic for a. Dr. McAndrew also has product management experience working for one of the largest automotive companies in the world – Ford Motor Company. Dr. McAndrew was responsible for a business channel of heavy-duty automotive equipment, European engines, and car bodies over an eight-year period.

H. Dr. Rev. John “Jack” Minogue. Dr. Minogue is the past President of DePaul University and a high visibility academic for the past 46 years. Dr. Minogue is also a Catholic priest. Two of Dr. Minogue’s areas of specialty for the past 30 year are legal ethics and medical ethics. He brings national expertise in ethics to the product management field during a period where new technologically advanced products in the medical arena and other fields are raising high stakes ethical issues.

I. Dr. Jason Pittman. In addition to his academic credentials, Dr. Pittman has extensive experience in product development and product management. He owns his own company, Signal Six Consulting, and is the chief scientist for product development and product management. Dr. Pittman also led the development of new products at Silent Circle/Blackphone as Vice President. He led the development and management of new products at Spyder Software Solutions and Nations Holding Group. Dr. Pittman’s academic credentials and extensive experience are directly applicable to this new degree.

J. Dr. Howard Van Horn. Dr. Van Horn is a highly accomplished teaching academic in the fields of Information Assurance, Internet Engineering, Computer Science and Systems Management. Dr. Van Horn also has significant experience in product management in the past with IBM, Aydin Controls, and Computer Science Corporation.