Office Use Only: PP#

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

Institution Submitting Proposal	Capitol Technology University

Each action below requires a separate proposal and cover sheet.

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

Payment Submitted: (•) Yes ( ) No
Payment Type: ( ) R*STARS # 99929 (•) Check # 99929
Payment Amount: 850.00
Date Submitted: 3/15/2026

Department Proposing Program	Engineering
Degree Level and Degree Type	Bachelor of Science (B.S.)
Title of Proposed Program	Bachelor of Science in Aviation Avionics and Instrumentation
Total Number of Credits	120
Suggested Codes	HEGIS: 5310.00 CIP: 47.0607
Program Modality	( ) On-campus ( ) Distance Education (fully online) (•) Both
Program Resources	(•) Using Existing Resources ( ) Requiring New Resources
Projected Implementation Date (must be 60 days from proposal submisison as per COMAR 13B.02.03.03)	(•) Fall ( ) Spring ( ) Summer Year: 2026
Provide Link to Most Recent Academic Catalog	URL: http://catalog.captechu.edu
Preferred Contact for this Proposal	Name: Dr. Mohamed Ghazy Title: Dean of Academics Phone: (340) 965-2473 Email: mshehata@captechu.edu
President/Chief Executive	Type Name: Dr. Bradford Sims Signature: [signature] Date: 3-15-26 Date of Approval/Endorsement by Governing Board: MARCH 15, 2026

Revised 1/2021

CAPITOL
Technology University

March 15, 2026

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

Dear Dr. Rai,

Capitol Technology University is requesting approval to offer a B.S. in Aviation Avionics and Instrumentation. The degree curriculum will be delivered by existing university faculty and supported through the development of new courses. Capitol Technology University's mission is to provide a practical education in engineering, computer science, information technology, and business—preparing individuals for professional careers and enabling them to thrive in a dynamic world. A key aspect of the university's mission is to advance hands-on knowledge in areas that are relevant to students and valued by prospective employers within the framework of Capitol Tech's degree programs. The university believes that a B.S. in Aviation Avionics and Instrumentation aligns closely with this mission.

The demand for professionals with expertise in aviation electronics, avionics systems, and aircraft instrumentation continues to grow as modern aircraft increasingly rely on advanced electronic systems for navigation, communication, control, and monitoring. This program is designed in response to that growing industry need. The B.S. in Aviation Avionics and Instrumentation is intended for individuals who seek to develop advanced knowledge and technical skills in the design, operation, troubleshooting, and integration of avionics systems within the aviation sector.

To address the evolving needs of the aviation and aerospace industries, Capitol Technology University respectfully submits for approval the B.S. in Aviation Avionics and Instrumentation program. Please find the required letter confirming the adequacy of the university's library resources to support the academic and research needs of students enrolled in this degree program.

Respectfully,

Bradford L. Sims, PhD

President

CAPITOL
Technology University

March 15, 2026

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

Dear Dr. Rai,

This letter is in response to the need for confirmation of the adequacy of the library at Capitol Technology University to support the proposed B.S. in Aviation Avionics and Instrumentation program. As President of the University, I confirm that the library resources, including professional staff and support services, are more than adequate to support the B.S. in Aviation Avionics and Instrumentation. Additionally, the University remains dedicated and committed to the continuous improvement of its library resources by providing sufficient budget and support to ensure the academic success of our students.

Respectfully,

Bradford L. Sims, PhD

President

99929 VENDOR NO. 17911 DATE 3/12/2026 CHECK NO. 99929

CAPITOL TECHNOLOGY UNIVERSITY

INVOICE NUMBER	INVOICE DATE	DESCRIPTION	GROSS AMOUNT	DISCOUNT/ADJUSTMENTS	PAYMENT AMOUNT
BS Aviation Avioni	03/10/2026	BS in Aviation Avionics and Instrumentat	850.00	0.00	850.00
			850.00	0.00	850.00

ORIGINAL CHECK HAS A COLORED BACKGROUND PRINTED ON CHEMICAL REACTIVE PAPER - SEE BACK FOR DETAILS

CAPITOL Technology University

11301 SPRINGFIELD ROAD, LAUREL, MD 20708
PH: 301-369-2800

FIRST NATIONAL BANK
60-1809/433

99929

DATE 3/12/2026

CHECK AMOUNT
$ *********850.00

PAY EIGHT HUNDRED FIFTY AND NO/100 DOLLARS

TO THE ORDER OF
Maryland Higher Education Commissic
217 E.Redwood Street Suite 2100
Baltimore, MD 21202

CAPITOL TECHNOLOGY UNIVERSITY

⑈099929⑈ ⑆043318092⑆ 030112668⑈

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 2026
Projected Implementation Date

Bachelor of Science
Award to be Offered

Bachelor of Science in Aviation Avionics and Instrumentation
Title of Proposed Program

5310.00
Suggested HEGIS Code

47.0607
Suggested CIP Code

Engineering
Department of Proposed Program

Dr. Mohamed Ghazy
Name of Department Head

Dr. Mohamed Ghazy
Dean of Academic

mshehata@captechu.edu
Contact E-Mail Address

(240) 965-2473
Contact Phone Number

3-15-26
Signature and Date

President/Chief Executive Approval

MARCH 15, 2026
Date

Date Endorsed/Approved by Governing Board

Bachelor of Science (B.S.)

In

Aviation Avionics and Instrumentation

Capitol Technology University
Laurel, Maryland

A. Centrality to Mission and Planning Priorities

1. Program Description and Alignment with Institutional Mission

The Bachelor of Science (B.S.) in Aviation Avionics and Instrumentation at Capitol Technology University is designed to provide students with a comprehensive education in aircraft electronic systems, avionics technologies, and flight instrumentation. The program equips students with the technical, analytical, and problem-solving skills required to support modern aviation systems and to succeed in the aerospace and aviation industries.

This program integrates electronics, embedded systems, aircraft systems, and instrumentation technologies to prepare graduates for careers in avionics systems integration, aircraft electronics maintenance and troubleshooting, flight instrumentation systems, and aviation technology operations. Students gain expertise in aircraft electrical systems, avionics architectures, navigation and communication systems, sensors and instrumentation, and diagnostic techniques used in modern aviation platforms. The curriculum combines engineering-based electronics coursework with aviation-specific applications to ensure graduates are prepared to work with complex avionics and aircraft monitoring systems.

The B.S. in Aviation Avionics and Instrumentation directly supports the institution's mission of providing STEM-focused, hands-on, career-relevant education that prepares students for leadership in technical and engineering-based fields. The program emphasizes applied learning through laboratory experiences, project-based coursework, and the integration of computing and embedded systems technologies commonly used in aviation environments. Graduates of the program will be prepared to contribute to the design, operation, and maintenance of advanced avionics and aircraft instrumentation systems used in commercial aviation, defense, and aerospace sectors.

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, and the B.S. in Aviation Avionics and Instrumentation program directly supports each of these initiatives:

a. Expand Educational Offerings, Increase Program Completion:
The introduction of this program aligns with the university's goal to expand its academic portfolio by offering a high-demand, industry-relevant degree in aviation electronics and instrumentation. By integrating avionics systems, embedded electronics, and aircraft instrumentation with hands-on laboratory experiences and applied projects, the program enhances student engagement and supports student persistence and program completion.

b. Increase Enrollment and Institutional Awareness:
The aviation industry continues to experience strong demand for professionals skilled in avionics systems, aircraft electronics, and instrumentation technologies. This program will attract students interested in aviation technology, aerospace systems, and applied electronics. Capitol Technology University will support enrollment growth through outreach to STEM-focused high school programs, partnerships with aviation organizations, and targeted recruitment efforts that highlight the university's strengths in engineering and technology education.

c. Improve the Utilization of University Resources and Institutional Effectiveness While Expanding Revenue:
The program leverages the university's existing engineering, electronics, and computing infrastructure while incorporating specialized aviation-focused instruction. Existing laboratories, electronics equipment, and computing resources will support the program's instructional needs, maximizing institutional resources while minimizing new capital investments. Enrollment growth is expected to contribute to institutional revenue while strengthening the university's portfolio of aviation and engineering programs.

d. Increase the Number and Scope of Partnerships:
Capitol Technology University will continue expanding partnerships with aviation companies, aerospace manufacturers, government agencies, and technology firms to support student internships, applied research, and workforce development initiatives. Collaboration with aviation maintenance organizations, avionics system suppliers, and aerospace companies will provide students with opportunities for experiential learning and career placement in the aviation electronics and instrumentation sector.

Evidence of Institutional Priority

The B.S. in Aviation Avionics and Instrumentation program has been identified as a strategic priority for Capitol Technology University due to:

a. Industry stakeholders and advisory board members have identified a growing need for professionals trained in avionics systems, aircraft electronics, and flight instrumentation technologies.

b. The program addresses workforce needs related to the increasing complexity of aircraft electronic systems, navigation technologies, and integrated avionics platforms.

c. The university has committed to supporting the program through qualified faculty with expertise in electronics, computing, and aviation systems, as well as through existing laboratory and technical resources.

d. The program aligns with Capitol Technology University's mission of providing hands-on, industry-relevant education that prepares graduates for careers in engineering, aviation technology, and applied STEM disciplines.

3. Provide a brief narrative of how the proposed program will be adequately funded for at least the first five years of program implementation.

The B.S. in Aviation Avionics and Instrumentation program will be adequately funded for at least the first five years through a combination of institutional support, tuition revenue, industry partnerships, and potential external funding opportunities. Capitol Technology University has developed a financial plan to

ensure the program's sustainability while maintaining high-quality instruction, laboratory resources, and technical infrastructure.

Funding sources include:

a. Capitol Technology University has allocated institutional resources to support curriculum development, faculty assignments, and laboratory equipment necessary to launch the program.

b. Partnerships with aviation companies, aerospace manufacturers, and avionics technology providers may provide equipment support, internship opportunities, and industry engagement that enhance the program's educational value.

c. The program is expected to become self-sustaining within three to five years as enrollment increases and tuition revenue supports instructional and operational costs.

d. The university will pursue external funding opportunities related to aviation workforce development, STEM education, and technology-focused training initiatives.

e. The program's focus on avionics systems and aircraft instrumentation will attract students interested in aviation technology careers, supporting steady enrollment growth and long-term program sustainability.

f. Capitol Technology University will also engage alumni, industry partners, and philanthropic organizations to support scholarships and program enhancements.

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

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

Capitol Technology University is committed to providing the administrative, financial, and technical resources necessary to support the long-term success of the B.S. in Aviation Avionics and Instrumentation program. Dedicated faculty and academic leadership will oversee program delivery, curriculum development, student advising, and industry engagement.

The university will support the program through existing laboratories, electronics equipment, and computing infrastructure used in engineering and technology programs. Additional aviation-related instructional tools and software will be incorporated as needed to support avionics and instrumentation instruction. Faculty will receive ongoing professional development opportunities to remain current with advancements in avionics technologies, aircraft electronics systems, and embedded computing platforms used in modern aviation systems.

Technical support services and the university's information technology infrastructure will ensure that students and faculty have access to required software tools, simulation platforms, and learning management systems that support both classroom and laboratory instruction.

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 sustaining the B.S. in Aviation Avionics and Instrumentation program to ensure that students who enroll are able to complete their degrees. The

university maintains a comprehensive teach-out policy that guarantees the availability of required courses, faculty support, and academic advising should any future program modifications occur.

The university will continuously evaluate enrollment trends, student outcomes, and industry workforce needs to maintain the long-term viability of the program. Through regular program review and ongoing collaboration with industry partners and advisory boards, the program will remain aligned with evolving aviation technologies and workforce requirements, ensuring that graduates are well prepared for careers in avionics systems and aircraft instrumentation technologies.

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

The proposed Bachelor of Science in Aviation Avionics and Instrumentation at Capitol Technology University is designed to address an emerging workforce need within Maryland's aviation and aerospace industries. As modern aircraft increasingly rely on advanced electronic systems, digital avionics, integrated sensors, and automated monitoring systems, there is a growing demand for professionals trained in avionics technologies and aircraft instrumentation systems.

The program integrates electronics, embedded systems, aircraft systems, and instrumentation technologies to prepare graduates for roles involving avionics system integration, aircraft electronics troubleshooting, flight instrumentation systems, and aviation technology operations. By combining engineering-based electronics coursework with aviation-specific applications, the program prepares students to work with the complex electronic systems that support navigation, communication, monitoring, and automation functions in modern aircraft.

a) The need for advancement and evolution of knowledge

Aviation technology is evolving rapidly due to advancements in digital avionics architectures, satellite navigation systems, sensor networks, automation, and integrated aircraft monitoring systems. Modern aircraft depend heavily on electronic instrumentation, embedded computing systems, and real-time data processing to maintain operational safety and efficiency.

In response to these trends, the proposed Bachelor of Science in Aviation Avionics and Instrumentation program incorporates coursework in electronics, digital systems, embedded microcontrollers, aircraft electrical systems, and advanced avionics technologies. The curriculum emphasizes hands-on learning through laboratory experiences, simulation tools, and project-based coursework that allow students to analyze and troubleshoot real-world avionics and instrumentation systems.

The program's structure reflects the growing convergence between aviation systems and advanced electronics technologies. Students will develop skills in areas such as aircraft instrumentation, avionics communications, navigation systems, and embedded monitoring systems used in modern aircraft platforms.

This approach strongly supports the Maryland State Plan's **Goal 3: Innovation – "Foster innovation in all aspects of Maryland higher education to improve access and student success."**

Specifically, the program aligns with:

Priority 8: Promote a culture of risk-taking
"Promote a culture of risk-taking and experimentation that encourages the development of new ideas, pedagogies, pathways, and technologies to improve education delivery and outcomes."

The integration of electronics engineering principles with aviation-specific systems represents an innovative approach to aviation education. By combining traditional engineering coursework with aviation technologies and experiential learning opportunities, the program prepares students to adapt to ongoing technological changes in the aerospace sector.

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

The proposed program also contributes to expanding access to STEM education and aviation-related careers for underrepresented populations. The program provides accessible pathways for minority, first-generation, female, and veteran students seeking careers in aviation technology and aerospace systems.

Capitol Technology University supports these objectives through targeted recruitment efforts, financial aid opportunities, and partnerships with community colleges to facilitate transfer pathways into aviation and engineering programs.

These initiatives align with the Maryland State Plan's:

Goal 1: Student Access – "Ensure equitable access to affordable and high-quality postsecondary education for all Maryland residents."

In particular, the program supports:

Priority 4:
"Analyze systems that impact how specific student populations access affordable and high-quality postsecondary education."

Through outreach initiatives, scholarship opportunities, and flexible learning options, the program aims to broaden participation in aviation and engineering fields that have historically had limited representation from minority and disadvantaged populations.

c) The need to strengthen and expand the capacity of historically black institutions to provide high-quality and unique educational programs

Although Capitol Technology University is not a Historically Black Institution (HBI), the university serves a diverse student population. Approximately 51 percent of Capitol's students identify as minorities, including approximately 34 percent who identify as Black or African American.

The university seeks to expand educational opportunities through collaboration with Maryland HBIs, including potential partnerships and transfer pathways with institutions such as the University of Maryland Eastern Shore. These partnerships may support collaborative initiatives in STEM education, aviation technology training, and workforce development.

This approach reinforces several priorities identified in the Maryland State Plan:

Priority 1:
"Study the affordability of postsecondary education in Maryland."

By providing transfer pathways and scholarship opportunities, Capitol Technology University helps reduce financial barriers to STEM education.

Priority 2:
"Examine and improve financial literacy programs for students and families to encourage financial planning to pay for postsecondary education."

Through advising services and financial aid education initiatives, the university seeks to support students from underserved communities in successfully pursuing higher education and technical careers.

The proposed program is designed to complement rather than duplicate existing offerings at HBIs. By focusing on avionics systems and aircraft instrumentation technologies, the program expands the range of aviation-related educational opportunities available to students across Maryland.

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

The Maryland State Plan for Postsecondary Education identifies three overarching goals for higher education:

1. Student Access
2. Student Success
3. Innovation

Goal 1: Student Access

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

Capitol Technology University is committed to expanding access to high-quality STEM education through programs that prepare students for careers in emerging technical fields. The proposed B.S. in Aviation Avionics and Instrumentation provides a pathway for Maryland residents to pursue careers in aviation electronics, aircraft instrumentation systems, and aerospace technologies.

The program expands opportunities for students seeking careers in aviation technology, a field that continues to grow due to increasing reliance on digital avionics systems and automated aircraft monitoring technologies.

Capitol Technology University's diverse student population reflects its commitment to access:

- Approximately **51 percent of students identify as minorities**, including **34 percent Black or African American students**.
- Approximately **22 percent of students are military veterans**, many of whom have experience or interest in aviation and aerospace technologies.

- The university actively encourages **female participation in STEM and aviation programs**, addressing gender disparities in technical fields.

To further expand access, the university offers:

- Transfer agreements with Maryland community colleges.
- Financial aid programs and scholarship opportunities.
- Flexible course delivery formats that support working professionals and adult learners.

These strategies align with the Maryland State Plan priorities:

- **Priority 1:** Study the affordability of postsecondary education in Maryland.
- **Priority 2:** Improve financial literacy programs for students and families.
- **Priority 4:** Analyze systems that impact how specific student populations access higher education.

Goal 2: Student Success

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

The B.S. in Aviation Avionics and Instrumentation program is designed to support student success through structured academic support systems and strong connections with industry.

Capitol Technology University provides a variety of support services, including:

- Academic advising and tutoring.
- Career mentoring and internship opportunities.
- Industry partnerships with aviation and aerospace organizations.

According to the U.S. Bureau of Labor Statistics, employment for **aircraft and avionics equipment mechanics and technicians is projected to grow approximately 6 percent from 2022 to 2032**, reflecting steady demand for skilled professionals in this field.

The university also supports student completion through several initiatives:

- A **tuition guarantee program**, helping students plan financially for the duration of their degree.
- **Military and veteran support programs**, allowing students to apply relevant experience toward academic credit.
- An **Early Alert advising system**, enabling faculty and advisors to identify and assist students experiencing academic challenges.

These initiatives align with:

- **Priority 5:** Maintain the commitment to high-quality postsecondary education in Maryland.
- **Priority 6:** Improve systems that prevent timely completion of an academic program.
- **Priority 7:** Enhance lifelong learning opportunities.

Goal 3: Innovation

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

Capitol Technology University has a strong tradition of innovation in STEM and applied learning. The proposed B.S. in Aviation Avionics and Instrumentation continues this tradition by introducing a program focused on advanced aviation electronics and instrumentation technologies.

Key innovative elements of the program include:

- Integration of electronics engineering concepts with aviation systems.
- Hands-on laboratory experiences in avionics systems and aircraft electronics.
- Project-based learning activities that simulate real-world aviation technology challenges.
- Capstone design projects that integrate electronics, computing, and aviation systems.

These instructional approaches represent curricular experimentation and interdisciplinary integration that align with:

Priority 8:
"Promote a culture of risk-taking and experimentation that encourages the development of new ideas, pedagogies, pathways, and technologies to improve education delivery and outcomes."

Through this innovative curriculum, Capitol Technology University will prepare graduates capable of supporting the technological evolution of modern aviation systems while contributing to Maryland's aerospace and aviation workforce.

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 for Graduates of the Proposed Program

Graduates of the B.S. in Aviation Avionics and Instrumentation program will be prepared for employment in multiple sectors of the aviation and aerospace industries. As modern aircraft rely increasingly on complex electronic systems, digital instrumentation, and integrated avionics platforms, the demand for professionals trained in avionics systems and aircraft instrumentation technologies continues to grow.

The proposed program prepares students to work with advanced aircraft electronic systems including navigation systems, flight instrumentation, communication systems, and embedded monitoring systems used in commercial, military, and unmanned aircraft.

Potential Industries and Employment Opportunities

Graduates may pursue careers in several sectors of the aviation and aerospace industries, including:

a. **Commercial Airlines** – Supporting the maintenance, testing, and troubleshooting of aircraft avionics systems including navigation, communication, and flight instrumentation equipment.

b. **Corporate and Private Aviation** – Maintaining and integrating avionics and instrumentation systems in private aircraft fleets and corporate aviation operations.

c. **Aerospace Manufacturing** – Working with aircraft manufacturers and avionics suppliers in areas such as avionics system integration, electronic testing, quality assurance, and product development.

d. **Government and Military Aviation** – Supporting avionics and electronic systems operations within agencies such as the Federal Aviation Administration (FAA), the Department of Defense (DoD), NASA, and military aviation programs.

e. **Unmanned Aerial Systems (UAS) and Drone Technology** – Maintaining avionics systems, navigation technologies, and onboard instrumentation used in commercial and defense drone applications.

f. **Airport Operations and Aviation Technology Services** – Supporting avionics diagnostics, electronic testing systems, and aircraft monitoring technologies at major airports.

g. **Aviation Electronics and Systems Integration Companies** – Assisting in the installation, integration, and testing of advanced avionics systems used in modern aircraft.

Employment Statistics and Salary Expectations in Maryland

According to the **U.S. Bureau of Labor Statistics (BLS)**, as of May 2023 there were approximately **1,510 aircraft mechanics and service technicians employed in Maryland**, representing approximately **0.56 percent of the state workforce in this occupation**.

Median wages for related aviation technology occupations include:

a. **Aircraft Mechanics and Service Technicians** – Median annual wage of approximately **$75,020**.

b. **Avionics Technicians** – Median annual wage of approximately **$77,420** nationally.

Within Maryland, salary levels can vary by region and employer:

a. **Baltimore Metropolitan Area** – Estimated total compensation for aircraft maintenance professionals averages approximately **$97,465 per year**, with base salaries averaging around **$87,354**.

b. **Southern Maryland Aviation and Defense Sector** – Avionics technicians earn average annual salaries of approximately **$83,885**, according to the **Maryland Department of Labor**.

Salary levels vary depending on industry sector, certifications, and professional experience.

Expected Level of Entry

Graduates of the program can expect to enter the workforce in **entry-level technical and systems support roles** in avionics systems, aircraft instrumentation, and aviation technology operations.

Typical entry-level roles may include:

- Avionics technician
- Aircraft electronics technician
- Avionics systems specialist
- Aircraft instrumentation technician

- Aviation systems support technician

Graduates who gain industry certifications, complete internships, or obtain specialized avionics training may advance to **mid-level systems integration or supervisory roles** within several years of professional experience.

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 B.S. in Aviation Avionics and Instrumentation program responds directly to increasing workforce demand for professionals skilled in aircraft electronic systems and avionics technologies.

National Projections

According to the **U.S. Bureau of Labor Statistics**, employment for **aircraft and avionics equipment mechanics and technicians** is projected to grow approximately **5 percent between 2023 and 2033**, consistent with average occupational growth across the national workforce.

This growth is expected to generate approximately **13,400 job openings annually** across the United States, largely due to workforce retirements and industry expansion.

Maryland State Projections

The **Maryland Department of Labor** provides state-level occupational projections that confirm continued demand for aviation technology professionals.

Employment for **Aircraft Mechanics and Service Technicians** in Maryland is projected to increase from **1,510 positions in 2022 to approximately 1,590 positions by 2032**, representing a **5.3 percent growth rate**.

This growth translates to approximately:

- **80 new positions over the decade**
- Approximately **130 annual job openings** when accounting for replacement needs.

Demand for **Avionics Technicians** is projected to grow even faster. State data indicates:

- Employment increasing from **307 positions in 2022 to approximately 342 positions by 2032**
- A projected **11.4 percent growth rate**

This growth represents approximately **35 new positions statewide** and an estimated **32 annual openings** in avionics-related occupations.

Industry Demand and Workforce Initiatives

The **Maryland Statewide Workforce Development Plan (2024)** identifies aviation and aerospace as strategic sectors requiring skilled technical workers. The report emphasizes the need for educational institutions to align programs with emerging workforce requirements in high-technology industries.

Additionally, the **Maryland Department of Labor's 2024 workforce report** identifies a continuing need for skilled aviation technicians and technology specialists as employers anticipate increasing hiring demand in the coming years.

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 Five Years

The aviation industry continues to face a significant demand for skilled aviation technology professionals due to increasing air travel, evolving aircraft technologies, and workforce retirements.

Multiple authoritative sources highlight the need for expanded training programs in aviation technologies.

Industry Projections – Boeing Pilot and Technician Outlook

According to **Boeing's Pilot and Technician Outlook**, the global aviation industry will require approximately **626,000 new aviation maintenance technicians over the next 20 years** to support the expanding global aircraft fleet.

This projection underscores the importance of expanding training capacity for aviation-related technical fields, including avionics systems and aircraft electronics.

National Employment Data – U.S. Bureau of Labor Statistics

The **U.S. Bureau of Labor Statistics** projects approximately **13,400 annual job openings for aircraft and avionics equipment mechanics and technicians** nationwide between 2023 and 2033.

This demand is driven by:

- Increased air travel activity
- Expansion of airline fleets
- Workforce retirements
- Advancements in aircraft technology

State-Level Projections – Maryland Department of Labor

Maryland's occupational projections mirror national trends, showing steady demand for aviation technicians and avionics specialists.

The **Maryland Department of Labor** confirms that aviation occupations will continue to grow steadily across the state, particularly in regions with major aviation infrastructure such as **Baltimore/Washington International Airport (BWI)**, **Martin State Airport**, and **Naval Air Station Patuxent River**.

Current Job Market Indicators

Recent job postings and workforce reports indicate a consistent number of aviation technician openings across Maryland. In early 2025, approximately **140 aviation maintenance and avionics technician positions** were listed across the state, indicating an ongoing need for trained professionals.

Educational and Training Needs – Programmatic Response

The consistent national and regional demand for aviation technicians and avionics specialists demonstrates the need for educational programs that provide rigorous technical training aligned with modern aviation technologies.

The proposed **B.S. in Aviation Avionics and Instrumentation** addresses this need by combining coursework in electronics, embedded systems, avionics technologies, and aircraft instrumentation systems. Graduates will possess both the technical and analytical skills necessary to support modern aircraft electronic systems and aviation technologies.

4. Provide Data Showing the Current and Projected Supply of Prospective Graduates

To evaluate the supply of aviation technology graduates in the region, it is important to examine existing aviation programs within Maryland and nearby areas.

Several institutions offer aviation maintenance or aviation technology programs that contribute to the regional workforce pipeline.

Pittsburgh Institute of Aeronautics – Hagerstown Campus

The **Pittsburgh Institute of Aeronautics (PIA)** operates an **Aviation Maintenance Technology diploma program** in Hagerstown, Maryland. The program delivers approximately **1,900 clock hours of instruction over a 16-month period** and admits students three times per year.

With average class sizes of approximately **17 students**, the program produces approximately **50 graduates annually**.

Community College of Baltimore County – Catonsville Campus

The **Community College of Baltimore County (CCBC)** offers a **two-year Associate Degree in Aviation Maintenance Technology**, producing approximately **30 graduates annually** who enter the aviation workforce.

University of the District of Columbia – Community College

The **University of the District of Columbia Community College** offers an **Associate of Applied Science (AAS) in Aviation Maintenance Technology**. The program reports approximately **20 graduates annually**, many of whom work at regional airports such as **Reagan National Airport** and **Dulles International Airport**.

Total Regional Graduate Supply

Together, these programs produce approximately **100 aviation maintenance graduates per year** in the regional workforce pipeline.

Over a five-year period, this represents approximately **500 graduates entering the aviation workforce**.

However, projected workforce demand exceeds this supply. Based on Maryland Department of Labor projections, approximately **162 annual job openings** are expected in aviation maintenance and avionics occupations, resulting in approximately **810 job openings over five years**.

This indicates a potential workforce gap of approximately **310 positions**, demonstrating the need for additional aviation technology programs within the state.

The proposed **B.S. in Aviation Avionics and Instrumentation** program at Capitol Technology University will help address this workforce gap by preparing graduates with specialized training in avionics systems, aircraft electronics, and instrumentation technologies required in modern aviation operations.

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.

Several institutions in Maryland and the surrounding region offer aviation-related programs, including aviation science, aviation maintenance, and aviation technology programs. However, few programs focus specifically on avionics systems and aircraft instrumentation within a four-year STEM-focused curriculum. The following institutions offer related programs that share certain characteristics with the proposed B.S. in Aviation Avionics and Instrumentation program.

a. University of Maryland Eastern Shore (UMES)

The University of Maryland Eastern Shore offers a **Bachelor of Science in Aviation Sciences**, which includes concentrations in areas such as Professional Pilot, Aviation Management, Aviation Electronics, and Aviation Software. These programs are designed to prepare students for careers in aviation operations and aviation technology.

While UMES offers an aviation electronics concentration, the program primarily focuses on aviation operations and aviation management pathways. The electronics concentration is offered as one option within a broader aviation sciences degree.

In contrast, the proposed **Bachelor of Science in Aviation Avionics and Instrumentation at Capitol Technology University** is a specialized program that focuses specifically on avionics systems, aircraft electronics, and instrumentation technologies. The program integrates coursework in electronics, digital systems, embedded microcontrollers, aircraft electrical systems, and aviation instrumentation technologies within a single degree pathway.

Additionally, Capitol Technology University's curriculum emphasizes the integration of engineering-based electronics coursework with aviation applications, providing students with a stronger technical foundation in avionics systems and embedded technologies commonly used in modern aircraft.

b. Community College of Baltimore County (CCBC)

The **Community College of Baltimore County** offers an **Associate Degree in Aviation Maintenance Technology**. This program focuses on technical training related to aircraft maintenance and prepares students for entry-level aviation maintenance roles.

While CCBC's program provides foundational aviation training, it does not focus on avionics system design, electronics integration, or aircraft instrumentation technologies. The program also leads to an associate degree rather than a bachelor's degree.

The proposed program at Capitol Technology University differs significantly by offering a **four-year bachelor's degree focused on avionics systems and instrumentation technologies**, integrating coursework in electronics, embedded systems, computing, and aircraft electronic systems.

c. Pittsburgh Institute of Aeronautics (PIA) – Hagerstown Campus

The **Pittsburgh Institute of Aeronautics (PIA)** offers a diploma program in **Aviation Maintenance Technology** at its Hagerstown campus. The program consists of approximately **1,900 hours of instruction delivered over approximately 16 months**, focusing primarily on aircraft maintenance training.

PIA's program emphasizes hands-on maintenance training and preparation for FAA certification. However, the program does not offer a college degree and does not include coursework related to avionics systems design, embedded electronics, instrumentation systems, or aviation computing technologies.

In contrast, the proposed B.S. in Aviation Avionics and Instrumentation at Capitol Technology University is a **four-year STEM-focused degree program** that integrates aviation technologies with electronics engineering, computing, and instrumentation systems. The program prepares students not only for technical aviation roles but also for careers involving advanced aircraft electronics and avionics system integration.

d. University of the District of Columbia Community College (UDC-CC)

The **University of the District of Columbia Community College** offers an **Associate of Applied Science in Aviation Maintenance Technology**, which focuses on preparing students for careers in aircraft maintenance and FAA certification.

While the UDC program provides valuable training in aircraft maintenance, it does not include the advanced electronics and avionics systems coursework found in the proposed program at Capitol Technology University.

The proposed program provides a **broader and more advanced technical curriculum**, combining aviation systems coursework with electronics engineering, computing, and embedded system technologies used in modern avionics systems.

e. Aviation Maintenance Technician Program – Salisbury-Wicomico County

The **Aviation Maintenance Technician Program at Salisbury-Wicomico County Regional Airport** is a workforce training initiative developed in partnership with aviation industry organizations. The program focuses on technical training to prepare students for entry-level aviation maintenance careers.

The Salisbury program is designed for rapid workforce entry and does not confer a college degree. In addition, the program does not include coursework in avionics system design, embedded electronics, or aviation instrumentation technologies.

The proposed program at Capitol Technology University differs significantly by offering a **four-year academic degree that integrates aviation systems education with electronics, computing, and instrumentation technologies**, preparing graduates for careers involving aircraft electronic systems and avionics technologies.

2. Provide Justification for the Proposed Program

The proposed **Bachelor of Science in Aviation Avionics and Instrumentation** program responds directly to an emerging workforce need for professionals trained in aircraft electronics, avionics systems, and aviation instrumentation technologies.

While several institutions in Maryland offer aviation-related programs, most existing programs focus on **aviation operations, aviation management, or aviation maintenance training**. There are currently **few programs in the state that provide a comprehensive bachelor's degree focused specifically on avionics systems and aircraft instrumentation technologies**.

The proposed program fills this gap by integrating coursework in electronics, embedded systems, computing, and aviation systems within a single degree program.

a. Growing Industry Demand for Avionics and Aviation Electronics Professionals

The aviation industry increasingly depends on complex electronic systems to support navigation, communication, monitoring, and automation functions in modern aircraft.

According to **Boeing's Pilot and Technician Outlook**, the aviation industry will require approximately **626,000 new maintenance technicians worldwide over the next 20 years**, many of whom will require skills related to avionics systems and aircraft electronics.

Similarly, the **U.S. Bureau of Labor Statistics** projects continued demand for **aircraft and avionics equipment mechanics and technicians**, with approximately **13,400 job openings annually** across the United States.

At the state level, the **Maryland Department of Labor** projects continued growth in aviation technology occupations, including avionics-related roles.

These workforce projections highlight the need for educational programs that prepare students to work with increasingly sophisticated aircraft electronic systems.

b. Limited Availability of Avionics-Focused Bachelor's Degree Programs in Maryland

Maryland currently offers relatively few **four-year bachelor's degree programs focused specifically on avionics systems and aviation electronics technologies**.

While aviation science programs exist, many focus primarily on pilot training, aviation management, or aviation operations rather than the electronic systems that support modern aircraft.

The proposed B.S. in Aviation Avionics and Instrumentation program addresses this gap by providing specialized training in avionics systems, aircraft electronics, instrumentation technologies, and embedded computing systems.

The program also provides an opportunity for students completing associate degrees in aviation technology or electronics to pursue a **clear transfer pathway into a bachelor's degree focused on avionics technologies**.

c. Alignment with Maryland's Workforce and Economic Development Goals

The proposed program aligns with the priorities outlined in the **Maryland State Plan for Postsecondary Education** and the **Maryland Workforce Development Strategic Plan**, which emphasize expanding access to high-demand STEM careers and strengthening the state's technology workforce.

Maryland hosts several major aviation and aerospace facilities, including:

- **Baltimore/Washington International Thurgood Marshall Airport (BWI)**
- **Martin State Airport**
- **Naval Air Station Patuxent River**

These facilities support aviation operations that rely heavily on avionics systems, aircraft instrumentation, and advanced electronic technologies.

By preparing graduates with expertise in avionics systems and aircraft electronics technologies, the program supports Maryland's broader workforce development goals in aviation, aerospace, and advanced technology sectors.

d. Competitive Advantage and Industry Collaboration

The program has been designed to align with industry needs and emerging aviation technologies. Capitol Technology University plans to collaborate with aviation organizations, aerospace companies, and technology providers to provide students with internship opportunities, applied learning experiences, and industry-relevant projects.

These partnerships will support experiential learning opportunities and strengthen the connection between academic preparation and workforce requirements.

By offering a **specialized bachelor's degree in aviation avionics and instrumentation**, Capitol Technology University will provide a unique educational pathway in Maryland that prepares students to work with advanced aircraft electronic systems and aviation technologies.

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 proposed Bachelor of Science (B.S.) in Aviation Avionics and Instrumentation at Capitol Technology University is not expected to negatively impact the implementation or maintenance of high-demand programs at Maryland's Historically Black Institutions (HBIs). Currently, no HBI in Maryland offers a bachelor's degree program specifically focused on avionics systems, aircraft electronics, and aviation instrumentation technologies within a STEM-based engineering and technology framework. As a result, the proposed program addresses a specialized workforce need while filling a gap within the state's higher education system.

For example, the University of Maryland Eastern Shore (UMES), a Historically Black Institution, offers a **Bachelor of Science in Aviation Sciences** with concentrations in areas such as Professional Pilot, Aviation Management, Aviation Electronics, and Aviation Software. While the aviation electronics concentration provides exposure to aviation-related electronic systems, the program primarily focuses on aviation operations and flight training pathways rather than a dedicated curriculum centered on avionics systems, aircraft electronics, and instrumentation technologies.

The proposed program at Capitol Technology University differs in that it provides a specialized STEM-focused curriculum emphasizing avionics systems, embedded electronics, aircraft electrical systems, and instrumentation technologies used in modern aircraft. This technical emphasis complements existing aviation programs offered by HBIs rather than duplicating them.

Additionally, the Capitol program may create opportunities for collaboration with HBIs through transfer pathways and academic partnerships. Students who begin their studies in aviation, engineering, or technology programs at HBIs may choose to transfer into Capitol Technology University's program to complete a bachelor's degree focused on avionics systems and instrumentation technologies. Such pathways could expand educational opportunities for students while strengthening collaboration between institutions.

By offering a program that focuses specifically on avionics systems and aircraft instrumentation technologies, Capitol Technology University expands the range of aviation-related educational opportunities available within Maryland without duplicating programs currently offered at HBIs. The proposed program therefore complements the existing higher education landscape while supporting workforce development in the state's aviation and aerospace sectors.

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 proposed Bachelor of Science (B.S.) in Aviation Avionics and Instrumentation at Capitol Technology University is designed as a highly technical, STEM-focused program that supports workforce development in aviation electronics and instrumentation technologies. The program is not expected to interfere with or alter the distinct missions, identities, or academic priorities of Maryland's Historically Black Institutions (HBIs).

Each HBI in Maryland maintains a unique institutional mission that emphasizes expanding access to higher education, supporting student success among diverse populations, and fostering community engagement. These institutions have developed academic programs that reflect their respective missions

and priorities. For example, Bowie State University emphasizes excellence, diversity, and student-centered learning; Coppin State University promotes leadership development, civic engagement, and community empowerment; Morgan State University focuses on providing broad access to higher education while advancing research and innovation; and the University of Maryland Eastern Shore supports regional economic development and workforce preparation through programs such as aviation sciences and other STEM fields.

The proposed program at Capitol Technology University addresses a specialized area within aviation education by focusing on avionics systems, aircraft electronics, and aviation instrumentation technologies. This focus aligns with Capitol Technology University's institutional mission to provide applied STEM education that prepares students for careers in engineering, technology, and emerging technical fields. The program's emphasis on electronics, embedded systems, and aviation technologies reflects Capitol's longstanding commitment to hands-on, career-oriented STEM education.

Importantly, the proposed program does not replicate the broader missions or programmatic priorities of Maryland's HBIs. Instead, it focuses on a specialized technical area that complements the existing academic offerings available within the state. By concentrating on avionics systems and aircraft instrumentation technologies, the program fills a niche within Maryland's aviation education landscape without affecting the unique institutional identities of HBIs.

Capitol Technology University also recognizes the value of collaboration with Maryland's HBIs. Opportunities may exist for cooperative initiatives, transfer pathways, and joint outreach activities that support students interested in aviation and STEM careers. Such collaborations could expand educational opportunities for students from historically underrepresented communities while strengthening the overall pipeline of skilled professionals entering Maryland's aviation and aerospace workforce.

In summary, the proposed B.S. in Aviation Avionics and Instrumentation respects and preserves the unique missions and institutional identities of Maryland's Historically Black Institutions. The program is designed to complement the state's higher education ecosystem by addressing a specialized workforce need while supporting broader statewide goals related to STEM education, workforce development, and expanded educational access.

G. Adequacy of Curriculum Design, Program Modality, and Related Learning Outcomes

(as outlined in COMAR 13B.02.03.10)

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

The proposed Bachelor of Science (B.S.) in Aviation Avionics and Instrumentation was developed through a comprehensive academic planning process conducted by Capitol Technology University's New Programs Group. This committee includes representatives from the faculty, academic administration, and the Executive Council. The program was developed in response to increasing industry demand for professionals trained in avionics systems, aircraft electronics, and aviation instrumentation technologies.

The curriculum was designed by reviewing workforce data, aviation technology trends, and industry needs related to aircraft electronic systems, digital avionics architectures, and integrated instrumentation systems used in modern aircraft. The program integrates coursework in electronics, embedded systems, computing, and aviation technologies to provide students with both theoretical knowledge and practical skills required in the aviation electronics field.

Faculty overseeing the program bring academic and industry expertise in electrical engineering, computer engineering, aviation systems, electronics, embedded systems, and aerospace technologies. These faculty members hold advanced degrees in engineering, computer science, aviation technology, and related fields. Many faculty members also have professional experience in aviation technology, electronics design, embedded systems, and applied engineering.

The program will be administered through the university's School of Engineering and Technology. Faculty responsible for instruction and program oversight will include full-time faculty in electrical engineering, computer engineering, aviation technology, and related disciplines. A detailed list of faculty qualifications and instructional assignments is provided in **Section I of this proposal**.

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

Educational Objectives

a. Students will develop a strong foundation in electronics, avionics systems, and aircraft instrumentation technologies used in modern aviation systems.

b. Students will apply engineering principles and analytical techniques to analyze, troubleshoot, and maintain avionics and aircraft electronic systems.

c. Students will demonstrate knowledge of aircraft electrical systems, communication systems, navigation technologies, and flight instrumentation systems.

d. Students will integrate embedded systems, microcontrollers, and digital technologies into aviation electronics applications.

e. Students will demonstrate professional responsibility, ethical decision-making, and effective communication in aviation technology environments.

f. Students will analyze emerging technologies in aviation systems, including integrated avionics architectures, digital instrumentation systems, and advanced aircraft monitoring technologies.

g. Students will apply project management and teamwork skills to the design and implementation of aviation electronics systems.

Learning Outcomes

Upon graduation, students will:

a. Demonstrate the ability to analyze and troubleshoot aircraft electronic systems including avionics subsystems, sensors, and instrumentation technologies.

b. Apply principles of electronics, digital systems, and embedded computing to aviation systems and avionics applications.

c. Interpret technical documentation, system diagrams, and electronic schematics used in aviation electronics and instrumentation systems.

d. Demonstrate knowledge of aircraft communication, navigation, and monitoring systems used in modern avionics platforms.

e. Apply safety procedures and technical standards related to aviation electronics systems and aircraft instrumentation.

f. Demonstrate effective teamwork, technical communication, and project management skills in aviation technology projects.

g. Design and implement integrated avionics or instrumentation systems through capstone design experiences.

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 program learning outcomes in accordance with the standards of the **Middle States Commission on Higher Education (MSCHE)** and the university's institutional assessment framework.

Under **MSCHE Standard V: Educational Effectiveness Assessment**, the university will:

1. Establish clearly defined educational objectives and learning outcomes at the institutional, degree, and program levels.
2. Implement systematic assessment processes conducted by program faculty to evaluate student achievement.
3. Use a combination of direct and indirect assessment measures to evaluate student learning and program effectiveness.

Assessment activities will include:

a. Evaluation of student performance in laboratory courses and technical assignments involving avionics systems and electronics.

b. Assessment of student projects and system designs completed in upper-level courses.

c. Evaluation of student performance in the **Senior Capstone Design sequence**, where students develop and implement aviation technology solutions.

d. Review of internship performance and employer feedback where applicable.

Assessment results will be reviewed annually by program faculty to identify opportunities for curriculum improvement and to ensure alignment with evolving aviation industry technologies.

b) Document student achievement of learning outcomes in the program

Student achievement of learning outcomes will be documented through the university's established academic assessment process.

Key indicators used to evaluate program effectiveness will include:

a. **Student Performance in Capstone Design Projects** – Evaluation of student ability to design and implement aviation electronics and instrumentation systems.

b. **Laboratory and Technical Course Performance** – Assessment of students' practical skills in electronics, avionics systems, and embedded technologies.

c. **Internship and Employer Feedback** – Feedback from aviation industry partners regarding graduate preparation and technical competencies.

d. **Graduate Employment Outcomes** – Tracking employment of graduates in aviation technology, avionics systems, and aerospace industries.

Assessment results will be analyzed by faculty and program administrators and used to improve curriculum design, instructional methods, and program effectiveness. Summary assessment results will be made publicly available through the university's academic assessment reporting process.

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 **Bachelor of Science (B.S.) in Aviation Avionics and Instrumentation** provides students with the technical knowledge and practical skills required to work with modern aircraft electronic systems and aviation instrumentation technologies. The program prepares students to support the design, operation, and maintenance of avionics systems used in commercial aviation, aerospace systems, and emerging aviation technologies.

The curriculum integrates coursework in electronics, embedded systems, computing, and aviation technologies to provide students with a comprehensive understanding of aircraft communication systems, navigation systems, flight instrumentation systems, and integrated avionics architectures.

Students gain hands-on experience through laboratory courses, technical projects, and a two-semester senior design sequence. The program emphasizes problem solving, systems integration, and applied engineering skills required to support complex aviation technologies.

Graduates of the program will be prepared for careers in avionics systems support, aircraft electronics integration, aviation technology operations, and aerospace electronics industries.

Description of Program Requirements

Entrance Requirements

Students must meet the standard undergraduate admission requirements of Capitol Technology University. Applicants should demonstrate preparation in mathematics and science consistent with admission into STEM degree programs.

Degree Requirements

Students pursuing the **Bachelor of Science in Aviation Avionics and Instrumentation** must complete **120 credit hours** of coursework distributed across the following academic areas.

Program Requirements

• General Education – 21 credits
• Mathematics and Physical Sciences – 24 credits
• Electronics and Embedded Systems Core – 30 credits
• Aviation Avionics and Instrumentation Core – 30 credits
• Computing and Data Systems – 9 credits
• Capstone Design – 6 credits

These coursework categories ensure that students receive a balanced education in mathematics, science, electronics engineering, aviation systems, and applied technology.

Students must successfully complete all required courses and prerequisites and maintain satisfactory academic progress in accordance with university policies.

B.S. in Aviation Avionics and Instrumentation_ Curriculum

B.S. in Aviation Avionics and Instrumentation (120 credits)			
1. General Education (21 credits)			
Course	**Title**	**Credits**	**Prerequisites**
EN 101	English Communications I	3	placement test scores.
EN 102	English Communications II	3	EN 101
HU 331	Arts and Ideas	3	EN 102
SS 351	Ethics	3	EN 102
BUS 174	Introduction to Business and Management	3	None
BUS 301	Project Management	3	BUS 101or BUS 174
SSxxx/Huxxx	Humanities / Social Science Elective	3	Varies
2. Mathematics and Science (24 credits)			
Course	**Title**	**Credits**	**Prerequisites**

MA 114	Algebra and Trigonometry	4	MA 112 or placement test score.
MA 261	Calculus I	4	MA 114
MA 262	Calculus II	4	MA 261
MA 128	Introduction to Statistics	3	MA 110, MA 111 or MA 112
PH 201	General Physics I	3	MA 114
PH 202	General Physics II	3	PH 201
CH 120	Chemistry	3	MA 112 or MA 114
3. Electronics and Embedded Systems Core (30 credits)			
Course	**Title**	**Credits**	**Prerequisites**
EL 100	Introduction to DC/AC Circuits	3	Corequisite(s): MA 112.
EL 150	DC/AC Circuits and Analysis	3	EL 100
EL 200	Electronic Devices and Circuits	3	EL 100
EL 204	Digital Electronics	3	None
EE 304	Digital Design I	3	EL 204
EL 262	Microprocessors and Microassembly	3	EL 204
EE 362	Microcontroller System Design	3	EL 204
EE 406	Signals and Systems	3	MA 262 and MA 340
EE 453	Control Systems	3	MA 340
EE 375	Power Electronics	3	EL 150, EL 200
4. Aviation Avionics and Instrumentation Core (30 credits)			
Course	**Title**	**Credits**	**Prerequisites**
AVM 100	Aircraft Fundamentals and FAA Regulations	3	None
AVM 120	Aircraft Propulsion and Engine Systems	3	AVM 100 or Instructor Aproval
AVM 130	Hydraulics, Pneumatics and Landing Gear Systems	3	AVM 100 or instructor approval
AVM 140	Aircraft Electrical and Avionics Systems	3	AVM 100 or instructor approval
AVM 150	FAA Compliance and Safety Standards	3	AVM 100 or instructor approval
AVT 311	Aircraft Systems and Components I	3	None
AVT 313	Aircraft Systems and Components II	3	AVT 311
AVT 413	Electronic Flight Management Systems	3	AVT 313
AVT 421	Global Navigation and NAVAIDS	3	AVT 413
AVM 230	Advanced Aircraft Troubleshooting and Diagnostics	3	

5. Computing and Data Systems (9 credits)			
Course	**Title**	**Credits**	**Prerequisites**
CS 120	Introduction to Programming Using Python	3	None
CS 150	Programming in C	3	MA 111 or MA 112 and CS 120
DS 101	Introduction to Data Science	3	. Corequisite(s): MA 112
6. Capstone Design (6 credits)			
Course	**Title**	**Credits**	**Prerequisites**
SDE 457	Senior Design I	3	Senior standing.
SDE 458	Senior Design II	3	SDE 457

Curriculum Distribution

Category	Description	Credits
General Education	Courses in written and oral communication, humanities, social sciences, ethics, business, and project management that develop critical thinking, communication skills, and professional awareness.	21
Mathematics and Science	Foundational coursework in algebra, calculus, statistics, physics, and chemistry that supports analytical reasoning and scientific understanding required for avionics and instrumentation systems.	24
Electronics and Embedded Systems Core	Core engineering courses in circuits, electronics, digital systems, microprocessors, signals, control systems, and power electronics that prepare students to design, analyze, and troubleshoot electronic and embedded avionics systems.	30
Aviation Avionics and Instrumentation Core	Specialized courses covering aircraft systems, avionics architecture, navigation systems, flight management systems, aircraft electrical systems, and diagnostic techniques used in modern aviation instrumentation and avionics platforms.	30
Computing and Data Systems	Programming and data-oriented coursework that introduces software development, embedded programming, and data analysis techniques used in avionics and aircraft monitoring systems.	9
Capstone Design	A two-semester senior design sequence in which students apply knowledge from avionics, electronics, computing, and instrumentation to develop and demonstrate a complete aviation systems project.	6
Total		**120**

Course Descriptions

I. General Education (21 Credits)

EN-101 – English Communications I (3 credits): This introductory college-level course focuses on effective oral and written communication skills and the development of analytical abilities through various reading and writing assignments. Students must demonstrate competence in writing mechanics, including grammar, sentence structure, logical content development, and research documentation through 4 essays/research papers. Rhetorical modes may include description, comparison/contrast, narrative, and process analysis. Students are expected to develop effective oral communication skills through speeches. Group projects will develop effective team skills such as decision-making, time management, and cooperation. Prerequisite(s): Acceptance based on placement test scores.

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

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

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

BUS 174 - Introduction to Business and Management (3 credits): This course presents a survey of the general business and management environment. Topics include an introduction to the various forms of business, organizational structure, and their legal implications. Modern management and supervision concepts, history and development of theory and practice, the roles of managers, and the relationship between manager and employee are examined. This is a seminar course with emphasis on class discussion and collaborative learning

BUS 301 - Project Management (3 credits): This course is an introduction to project management. It covers the origins, philosophy, methodology, and involves actual applications and use of tools such as MS Project. The System Development Cycle is used as a framework to discuss project management in a variety of situations. Illustrative cases are used and project leadership and team building are covered as integral aspects of good project management. Prerequisite(s): BUS 101 or BUS 174

HU/SS Elective – Humanities or Social Science Elective (3 credits): This elective allows students to select a course in the humanities or social sciences that supports the development of critical thinking, cultural awareness, ethical reasoning, and social responsibility. Approved courses broaden students' understanding of human behavior, societal structures, and global perspectives, complementing the technical focus of the degree program.

II. *Mathematics* and Science (24 Credits)

MA 114 - Algebra and Trigonometry (4 credits): Designed for students needing mathematical skills and concepts for MA-261. Topics in this course are as follows. Algebra: basic operations on real and complex numbers, fractions, exponents and radicals. Determinates: Solution of linear, fractional, quadratic and system equations. Trigonometry: definition and identities, angular measurements, solving triangles, vectors, graphs and logarithms. Prerequisite(s): MA 112 or placement test score.

MA 128 - Introduction to Statistics (3 credits): This course addresses probability: definitions, theorems, permutations and combinations; binomial, hypergeometric, Poisson and normal distributions; sampling distribution and central limit theorem; and estimation and hypothesis testing. Prerequisite(s): MA 110, MA 111 or MA 112.

MA 261 - Calculus I (4 credits): This course covers lines, circles, ellipses; functions and limits, differentiation, power rule, higher-order derivatives, product, quotient and chain rules, implicit differentiation, and applications. Regarding integration, it addresses definite integrals; indeterminate forms; exponential, logarithmic, trigonometric and hyperbolic functions; differentiation and integration, and graphing. Prerequisite(s): MA 114

MA 262 - Calculus II (4 credits): This course centers on methods of integration, including completing the square, substitution, partial fractions, integration by parts, trigonometric integrals, power series, and parametric equations. It also addresses partial derivatives, directional derivatives, and an introduction to multiple integrals. Prerequisite(s): MA 261

PH 201 - General Physics I (3 credits): This is a non-calculus-based physics course intended for credit in engineering technology courses. PH-261 is to be used for electrical, computer, and software engineering courses. PH-201 addresses mechanics, focusing on units, conversion factors, vector diagrams, translational equilibrium, friction, torque and rotational equilibrium, uniformly accelerated motion, projectiles, Newton's Law, work energy and power, kinetic and potential energy, conservation of energy, and impulse and momentum. It also addresses heat, focusing on temperature scales, thermal properties of matter, heat and temperature change, heat and change of phase, physics of heat transfer, and applications. Students completing this course may not enroll in PH-261 for additional credit. Prerequisite(s): MA 114

PH 202 - General Physics II (3 credits): Non-calculus based physics intended for credit in engineering technology courses. Use PH-262 for electrical, computer and software engineering courses. Light and sound: wave motion, nature of light, reflection and mirrors, refraction, prisms, dispersion lenses; simple harmonic motion; sound transmission, resonance, interference. Doppler Effect. Electricity and magnetism: Static electricity, electric fields, magnetic fields, electric potential, capacitance; electricity in motion; magnetic induction; electromagnetic relations. Alternating currents. Prerequisite(s): PH 201

CH 120 – Chemistry (3credits): This courses teaches metric system and significant figures, stoichiometry, fundamental concepts of atomic structure and its relationship to the periodic table and electron configuration. Bonds and electronegativity, gases, oxidation states and redox, solutions, acids and bases, changes of state, thermodynamics, and chemical kinetics and equilibrium are also included. Prerequisite(s): MA 112 or MA 114

III. Electronics and Embedded Systems Core (30 credits)

EL 100 – Introduction to DC/AC Circuits (3 credits): Basic electrical concepts and laboratory techniques. Current, voltage, resistance and power. Ohm's law, series and parallel resistive circuits. Kirchhoff's voltage and current laws. Loading effects on meters and supplies. Capacitors and Inductors. Charging and discharging. RC and RL time constants. Introduction to AC. Sinusional waveforms, phasors and use of the J operator. Reactance and admittance. Average values and RMS. Laboratory emphasis is on the proper use of standard meters, testing equipment and circuit breadboarding. MATLAB Part I: Introduction to MATLAB, variables, MATLAB functions, data types, writing a MATLAB program, using basic plotting functions. Corequisite(s): MA 112.

EL 150 – DC/AC Circuits and Analysis (3 credits): Applications of Kirchhoff laws to multiple source and complex series-parallel circuits. Determinants and matrices. Mesh and nodal analysis. Network Theorems: Thevenin, Norton, superposition, maximum power transfer. Review of complex number manipulation. Application to capacitive and inductive circuits, impedance. Complex Mesh analysis. Network theorems applied to complex RLC networks. Frequency response of RL and RC circuits. Plotting frequency response. Bode plots. Laboratory emphasis on the use of standard test equipment to verify theory. MATLAB Part II: input and output statements, importing data from spreadsheets, text files and other formats into MATLAB, conditional statements, loops, arrays, array functions. Prerequisite(s): EL 100. Corequisite(s): Math (MA 114 or MA 114 Placement Test equivalent or MA 261 or MA 261 Placement Test equivalent)..

EL-200 – Electronic Devices/Circuits (3 credits): Principles and characteristics of semiconductor devices. Devices covered include diodes, Zener diodes, bipolar junction transistors, field-effect transistors, and operational amplifiers. Includes bias networks, operating points, maximum output and optimum bias, and DC and AC load lines. Input and output impedances, and voltage and current gains for each amplifier configuration. Prerequisite(s): EL 150.

EL-204 – Digital Electronics (3 credits): Number systems, including binary, octal and hexadecimal bases. Binary arithmetic. Boolean algebra, Karnaugh map simplification. Design of combinational circuits. Decoders, multiplexers, flip-flops and other multi-vibrator circuits. Logic families including TTL, CMOS, ECL and others. Memory, shift registers and counters. Prerequisite(s): None

EE 304 - Digital Design I (3 credits): Minimization of Boolean functions using Kamaugh Maps and Quine-McCluskey Tabulation. Multilevel circuits: FPGA's. Combinational logic design with MSI LSI. Chip count reduction. Sequential circuit analysis and design. State tables and state diagrams. Asynchronous circuit design. Introduction to FPGA design software. Students design, simulate and build circuits. Prerequisite(s): EL 204

EL-262 – Microprocessors/Microassembly (3 credits): Introduction to microprocessors. Architecture. Fetch and execute cycles. Microprocessor instruction set and assembly language programming. Hardware configuration, pin functions and modes of operation of a typical microprocessor. Basic I/O timing, control and memories. Prerequisite(s): EL 204.

EE 362 - Microcontroller System Design (3 credits): Study of a state of the art microcontroller and related families. Evaluation board hardware preparation and checkout. PC to board interfaces. Assembler and C-compiler. Configuration registers for code and program protection. On-chip memories. Serial peripheral interface and parallel I/O routines. A/D converter, real-time interrupts and timer applications. A

series of three group projects are required leading up to a final stand-alone project. Prerequisite(s): EL 262 or microcomputer, micro-assembly background.

EE 406 - Signals and Systems (3 credits): Mathematical models, systems, signal classifications, I/O differential and difference equations, block diagram realizations, discrete-time systems. Convolutions: discrete-time and continuous-time. The Z-transform in linear discrete-time systems, transfer functions. Trigonometric Fourier series, polar and rectangular forms, odd/even functions, response of a linear system to periodic input. Fourier transform, symmetry properties, transform theorems, linear filtering, modulation theorem. Laplace and Fourier transforms and their properties. Offered during fall semester only. Offered during fall semester only. Prerequisite(s): MA 262 and MA 340

EE 453 - Control I (3 credits): This course provides a comprehensive introduction to feedback control systems, focusing on the analysis and design of dynamic systems. Key topics include mathematical modeling of physical systems, transfer functions, system response for first- and second-order systems, and stability analysis using Routh-Hurwitz criterion. Students will study steady-state error, system performance metrics, and compensator design methods such as lead and lag compensators. Frequency-domain analysis is emphasized with Bode plots, gain and phase margins, and crossover frequencies. Practical applications are integrated through laboratory exercises and industry-standard computer-aided design tools (e.g., MATLAB/Simulink), equipping students with skills to design and analyze control systems for mechatronics and robotics applications. This course emphasizes both theoretical foundations and hands-on implementation to bridge the gap between theory and practice. Prerequisite(s): MA 340

EE 375 – Power Electronics (3 credits): This course introduces the principles and applications of power electronic devices and circuits used for the conversion and control of electrical energy. Topics include semiconductor power devices such as diodes, thyristors, MOSFETs, and IGBTs; controlled and uncontrolled rectifiers; DC–DC converters; inverters; and AC voltage controllers. Emphasis is placed on switching techniques, efficiency, thermal considerations, and applications in motor drives, renewable energy systems, and power conditioning. Students analyze and simulate power electronic circuits using modern engineering tools and perform laboratory experiments to study converter operation and performance. **Prerequisite(s): EL 200 and EL 150.**

IV. Aviation Avionics and Instrumentation Core (30 credits)

AVM 100 – Aircraft Fundamentals & FAA Regulations (3 credits): This course provides an **introduction to aircraft fundamentals** and the **regulatory framework** governing aviation maintenance. Students will explore **aircraft structures, powerplants, avionics systems, and aerodynamics** while gaining a comprehensive understanding of the **Federal Aviation Administration (FAA) regulations and standards** that ensure aviation safety and compliance. Prerequisite(s): None

AVM 120 – Aircraft Propulsion & Engine Systems (3 credits): This course provides a comprehensive introduction to **aircraft propulsion systems**, including both **reciprocating (piston) engines and turbine (jet) engines**. Students will explore the **design, operation, and maintenance** of aircraft engines, as well as **fuel systems, ignition systems, and engine performance considerations**. **Prerequisite: AVM 100** or instructor approval

AVM 130 – Hydraulics, Pneumatics & Landing Gear Systems (3 credits): This course provides an in-depth study of aircraft hydraulic and pneumatic systems, with a focus on landing gear operation, maintenance, and troubleshooting. Students will explore the principles of fluid dynamics, system components, and safety procedures essential for maintaining hydraulic and pneumatic systems in modern aircraft. Prerequisite: AVM 100 or instructor approval

AVM 140 – Aircraft Electrical & Avionics Systems (3 credits): This course provides an introduction to aircraft electrical systems and avionics, focusing on the theory, operation, maintenance, and troubleshooting of electrical and electronic components in modern aircraft. Students will learn about aircraft power generation, distribution, wiring, navigation, and communication systems, as well as FAA regulations governing avionics maintenance. Prerequisite: AVM 100 or instructor approval

AVM 150 – FAA Compliance & Safety Standards (3 credits): This course provides an in-depth study of FAA regulations, aviation safety standards, and compliance requirements essential for aviation maintenance professionals. Students will explore the legal framework that governs aircraft maintenance, operations, and inspections, ensuring compliance with Federal Aviation Administration (FAA) regulations, industry best practices, and international aviation safety standards. Prerequisite: AVM 100 or instructor approval

AVT-311 – Aircraft Systems and Components I - Introduction (3 credits): Introduction to basic aircraft systems found on modern single and multi-engine reciprocating aircraft. Topics will include piston engines, electrical systems, hydraulic and pneumatic systems, radios and instruments, propellers, pressurization, maintenance requirements and documentation, and trouble shooting from the cockpit. Prerequisite(s): None

AVT-313 – Aircraft Systems and Components II- Turbines and Aerodynamics (3 credits): Continuation of AVT-311, introducing aircraft systems in turbine-powered aircraft. Topics include hydraulic and pneumatic systems, landing gear, brakes, environmental control, ice and rain protection, fire protection, aircraft turbine engines, and high-speed aerodynamics. High-speed aerodynamics includes compressibility effects, shock waves, and supersonic flight dynamics. Prerequisite(s): AVT 311

AVT-413 – Electronic Flight Management Systems (3 credits): Introduces the concepts and functions of electronic flight management systems (FMS), including flight plans, GPS, INS, navigation, control display units, electronic flight instrument systems, and navigation displays. Prerequisite(s): AVT 313

AVT-421 – Global Navigation and NAVAIDS (3 credits): Covers advanced navigation systems including HSI, RMI, Loran, Doppler, VOR, NDB, and GPS. Topics include navigation theory, in-flight emergencies, electronic instrumentation, and advanced flight computing problems. Extensive in-class computer flight simulation exercises reinforce concepts. Prerequisite(s): AVT 413

AVM 230 – Advanced Troubleshooting & Aircraft Systems Diagnostics (3 credits): This course focuses on advanced methods for diagnosing and troubleshooting complex aircraft systems. Students learn systematic problem-solving approaches, use of diagnostic equipment, and interpretation of data from avionics, propulsion, hydraulic, and electrical systems. Emphasis is placed on root cause analysis and maintenance documentation aligned with FAA standards. **Prerequisite:** AVM 140 and AVM 150

V. Computing and Data Systems (9 credits)

CS 120 – Introduction to Python (3 credits): The course will cover basic concepts and elements of computer programming using Python. Topics include variables, constants, operators, expressions, statements, branching, loops, and functions. Additionally, Python specific data structures, built-in functions, library modules and working with external files will be applied in developing working code. Prerequisite(s): None

CS 150 - Programming in C (3 credits): This introductory course in programming will enable students to understand how computers translate basic human instructions into machine executable applications. The language of choice for this course is C. The C syntax that will be covered includes functions; variables and memory allocations including pointer notation; conditional statements and looping. Students will also learn binary to hexadecimal and decimal conversions along with basic computer architecture. Memory management, data input output and file manipulations will be among some other topics discussed and applied during this course. Formerly titled Introduction to Programming Using C. Prerequisite(s): MA 111 or MA 112 and CS 120 or placement test.

DS 101 - Introduction to Data Science (3 credits): Fundamental coursework on the standards and practices for collecting, organizing, managing, exploring, and using data. Topics include preparation, analysis, and visualization of data and creating analysis tools for larger data sets. Corequisite(s): MA 112

VI. Capstone Design (6 credits)

SDE 457 - Senior Design I (3 credits): Students/teams select a project, develop an understanding of the project scope that includes research and documentation of related work, prepare a feasibility study, develop project requirements (constraints) and engineering, software, and/or security specifications, propose solutions and multiple designs, analyze proposed designs, select a final proposed design, and prepare and present a preliminary design review (PDR). Students are expected to apply proper systems engineering and project management to their work. Additional components may be required in some projects. Students/teams submit a final report at the end of the semester. Prerequisite(s): Senior standing.

SDE 458 - Senior Design II (3 credits): Students/teams build and test their selected designs (completed in SDE 457). Each student team delivers a tested prototype and defends its project in front of a panel of experts. Students/teams submit a final report that includes description of the design, realization, and test processes as well as test results, discussion, and conclusion. Failure to deliver a completed design and a working prototype that meets engineering, software, and/or security specifications by the end of the semester may result in failing the course. Prerequisite(s): SDE 457

G. Adequacy of Curriculum Design, Program Modality, and Related Learning Outcomes

(as outlined in COMAR 13B.02.03.10)

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

The general education requirements for the Bachelor of Science in Aviation Avionics and Instrumentation meet or exceed the specifications outlined in the Code of Maryland Regulations (COMAR). These requirements ensure that students receive a well-rounded education that supports both the technical and professional competencies required in aviation technology careers.

Students in this program will complete coursework in English composition, humanities, social sciences, mathematics, and physical sciences. These courses are designed to develop critical thinking, analytical reasoning, ethical decision-making, and effective written and oral communication skills.

The general education curriculum complements the program's technical coursework by strengthening students' abilities to analyze technical information, communicate effectively within multidisciplinary teams, and make informed decisions in complex technological environments. These foundational skills are essential for professionals working with advanced aviation electronics systems, instrumentation technologies, and aerospace systems.

For a detailed breakdown of the general education requirements and their alignment with COMAR standards, please refer to **Section G.4 of this proposal**.

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

The B.S. in Aviation Avionics and Instrumentation program will operate under the institutional accreditation of the **Middle States Commission on Higher Education (MSCHE)**, which accredits Capitol Technology University.

Although the program does not require a specific professional licensure for graduates, the curriculum is designed to align with industry standards related to aviation electronics, avionics systems integration, and aerospace technology operations. Coursework in electronics, embedded systems, and aviation technologies will prepare graduates for careers in avionics systems support, aircraft electronics integration, and aviation technology operations.

Students completing the program may pursue industry certifications relevant to avionics and electronics technologies, depending on their career pathway and employer requirements. The program's technical foundation in electronics, digital systems, and embedded computing also supports graduates who may choose to pursue advanced training or professional certifications related to avionics technologies, electronics systems, or aerospace technologies.

Through its combination of engineering-based electronics coursework and aviation systems education, the program prepares students to meet the evolving technological demands of the aviation and aerospace industries.

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

At this time, the proposed B.S. in Aviation Avionics and Instrumentation program does not require a formal contractual partnership with another institution for program delivery. All academic coursework will be delivered by Capitol Technology University faculty using existing instructional resources and laboratory facilities.

However, the university intends to develop relationships with aviation and aerospace industry partners to support experiential learning opportunities, internships, and applied student projects. These collaborations

will enhance student learning experiences by exposing students to real-world aviation technologies and avionics systems used in the aviation industry.
Should formal agreements with external partners be established in the future to support internships, cooperative education experiences, or specialized training opportunities, those agreements will be documented and maintained in accordance with institutional policies.

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 B.S. in Aviation Avionics and Instrumentation program will ensure that students receive clear, complete, and timely information regarding program requirements, course expectations, academic support services, and financial policies.
Program information will be made available through multiple institutional communication channels, including the university website, academic catalog, student handbook, orientation sessions, and direct communication with academic advisors.
a. The complete curriculum, including course descriptions and degree requirements, will be published in the university academic catalog and on the university website.
b. The program will incorporate classroom instruction, laboratory experiences, and project-based learning activities. Expectations regarding faculty–student interaction, course participation, and academic engagement will be clearly outlined in course syllabi and orientation materials.
c. Students will be expected to demonstrate basic proficiency in mathematics, computing, and technical problem-solving appropriate for STEM degree programs. Any technical equipment or software requirements will be communicated through course syllabi and program materials.
d. Course content, assignments, and communication between faculty and students will be delivered through **Canvas**, the university's learning management system. Students will receive training on using the system during orientation.
e. The university provides comprehensive academic support services including academic advising, tutoring, career counseling, and financial aid assistance. Information regarding these services will be provided through orientation programs, advising sessions, and student support offices.
f. Tuition, fees, and payment policies will be clearly communicated through the university catalog, financial aid office resources, and admissions materials. Information about scholarships, grants, and financial assistance programs will be available through the university's financial aid office.

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

All advertising, recruiting, and admissions materials related to the B.S. in Aviation Avionics and Instrumentation program will accurately represent the program's curriculum, academic requirements, and career pathways.
Promotional materials will be developed based on the program proposal submitted to the Maryland Higher Education Commission (MHEC) and will accurately reflect the approved program structure.
a. The program will be promoted through the university website, social media platforms, printed materials, career fairs, and targeted outreach activities. Marketing materials will clearly describe the program curriculum, technical focus areas, and potential career opportunities.
b. Admissions counselors will provide prospective students with accurate information regarding program requirements, coursework, career pathways, tuition, and financial aid opportunities.

c. The admissions office will clearly communicate eligibility requirements, prerequisite preparation, transfer policies, and academic expectations through admissions materials, recruitment events, campus visits, and virtual information sessions.
These practices ensure transparency and provide prospective students with the information necessary to make informed decisions regarding enrollment in the program.

H. Adequacy of Articulation

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

The Bachelor of Science in Aviation Avionics and Instrumentation program does not currently have formal articulation agreements with partner institutions. However, Capitol Technology University is committed to expanding transfer opportunities and developing articulation pathways with community colleges and technical institutions that offer programs in electronics, aviation technology, engineering technology, and related STEM fields.

Capitol Technology University has an established history of working with community colleges in Maryland and surrounding states to support transfer students pursuing bachelor's degrees in engineering and technology disciplines. The proposed program will build on these existing transfer practices to support students interested in continuing their education in avionics systems and aviation technologies.

a. The University works closely with Maryland community colleges and technical institutions to develop transfer pathways that allow students who complete associate degree programs in electronics technology, aviation technology, or engineering technology to transfer credits toward bachelor’s degree programs.

b. The University plans to establish articulation agreements with institutions offering associate degree programs in aviation technology, electronics technology, and related technical disciplines. These agreements will help students transfer relevant coursework efficiently and complete the B.S. in Aviation Avionics and Instrumentation with minimal loss of credit.

c. Dedicated transfer advisors are available to assist incoming students in evaluating previously earned credits, aligning coursework with program requirements, and supporting a smooth transition into the program.

As the program develops, Capitol Technology University will pursue additional articulation agreements with regional institutions offering aviation technology, electronics, or engineering technology programs. These partnerships will help create clear academic pathways for students seeking to advance from associate-level technical programs into a bachelor’s degree focused on avionics systems and aviation instrumentation technologies.

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.

Faculty members teaching in the **B.S. in Aviation Avionics and Instrumentation** program at Capitol Technology University possess extensive academic and professional experience in aviation systems, electrical engineering, computer science, electronics, mathematics, and applied technology. The faculty includes full-time and adjunct instructors with doctoral and master's degrees in engineering, computer science, software engineering, analytical chemistry, and related disciplines.

The program draws upon Capitol Technology University's existing faculty expertise in electrical engineering, embedded systems, computing, and aviation technologies. These faculty members have experience teaching courses related to circuits, electronics, digital systems, microcontrollers, avionics technologies, aviation systems, and programming. Their combined academic preparation and industry knowledge provide students with both theoretical understanding and practical skills required for careers in aviation avionics systems and instrumentation technologies.

Faculty members teaching in the program are actively involved in STEM education and applied engineering instruction. Their backgrounds support the interdisciplinary nature of the program, which integrates electronics engineering, aviation systems, embedded computing, and instrumentation technologies. The program will be supported primarily by full-time faculty members, supplemented by adjunct faculty with specialized expertise in aviation operations and technical fields.

The faculty members listed below are well-qualified in their respective disciplines and are committed to providing a high-quality learning experience for students in the Aviation Avionics and Instrumentation program. As enrollment increases and the program expands, additional faculty with expertise in avionics systems, aerospace electronics, and aviation technologies may be recruited to further strengthen the program.

Faculty Summary

Faculty Name	Appointment Type	Qualification	Employment Status	Courses Taught
Jeff Chi	Faculty	Ph.D. in Project Management	Full-Time	BUS 174, BUS 301
Amelia Wear	Faculty	M.S. Software Engineering	Full-Time	EL 100, EL 204, EE 304, EL 262
Andrew Mehri	Faculty	Ph.D. in Computer Science	Full-Time	PH 202, EL 150, EL 200, AVT 413
Frank Turney	Faculty	J.D., CFI, CFI-IA, MEI, AGI	Full-Time	AVM 150, AVT 311, AVT 313, AVT 421, SDE 457
Gregory P. Behrmann	Faculty	Ph.D. in Mechanical Engineering	Full-Time	MA 262, PH 201, EE 362, SDE 458
Megan Miskovish	Adjunct Faculty	M.S. Education	Part-Time	EN 101, EN 102, HU 331, SS 351

Michael Ripley	Adjunct Faculty	FAA A&P, IA Mechanic	Part-Time	AVM 100, AVM 120, AVM 130, AVM 140, AVM 230
Mohamed Ghazy	Faculty	Ph.D. in Electrical Engineering	Full-Time	EE 406, EE 453, EE 375
Nisma Omar	Faculty	Ph.D. in Analytical Chemistry	Full-Time	MA 114, MA 261, MA 128, CH 120
Tahani Baabdullah	Faculty	Ph.D. in Computer Science	Full-Time	CS 120, CS 150, DS 101

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

a) Pedagogy that meets the needs of the students

Capitol Technology University employs an **Active Learning instructional model** designed to engage students through hands-on, problem-solving, and project-based learning activities. This approach is particularly well suited for STEM disciplines and supports the development of practical technical skills required in aviation avionics and instrumentation fields.

Instruction in the program emphasizes:

• Real-world applications of avionics systems and aviation electronics concepts
• Laboratory-based learning involving electronics circuits, embedded systems, and instrumentation technologies
• Simulation and troubleshooting exercises involving aircraft electronic systems
• Project-based learning focused on system integration and applied engineering problems

Faculty members participate in periodic professional development workshops and training sessions focused on:

• Student-centered learning strategies
• Problem-based and project-based learning methodologies
• Integration of laboratory and simulation tools in STEM education
• Adapting instructional approaches to diverse student learning styles

These training opportunities are delivered through both in-person workshops and online sessions, ensuring that all faculty members, including adjunct instructors, have access to ongoing professional development resources.

b) The learning management system (LMS)

Capitol Technology University utilizes **Canvas** as its primary Learning Management System (LMS). Faculty members receive training and support to ensure effective use of the platform for course delivery, communication, and assessment.

Training includes instruction on:

• Uploading and organizing course materials and multimedia content
• Managing assignments, quizzes, and grading tools
• Monitoring student engagement and academic progress
• Facilitating discussions, collaborative learning activities, and group projects
• Providing timely and constructive feedback to students

New faculty members receive formal training in the use of Canvas during onboarding, and ongoing technical support is available through the university's **Department of Online Learning and the Information Technology Help Desk**.

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

For faculty teaching hybrid or online courses, Capitol Technology University provides training in evidence-based instructional strategies for distance education. These training initiatives include instructional design methods based on **Keller's ARCS Motivational Model**, which focuses on improving student engagement, motivation, and satisfaction in online learning environments.

Faculty development activities emphasize:

• Designing engaging online learning experiences
• Incorporating multimedia and interactive course content
• Utilizing virtual laboratories and simulation tools for electronics and engineering courses
• Implementing assessment strategies that effectively measure student learning outcomes

Training sessions are recorded and archived so that faculty members may access them for reference and continuous improvement. These professional development initiatives ensure that faculty remain current with effective teaching practices and technological tools that support student success in both traditional and online learning environments.

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

Capitol Technology University provides comprehensive library resources to support the **B.S. in Aviation Avionics and Instrumentation** program. The Puente Library, the university's primary library facility, offers both physical and digital collections, research databases, and interlibrary loan services to ensure that students and faculty have access to the academic materials necessary for study and research in aviation technologies, electronics, and engineering.

Library Resources Available

• **Engineering and Technology Databases:**
The library subscribes to major scholarly databases including **IEEE Xplore, ScienceDirect, ProQuest, and EBSCOhost**, providing access to peer-reviewed journals, technical standards, research articles, and conference proceedings related to avionics systems, electronics engineering, embedded systems, aerospace technologies, and instrumentation systems.

• **E-books and Online Journals:**
Students have access to a large collection of electronic books and academic journals covering topics such as avionics systems, aircraft electrical systems, digital electronics, sensors and instrumentation, embedded systems, and aerospace engineering technologies.

• **Aviation and Aerospace Publications:**
The library provides access to industry and government publications related to aviation technologies, including technical reports, aerospace standards, and aviation system documentation that support coursework and research in avionics systems and aircraft instrumentation technologies.

• **Interlibrary Loan Services:**
Through partnerships with the **Maryland Digital Library (MDL)** and other academic institutions, students and faculty may request books, journal articles, and technical materials that are not available in the Puente Library's current collection.

• **Research Assistance and Instruction:**
Library staff provide research consultations, instructional workshops, and online research guides that support students in engineering and aviation technology programs. These services help students develop research skills and effectively use scholarly and technical resources.

Measures to Ensure Adequate Support

• The university conducts periodic reviews of library holdings to ensure that resources remain current and aligned with developments in aviation technologies, avionics systems, electronics engineering, and instrumentation technologies.

• Additional textbooks, technical manuals, and scholarly resources related to avionics systems, aircraft electronics, embedded systems, and aerospace technologies will be acquired as needed to support the program curriculum.

• Library staff will collaborate with program faculty to identify and obtain key academic and industry resources that support teaching, student research, and emerging developments in aviation technology.

• The university will continue expanding access to electronic journals, engineering databases, and digital research tools to ensure that both on-campus and remote students have access to essential academic resources.

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 instructional equipment are adequate to initiate the program.

The **B.S. in Aviation Avionics and Instrumentation** program will be implemented using the existing physical facilities, infrastructure, and instructional equipment available at Capitol Technology University.

The university maintains modern instructional facilities that support engineering, electronics, and technology programs, including classrooms, faculty offices, and specialized laboratories.

Capitol Technology University has the facilities necessary to support instruction in avionics systems, electronics, embedded systems, and instrumentation technologies. Existing laboratories and instructional equipment used in engineering and electronics courses will provide students with hands-on experience relevant to aviation electronics and avionics systems.

Instructional Facilities

• **Classrooms:**
The university provides modern lecture halls and technology-enabled classrooms equipped with audiovisual systems, computing resources, and digital presentation tools that support both traditional and hybrid instruction.

• **Faculty and Staff Offices:**
Adequate office space is available for faculty and administrative staff supporting the program. These facilities enable faculty to provide advising, mentoring, and academic support for students enrolled in the program.

• **Engineering and Electronics Laboratories:**
Students will have access to existing engineering laboratories used for instruction in circuits, electronics, digital systems, and embedded systems. These laboratories are equipped with instruments such as oscilloscopes, function generators, power supplies, microcontroller development platforms, and computer-based simulation tools used in engineering education.

Avionics and Instrumentation Learning Resources

• **Electronics and Embedded Systems Laboratories:**
These laboratories support coursework in electronics, digital systems, and microcontroller technologies that form the technical foundation for avionics systems and aircraft electronic instrumentation.

• **Simulation and Engineering Software:**
The program will incorporate industry-standard engineering software and simulation tools used for circuit analysis, signal processing, and system modeling to support the study of avionics and instrumentation systems.

• **Project and Design Facilities:**
Students will utilize engineering laboratories and project workspaces to complete laboratory experiments, electronics design exercises, and senior capstone projects involving aviation electronics and instrumentation systems.

Existing institutional facilities and laboratory resources are sufficient to support the launch of the program. No additional physical expansions are required at this time. The University President has confirmed that the current facilities, infrastructure, and instructional equipment are adequate to support the implementation of the B.S. in Aviation Avionics and Instrumentation program.

2. Provide assurance that students enrolled in and faculty teaching in distance education will have adequate access to:

a. An Institutional Electronic Mailing System

Capitol Technology University ensures that all students and faculty have access to a dedicated institutional electronic mailing system. This system is available across all learning modalities, including in-person, hybrid, and online courses.

• **Institutional Email Access:**
Each student and faculty member is assigned a university email address (e.g., xxxx@captechu.edu).

• **Microsoft Office 365 Integration:**
The university uses Microsoft Outlook through the Microsoft Office 365 platform to provide secure email communication, scheduling tools, and collaboration features.

• **Official Communication Channel:**
Institutional email is used for all official academic and administrative communication, ensuring reliable communication between students, faculty, and university offices.

These systems ensure that students and faculty participating in the Aviation Avionics and Instrumentation program can effectively communicate and access university resources regardless of their location.

b. A Learning Management System that Provides the Necessary Technological Support for Distance Education

Capitol Technology University utilizes **Canvas** as its Learning Management System (LMS), providing a robust platform for course delivery, collaboration, and assessment for both on-campus and distance learning students.

Canvas LMS Capabilities

Canvas is a cloud-based learning platform that provides students and faculty with tools for managing coursework, communication, and academic progress.

Course Management Tools

• Centralized access to course materials, lecture content, assignments, and assessments
• Secure gradebook and student progress tracking
• Online discussion forums that support collaborative learning

Interactive Learning Features

• Integration with video conferencing tools such as Zoom for virtual class sessions
• Multimedia submission tools for assignments, presentations, and projects
• Online collaboration tools that support group work and team-based projects

Mobile and Cloud-Based Accessibility

• Students and faculty may access Canvas through laptops, tablets, or mobile devices
• Course materials can be downloaded for offline viewing when needed

Analytics and Assessment Tools

• Tools for monitoring student engagement and academic progress
• Automated grading and feedback capabilities that support efficient course management

Integration with Engineering and Technology Instruction

Canvas will support the delivery of course materials, laboratory documentation, simulation resources, and project instructions used in the Aviation Avionics and Instrumentation program. The platform enables students to access course content, communicate with instructors, and submit assignments regardless of location.

Capitol Technology University has used Canvas for several years as its primary learning management system, and it has proven to be an effective platform for supporting both traditional and distance education programs. The system provides the technological infrastructure necessary to support the academic and technical requirements of the proposed program.

L. Adequacy of Financial Resources with Documentation

(as outlined in COMAR 13B.02.03.14)

1. Table 1: Resources

Finance data for the first five years of program implementation are presented below. Figures are provided for each year and totaled by category.

TABLE 1: RESOURCES

Resource Categories	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**
1. Reallocated Funds	$0	$0	$0	$0	$0
2. Tuition/Fee Revenue (c + g below)	$445,355	$1,068,083	$1,530,659	$2,266,955	$2,600,475
a. Number of F/T Students	13	31	43	61	69
b. Annual Tuition/Fee Rate	$26,003	$26,393	$26,789	$27,191	$27,871
c. Total F/T Revenue (a × b)	$338,039	$818,183	$1,151,927	$1,658,651	$1,923,099
d. Number of P/T Students	11	25	37	58	63
e. Credit Hour Rate	$813	$833	$853	$874	$896
f. Annual Credit Hour	12	12	12	12	12
g. Total P/T Revenue (d × e × f)	$107,316	$249,900	$378,732	$608,304	$677,376
3. Grants, Contracts, and Other External Sources	$0	$0	$0	$0	$0
4. Other Sources	$0	$0	$0	$0	$0
TOTAL (Add 1–4)	**$445,355**	**$1,068,083**	**$1,530,659**	**$2,266,955**	**$2,600,475**

This proposal builds upon existing instructional capacity within the university's engineering and technology programs.

Narrative Rationale for Resource Categories

1. Reallocated Funds
The university does not anticipate reallocating institutional funds to support this program. Existing academic and laboratory resources currently available within engineering and technology programs will support program implementation.

2. Tuition and Fee Revenue
The primary source of revenue for the B.S. in Aviation Avionics and Instrumentation program will be tuition and fee income generated from student enrollment. Tuition projections include an estimated annual tuition increase of approximately **2.5 percent**, and enrollment projections incorporate an estimated **20 percent attrition rate** across the five-year period.

3. Grants and Contracts
At present, the program is not dependent on external grants or contracts for initial implementation. However, the university may pursue future grant opportunities related to aviation technologies, engineering education, and STEM workforce development.

4. Other Sources
No additional funding sources are currently identified. The program is expected to operate primarily through tuition-generated revenue.

5. Total Resources
The projected revenue generated from student enrollment is expected to adequately support the program's operational expenses during the first five years.

2. Table 2: Program Expenditures

Financial projections for program expenditures over the first five years are presented below.

TABLE 2: EXPENDITURES

Expenditure Category	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**
1. Faculty (b + c below)	$32,670	$58,960	$69,067	$106,193	$145,133
a. Number of FTE	2	3.5	4	6	8
b. Total Salary	$27,392	$49,133	$57,556	$88,494	$120,944
c. Total Benefits (20% of salaries)	$5,278	$9,827	$11,511	$17,699	$24,189
2. Admin Staff (b + c below)	$4,798	$5,090	$5,243	$5,374	$5,508
a. Number of FTE	0.07	0.07	0.07	0.07	0.07
b. Total Salary	$4,084	$4,207	$4,333	$4,441	$4,552
c. Total Benefits	$858	$883	$910	$933	$956
3. Support Staff (b + c below)	$57,475	$88,369	$114,950	$120,770	$185,676
a. Number of FTE	1.00	1.5	1.75	2	3
b. Total Salary	$47,500	$73,032	$83,125	$99,810	$153,450
c. Total Benefits	$9,975	$15,337	$16,625	$20,960	$32,226
4. Technical Support and Equipment	$1,440	$3,640	$5,600	$8,925	$10,560

5. Library	$0	$0	$0	$0	$0
6. New or Renovated Space	$0	$0	$0	$0	$0
7. Other Expenses	$43,848	$105,392	$155,040	$237,524	$271,392
TOTAL (Add 1–7)	**$140,231**	**$261,451**	**$349,900**	**$478,786**	**$618,269**

Narrative Rationale for Expenditure Categories

a. Faculty
Faculty costs reflect the instructional effort required to support the program's curriculum. These costs include salaries and benefits for faculty members teaching courses in electronics, avionics systems, embedded systems, computing, and aviation technologies. Instruction will be supported by a combination of existing full-time faculty and adjunct faculty as needed.

b. Administrative Staff
Existing administrative personnel will provide program support, including scheduling, student services coordination, and academic program administration. No additional administrative positions are required for program implementation.

c. Support Staff
Support staff will assist with laboratory operations, student services, and program administration. As student enrollment increases, additional support staff may be required to assist with laboratory coordination and student advising.

d. Technical Support and Equipment
Funding is allocated for technical resources required to support laboratory instruction and course delivery. These may include:

• Engineering and simulation software used in electronics and avionics coursework
• Laboratory equipment maintenance and upgrades
• Learning management system licensing costs, estimated at approximately **$60 per student in Year 1**, increasing by **$5 per student annually**

e. Library
The university's existing library resources adequately support the program's instructional needs. Additional resources may be added as needed through the university's ongoing library acquisition process.

f. New or Renovated Space
No new or renovated facilities are required. Existing classrooms, engineering laboratories, and instructional spaces are sufficient to support the program.

g. Other Expenses
Additional funds are allocated for program-related expenses including:

• instructional materials and office supplies
• faculty professional development and travel
• course development and curriculum enhancement
• marketing and recruitment activities
• student scholarships and outreach initiatives

These expenditures will support program visibility, faculty development, and student recruitment efforts during the program's early years.

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 Capitol Technology University consists of a structured series of evaluation activities conducted throughout the academic year. The University Assessment Team collects and stores assessment results within the Canvas Learning Management System (LMS) for analysis and inclusion in annual institutional reports, accreditation documentation, and curriculum improvement initiatives. The Assessment Team reviews results, develops action plans, and monitors their implementation to ensure the continuous improvement of the B.S. in Aviation Avionics and Instrumentation program.

Academic Year Assessment Events

Fall Semester

• During the August Faculty Retreat, faculty review student learning challenges and propose strategies for improving instructional effectiveness. These discussions are communicated to the Academic Deans for review and action planning.

• Faculty submit performance plans aligned with the university's mission and academic goals. These plans are reviewed and approved by the Academic Deans.

• Department Chairs and Academic Deans evaluate data from the Graduating Student Survey to assess student satisfaction and program effectiveness.

• Internship and experiential learning evaluations are reviewed to assess the performance of students participating in aviation technology, avionics, and engineering-related internships.

• Grade distribution reports from the spring and summer semesters are analyzed to identify academic performance trends.

• Course evaluations from the summer semester are reviewed to identify opportunities for instructional improvement.

• Industrial Advisory Board meetings are conducted to review curriculum relevance and incorporate feedback from industry partners involved in avionics systems, aerospace technologies, and aviation electronics.

Note: A full curriculum review occurs every two years. Minor curriculum changes require Academic Dean approval, while major curriculum revisions require approval by the Executive Council.

• Student Town Hall meetings provide additional feedback regarding student experiences and opportunities for curriculum improvement.

• Employer interviews conducted during Career Fairs provide insight into industry expectations for graduates with avionics and aviation electronics expertise.

• Post-residency reviews are conducted to monitor student progress and adjust instructional strategies when needed.

Spring Semester

• Faculty Performance Plans are reviewed and adjusted as necessary.

• Grade distribution reports from the fall semester are analyzed to identify trends in student academic achievement.

• Graduating Student Survey data are evaluated to assess student learning outcomes and program effectiveness.

• Course evaluations from the fall and spring semesters are analyzed before the summer academic term begins.

• Department Chairs and Academic Deans review the content of student, alumni, and employer surveys to refine program evaluation tools.

• The Annual Faculty Summit held in May is used to review academic challenges and develop improvement strategies.

• Employer interviews at Career Fairs continue to provide industry feedback regarding avionics and aviation technology workforce needs.

• Industrial Advisory Board meetings continue to refine curriculum content and ensure alignment with current avionics technologies and industry expectations.

In addition to these formal assessment activities, Academic Deans and Department Chairs meet regularly to discuss student progress, faculty concerns, and instructional improvements.

The Faculty Senate meets monthly from August through April to discuss issues affecting student learning and academic outcomes. Recommendations from the Faculty Senate are reviewed by Academic Deans, who determine whether adjustments to curriculum, teaching methods, or faculty resources are required.

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

The B.S. in Aviation Avionics and Instrumentation program will evaluate student learning through multiple assessment methods, including:

• Capstone design projects, laboratory experiments, and technical examinations that measure students' understanding of avionics systems, electronics, and instrumentation technologies.

• Project-based assessments that evaluate students' ability to design, analyze, and troubleshoot electronic and avionics systems.

• Industry-informed assessment rubrics developed in collaboration with faculty and advisory board members to ensure alignment with current aviation and avionics industry practices.

• Assessment procedures aligned with the accreditation standards of the Middle States Commission on Higher Education (MSCHE), particularly **Standard V: Educational Effectiveness Assessment**.

These assessment strategies ensure that graduates demonstrate both theoretical knowledge and practical skills in avionics systems, aircraft electronics, embedded systems, and instrumentation technologies.

Student Retention

Capitol Technology University maintains a structured student retention framework under the Vice President for Student Engagement to support student success.

Retention strategies include:

• **Canvas Drop-Out Detective System:** The learning management system includes an early alert feature that identifies students who may be at risk academically.

• **Academic Advising:** Advisors contact students who demonstrate academic difficulties and work with them to develop improvement strategies.

• **Semester Advising Meetings:** Students meet with their academic advisors each semester to review academic progress and discuss career pathways.

• **Administrative Oversight:** The Vice President for Student Engagement and Academic Deans regularly review retention data to identify trends and implement support strategies.

• **Student Support Mechanisms:** Faculty mentorship, advising sessions, and student feedback surveys help ensure students receive appropriate academic and professional support.

Student and Faculty Satisfaction

Student and faculty feedback is an essential component of program evaluation.

• Students complete online course evaluations at the end of each semester to provide feedback regarding course content, instructional effectiveness, and learning experiences.

• Faculty conduct periodic self-assessments and participate in performance reviews to support continuous instructional improvement.

• Department Chairs and Academic Deans review course evaluation results and faculty performance data to identify opportunities for program improvement.

• Curriculum revisions and instructional improvements are implemented when necessary based on evaluation results.

• Major program changes are reviewed by the Academic Deans and, when appropriate, require approval from the Executive Council.

Evaluation Cycle

The university follows a continuous evaluation cycle to ensure program improvement:

1. Faculty submit course reflections and improvement recommendations.
2. Department Chairs and Academic Deans review faculty performance and instructional outcomes.
3. Student course evaluations are analyzed to identify opportunities for curriculum improvement.
4. Subsequent evaluations determine whether implemented improvements have improved student learning outcomes.

This continuous assessment process supports ongoing academic quality and student success.

Cost-Effectiveness

The financial sustainability of the program will be monitored through a structured budget and evaluation process.

• **Annual Budget Review:** Academic Deans prepare annual academic budgets based on enrollment trends, instructional needs, and program growth.

• **Resource Allocation:** Budget increases are aligned with instructional needs such as laboratory upgrades, avionics simulation tools, and faculty professional development.

• **Financial Oversight:** The Vice President of Finance and Administration monitors program financial performance and operational sustainability.

• **Institutional Review:** The Executive Council and Board of Trustees review financial and enrollment data annually to ensure the program remains cost-effective and aligned with institutional priorities.

N. Consistency with the State's Minority Student Achievement Goals

(as outlined in COMAR 13B.02.03.05 and in the State Plan for Postsecondary Education)

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

Capitol Technology University is a majority-minority institution that is strongly committed to promoting diversity, equity, and inclusion across all academic programs. The University actively works to increase access and success for students from underrepresented minority groups, particularly in STEM-related fields such as engineering, aviation technology, and electronics systems.

The proposed **B.S. in Aviation Avionics and Instrumentation** program supports these goals by providing minority students with access to high-demand career pathways in aviation technology, avionics systems, and aerospace electronics. These technical fields have historically experienced limited representation among minority populations, and the program is designed to help expand opportunities for diverse student populations to enter and succeed in these careers.

The University will actively recruit minority students, including African American, Hispanic, and female students, to increase diversity within the aviation technology and avionics workforce. Recruitment and outreach strategies include:

• Targeted outreach to minority-serving institutions and Historically Black Colleges and Universities (HBCUs).
• Partnerships with local high schools and STEM education initiatives that serve students from underrepresented communities.
• Scholarships and financial aid opportunities for minority and economically disadvantaged students pursuing careers in aviation technology and engineering fields.
• Collaboration with industry partners to provide internship opportunities, mentorship programs, and career pathways for minority students interested in avionics and aviation technologies.

Capitol Technology University also promotes cultural diversity and inclusion within the academic environment. The Aviation Avionics and Instrumentation program will support these institutional priorities by:

• Integrating diverse perspectives and real-world case studies into aviation technology and engineering coursework.
• Providing academic advising, tutoring, and career development support designed to promote minority student success.
• Encouraging student participation in professional organizations and networking opportunities that support diversity in engineering and aviation technology fields.

Through these initiatives, the program contributes to the State of Maryland's goals of expanding minority participation in STEM education and strengthening access to high-demand career pathways for students from diverse backgrounds.

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.

The proposed **B.S. in Aviation Avionics and Instrumentation** program is not associated with any low productivity programs identified by the Maryland Higher Education Commission. The program is designed to address a growing industry demand for professionals with expertise in avionics systems, aviation electronics, and aircraft instrumentation technologies.

The program aligns with Capitol Technology University's strategic priorities to expand workforce-oriented degree programs in engineering, aviation technology, and applied STEM disciplines. Existing institutional resources—including faculty expertise, laboratories, library resources, and instructional

infrastructure—are sufficient to support the program without the need to reallocate resources from low productivity programs.

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 delivering high-quality online and hybrid educational programs. Capitol Technology University is regionally accredited by the Middle States Commission on Higher Education (MSCHE) and holds specialized program accreditations and recognitions including accreditation by the Accreditation Board for Engineering and Technology (ABET) and the International Accreditation Council for Business Education (IACBE). The university also maintains affiliations with national organizations including the National Security Agency (NSA) and the Department of Homeland Security (DHS).

These accrediting organizations have reviewed and approved the university's distance education activities as part of their accreditation processes. Capitol Technology University remains in good standing with all of its accrediting bodies and is authorized to offer academic programs through online and hybrid delivery modalities.

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 maintains a strong record of delivering high-quality distance education in compliance with the **Council of Regional Accrediting Commissions (C-RAC) Interregional Guidelines for the Evaluation of Distance Education**. The university will continue to adhere to these guidelines in the delivery of the **B.S. in Aviation Avionics and Instrumentation** program.

Council of Regional Accrediting Commissions (C-RAC) Interregional Guidelines

1. Online learning is appropriate to the institution's mission and purposes.
Online learning aligns with Capitol Technology University's mission of providing accessible, career-focused STEM education. The university has extensive experience delivering engineering and technology programs through hybrid and online modalities.

2. The institution's plans for developing, sustaining, and expanding online learning offerings are integrated into its regular planning and evaluation processes.
All academic programs at Capitol Technology University—including on-campus, hybrid, and online programs—are subject to the same planning, evaluation, and assessment processes described in Section M of this proposal.

3. Online learning is incorporated into the institution's systems of governance and academic oversight.
Online programs follow the same governance and academic oversight structures as traditional programs.

Curriculum development, review, and approval follow established university procedures through faculty committees, academic leadership, and institutional governance processes.

4. Curricula for the institution's online learning offerings are coherent, cohesive, and comparable in academic rigor to programs offered in traditional formats.
Online courses meet the same accreditation standards, educational objectives, and student learning outcomes as in-person courses. Capitol Technology University follows **Quality Matters (QM)** research-based standards in the development of online courses to ensure academic rigor and instructional quality.

The curriculum undergoes periodic review by Academic Deans, Department Chairs, faculty, and Industry Advisory Boards to ensure continued alignment with academic standards and industry expectations.

5. The institution evaluates the effectiveness of its online learning offerings.
Online courses and programs undergo the same evaluation processes used for traditional courses. Academic Deans and faculty conduct ongoing assessments to ensure:

• course content aligns with program objectives
• students achieve expected learning outcomes
• instructional technologies support effective learning

6. Faculty responsible for delivering online courses are appropriately qualified and supported.
Faculty teaching in the Aviation Avionics and Instrumentation program possess appropriate academic credentials and professional expertise in electronics, avionics systems, aviation technology, and engineering. Faculty members teaching online courses receive training and support in online instruction.

The university provides:

• faculty workshops on best practices in online teaching
• mentoring programs for new online instructors
• regular faculty performance evaluations and student feedback reviews

7. The institution provides effective student and academic services to support online learners.
Students enrolled in online courses have access to a wide range of academic and support services, including:

• technical support for online learning platforms
• virtual tutoring and academic support services
• digital library resources and research databases
• virtual faculty office hours
• academic advising and career services

The Canvas Learning Management System serves as the central platform through which students access course materials, communicate with instructors, submit assignments, and participate in online discussions.

8. The institution provides sufficient resources to support and expand online learning offerings.
Capitol Technology University continues to invest in technological infrastructure, instructional design support, and faculty development to maintain and expand its online education capabilities. Financial planning for the program is described in Section L.

9. The institution assures the integrity of its online offerings.
The university maintains strong policies and technological systems to ensure academic integrity in online courses. These include:

- secure student authentication procedures
- plagiarism detection tools integrated within the learning management system
- secure online assessment and proctoring solutions

Faculty monitor student progress closely and provide timely feedback to ensure meaningful engagement and academic accountability.

All distance education programs are subject to ongoing evaluation and accreditation review by the Middle States Commission on Higher Education. Assessment results are documented and reported to university leadership to ensure continuous improvement and compliance with accreditation standards.